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Do Gender and Race Play a Role in the Compensation of University Presidents? Evidence from Institution-level Panel Data*

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Abstract

This study updates and extends prior economics research on the compensation of college and university presidents by examining a 13-year panel containing data on the total compensation packages of private college and university presidents in the U.S. Our econometric approach is the first to include president-level information on both gender and race in order to draw inferences about both the male-female and white-black pay gaps (favoring males and whites, respectively) in higher education administration. Results from both OLS and fixed-effects estimations suggest that white female presidents are paid significantly less than their white male counterparts, although this difference, which ranges from six to 9.8 per cent, is sensitive to the racial makeup of the student body of the institution to which a president is affiliated. Secondarily, we also find that non-white male presidents earn more than their white male counterparts. This gap is also sensitive, although to a lesser degree, to the racial makeup of the student body of the institution to which a president is affiliated.

Keywords: executive compensation; gender discrimination; racial discrimination; higher education
JEL Codes: J30, J31, J33, J71

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1. Introduction and background

The economics literature on both gender and racial discrimination in university faculty salaries dates back to, and grew rapidly during, the 1970s and 1980s (e.g., Katz, 1973; Gordon, Morton and Braden, 1974; Hoffman, 1976; Koch and Chizmar, 1976; Hirsch and Leppel, 1982; Barbezat, 1987; Raymond, Sesnowitz and Williams, 1988). These early studies offered mixed conclusions, with, for example, Gordon et al. (1974), Hoffman (1976) and Barbezat (1987) presenting evidence of a male-female salary differential (favoring males) ranging from 7.4 per cent to 23 per cent, while Hoffman (1976), Hirsch and Leppel (1982) and Raymond, Sesnowitz and Williams (1988) find little or no evidence of male-female salary differences (gender discrimination).[1] Similarly, studies by Ashraf (1996b) and Ashraf and Shabbir (2006) find some evidence of a white-black differential (favoring whites) in faculty salaries, while Hoffman (1976) and Gordon et al. (1974) both find evidence of a black-white faculty salary difference.[2] This research stream also continued beyond the 1980s (e.g., Barbezat, 1991; Lindley, Fish and Jackson, 1992; Lillydahl and Singell, 1993; Ashraf, 1996a and 1996b; McNabb and Wass, 1997; Toutkoushian, 1998; Ward, 2001; Ashraf and Shabbir, 2006), finding, as before, quite mixed results. In recent years, economists working in this genre turned more toward an examination of gender differences in practices related to tenure, promotion and the awarding of named professorships (e.g., Ginther and Hayes, 2003; Mixon and Treviño, 2005a; Gomez-Mejia, Treviño and Mixon, 2009; Sabatier, 2010; Cooray, Verma and Wright, 2014; Treviño, Gomez-Mejia, Balkin and Mixon, 2018).[3] Together, these studies find a male advantage in the attainment of tenure, promotion and receipt of named professorships.[4]

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1 Katz (1973) examines personal interview data from a large, prestigious public university. He finds that female faculty earn $2,410 less, on average, than their male counterparts in 1969. Barbezat (1987) analyzes a national cross section of faculty surveys from 1968, 1975 and 1977, and finds that while male faculty salaries exceed those of their female counterparts, the per centage differential between male and female salaries (favoring males) fell from 23 per cent in 1968 to 19 per cent in 1977. This result is supported in the general study by Ashraf (1996a), who finds that the male-female salary gap (favoring males) in the *Panel Study of Income Dynamics* also narrowed between 1968 and 1989. On the other hand, Koch and Chizmar (1976) examine peer evaluations of faculty productivity and reported salaries at Illinois State University and find that the male-female salary gap (favoring males) that existed before affirmative action legislation/regulation was erased by that legislation/regulation, resulting in a female-male salary gap (favoring females) in academe.

2 The white-black salary differential (favoring whites) estimated from five micro datasets in Ashraf (1996b) is reported to be diminishing over the period 1969-1989. Using data from the *1993 National Study of Postsecondary Faculty*, Ashraf and Shabbir (2006) report that the white-black salary differential (favoring whites) exists at both the associate and full professor ranks, while a black-white differential (favoring blacks) exists at the rank of assistant professor. Lastly, the black-white difference estimated in Gordon et al. (1974), which is based on individual data from a large urban university, is 13 per cent.

3 Ginther and Hayes (2003) use data from the *Survey of Doctorate Recipients*, while Sabatier (2010) employs data on French female researchers from the *National Institute for Agricultural Research* database. Mixon and Treviño (2005a) examine economics faculty employment data from public and private universities in the U.S. South, while Gomez-Mejia et al. (2009) and Treviño et al. (2018) employ management faculty employment data from public and private universities across the U.S.

4 The most recent of these studies by Treviño et al. (2018) finds, for example, that female management faculty face a probability of holding a named (endowed) professorship that is 16 percentage points less than that faced by their male management faculty counterparts.

Interestingly, although there is a stream of economics research, albeit relatively small, examining the determinants of executive compensation in the academy (e.g., Sorokina, 2003; O'Connell, 2005; Monks, 2007), there is only one study of which we are aware that explores potential gender discrimination in the compensation of college and university presidents. In that particular study, Monks and McGoldrick (2004) examine the earnings of the five highest-ranking executives across private colleges and universities in the U.S. Using a three-year panel taken from the *Chronicle of Higher Education*, OLS estimates suggest that female administrators earn 13 per cent less than their male counterparts. Of this gap, Monks and McGoldrick (2004) estimate that 10.4 percentage points are attributable to institutional and occupational differences between the male and female executives in the sample, while only 2.6 percentage points (of the gap) are attributable to gender discrimination in compensation.

This paper both updates and extends the Monks and McGoldrick (2004) study by examining a 13-year panel containing data on the total compensation packages of private college and university presidents in the U.S.[5] In updating the study by Monks and McGoldrick (2004), our econometric model contains president-level information on gender that is interacted with both race and institution type in order to draw inferences about the male-female pay gap (favoring males) in higher education administration. Our extension of Monks and McGoldrick involves the inclusion of president-level information on race, which has not heretofore been included in economics studies examining the compensation of college and university presidents. In doing so, this variable (information) is also interacted with both gender and institution type in order to draw inferences about the male-female pay gap (favoring males) in higher education administration. Results from both OLS and fixed-effects estimations suggest that white female presidents are paid significantly *less* than their white male counterparts, although this difference, which ranges from six to 9.8 per cent, is sensitive to the racial makeup of the student body of the institution to which a president is affiliated. Secondarily, we also find that non-white male presidents earn *more* than their white male counterparts. This gap (favoring non-white males) is also sensitive, although to a lesser degree, to the racial makeup of the student body of the institution to which a president is affiliated.

Lastly, it is also worth noting that this analysis extends the literature on gender disparities in executive pay in the broader labor market. For example, in their examination of executive salaries in top U.S. corporations (over the period 1992-1997), Bertrand and Hallock (2001) find a gender pay gap (favoring males) of 45 per cent, about three-fourths of which is attributable to differences in firm size. In their analysis of executive salaries at large U.S. corporations (0ver the period 1992-2004), Adams, Gupta, Haughton and Leeth (2007) find that, although CEO pay is similar across genders, a gender gap (favoring males) of 16 per cent exists for executives

5 In the U.S., an institution's president is its chief executive officer and plays a role similar to that of vice-chancellor in Australian universities. A president's key responsibilities typically involve strategic planning, financial management, and fundraising. University presidents are typically selected on the basis of parameters established for a national (or international) search process, and their compensation is usually determined through negotiation with the institution's governing authority (e.g., a board of trustees).

below the level CEO in the corporate hierarchy. On the other hand, Vieito and Khan's (2012) study of salaries of CEOs of S&P 1500 listed firms (over the period 1992-2004) finds a narrowing gender gap (favoring males) in pay across time period, while research using a large panel dataset by Gayle, Golan and Miller (2012) finds that, after controlling for background characteristics and rank, women are actually paid more than men, although they attribute the gender gap (favoring women) to higher attrition rates among women. In any event, drawing the link between these studies and the current one is useful in explaining why, given that the decisions of executives in any organization carry significant weight, gender equality among executives matters.

The remainder of this paper is organized into five sections. The next section describes the econometric model, along with the hypotheses tested, while the following section describes the data and variables used in the regression analysis. Section 4 presents the various econometrics results, while the remaining section offers some concluding comments.

2. Framing the hypotheses

Following the previous literature on gender and race gaps in faculty salaries, as well as the Monks and McGoldrick (2004) study of the male-female gap (favoring males) in the compensation of college and university presidents in the U.S., the following statistical equation is employed in this study,

$$\ln TotComp = \alpha + \sum_{j=1}^{k} \beta_j P_j + \sum_{l=1}^{m} \delta_l I_l + \varepsilon \quad , \tag{1}$$

where ln*TotComp* is the natural log of total compensation. Total compensation includes a university president's base pay, bonus pay, deferred compensation (including vested deferred compensation), nontaxable benefits and other pay.[6]

As specified in (1), a university executive's total compensation is a function of two vectors. The first of these, P_j, is a vector of k personal characteristics variables, j, for each university president included in our study. Included in this vector are the variables *Male*, *Female*, *White* and *NonWhite*. The first two of these variables control for the gender of the university president, where *Male* is a dummy variable equal to 1 if the university president is male, and 0 otherwise. The second variable, *Female*, is a dummy variable equal to 1 if the university president is female, and 0 otherwise. With *Male* omitted from the econometric specification, a negative coefficient estimate attached to *Female* would be consistent with gender discrimination in terms of the compensation of university presidents, as in the case of the gender pay gap literature discussed earlier.

6 http://www.chronicle.com/article/Executive-Compensation-at/143541/#id=table.

Next, the variables controlling for race are *White* and *NonWhite,* where *White* is a dummy variable equal to 1 if the university president is white, and 0 otherwise. The second of these two, *NonWhite*, is a dummy variable equal to 1 if the university president is non-white, and 0 otherwise.[7] As before, with *White* omitted from the econometric specification, a negative coefficient estimate attached to *NonWhite* would be consistent with race discrimination in terms of the compensation of university presidents. Interaction of these four dummy variables allows us to capture finer details about each university president. For example, *White × Male* captures university presidents who are classified as white males, while *NonWhite × Male* accounts for university presidents who are classified as non-white males. Similarly, *White × Female* captures university presidents who are classified as white females, while *NonWhite × Female* accounts for university presidents who are classified as non-white females. In our empirical tests, these finer descriptions are substituted for the broader identifications described earlier, with *White × Male* serving as the omitted category.

The second vector in (1) above, I_l, is a vector of m institutional characteristics variables, l, for each private university included in our study. The first regressor in this vector is *MinorityInst*, which is a dummy variable equal to 1 if the total undergraduate enrollment of the university is, during a given year, at least 51 per cent non-white, and 0 otherwise. This variable and its counterpart, *NonMinorityInst*, are interacted with the gender-race interaction terms in the first vector in order to more finely parse the role that gender/race and institutional structure plays in presidential compensation at private universities.[8]

The next five variables included in this vector are the variables ln*UGEnrollment*, *RatioBlack*, *RatioNative*, *RatioHispanic* and *RatioAsian*. The first of these, ln*UGEnrollment*, is equal to the logarithm of total undergraduate enrollment of each institution in the sample during each year. It is expected that presidents of larger universities will receive higher levels of total compensation. Next, a series of variables captures the proportion of the total undergraduate enrollment of each institution in the sample during each year that is accounted for by blacks, Native Americans, Hispanics, and Asians. These variables are included in order to capture any existing discount or boost present in the compensation of college and university presidents that may be a result of differences in the student body structure of these same institutions. As such, no *a priori* relationship regarding these variables and the dependent variable, ln*TotComp*, is provided.

7 Determination of race was made solely on the basis of photographs available on college and university websites. Where no photograph was available, and where race was uncertain, the observation was dropped from the sample. The vast majority of presidents coded as NonWhite in our sample are black. Lastly, although it is possible that mixed race (or even Asian or Hispanic individuals) are coded as white, the American College President Study 2017, which is published by the American Council on Education, states that only one per cent of private college presidents report being biracial. Thus, any potential miscoding of NonWhite should not impact the reliability of our results.

8 The interaction terms created by this secondary interaction are (1) *NonWhite × Male × MinorityInst*, (2) *White × Male × MinorityInst*, (3) *NonWhite × Female × MinorityInst*, (4) *White × Female × MinorityInst*, (5) *NonWhite × Male × NonMinorityInst*, (6) *NonWhite × Female × NonMinorityInst*, and (7) *White × Female × NonMinorityInst*.

Next, a series of dummy variables capturing the level at which the institutions in the sample compete in terms of intercollegiate sports is also included in (1) above. This series includes *Division1*, *Division2*, *Division3*, *DivisionOther* and *DivisionNL*. The first of these is a dummy variable equal to 1 if the university participates in NCAA athletics at the Division 1 level, and 0 otherwise. Given the vast literature in economics purporting that the presence (and success of) big-time intercollegiate sports results in higher SAT scores for incoming students and higher retention and graduation rates for current students (e.g., Mixon and Treviño, 2005b; Pope and Pope, 2009; Pope and Pope, 2014; Anderson, 2017), one would expect higher compensation of presidents at institutions offering Division 1 sports.

Additional sports variables include Division2 and Division3, which are dummy variables equal to 1 if the university participates in NCAA athletics at the Division 2 level and the Division 3 level, respectively, and 0 otherwise. The remaining two sports variables are *DivisionOther* and *DivisionNL*. The first of these is a dummy variable equal to 1 if the university participates in intercollegiate athletics at a level other than Division 1, Division 2 or Division 3, and 0 otherwise. The latter is a dummy variable equal to 1 if the level at which a university participates in sports is not listed in *Peterson's*, and 0 otherwise. Institutions participating in intercollegiate sports at the Division 1 level build greater alumni affinity, a result that has been found to increase alumni donations (Anderson, 2017), even for selective liberal arts institutions (Holmes, 2009). With *Division1* serving as the omitted category, it is expected that the estimated coefficients for the other athletics variables described above will be negative and, perhaps, exhibit a decreasing trend (cascade).

The penultimate series of regressors in the second vector of (1) above captures information about the geographical setting, wealth, and age of each institution in the sample. Included in this series are *Urban*, *Suburban*, *SmallTown*, and *Rural*. The first of these, *Urban*, is a dummy variable equal to 1 if the university resides in an urban setting, and 0 otherwise. Next, *Suburban* (*SmallTown*) is a dummy variable equal to 1 if the university resides in a suburban (small town) setting, and 0 otherwise. Lastly, *Rural* is a dummy variable equal to 1 if the university resides in a rural setting, and 0 otherwise. The local alumni base will be larger for universities located in urban and suburban settings, thus generating more support locally for research and other endeavors of universities located in urban and suburban areas. Urban and suburban areas are also home to large companies and government agencies, which provide financial support for research and related efforts of higher education institutions. Where support for research and related endeavors of universities is greater, executive compensation will also likely exceed that of institutions located in rural areas and small towns. Thus, it is likely that presidential compensation will be greatest in urban and suburban settings. With *Rural* serving as the omitted variable, we expect that both *Urban* and *Suburban* will retain positively signed coefficient estimates.

Also included in this penultimate series are ln*Endowment* and *UnivAge*. The first of these, which is equal to the logarithm of each institution's endowment, captures the wealth of each university in the sample. Given that the financial prospects of an institution will have some impact of the compensation of its top-level executives, it is expected that ln*Endowment* will retain a positively signed coefficient estimate.

Next, various structural, institutional and cultural biases could give rise discriminatory outcomes in terms of the compensation of university presidents. These may be attributed to historical or traditional norms that are observed in U.S. universities, and that signal that the process of negotiating compensation packages is a subjective outcome. To investigate these aspects of the process, the empirical analysis incorporates an additional explanatory variable, *UnivAge*, which captures the age of each institution in the sample. Given that *UnivAge* serves as a proxy for the role of historical traditions and cultural biases, its role in the compensation process is left to empirical exploration.

The final series of regressors in the second vector of (1) above is a dummy variable series capturing the year of the sample (i.e., *2000-Year*, *2001-Year*, etc.). The omitted variable in this series is *1998-Year*. As such, each of the included regressors in this series is expected to retain a positively signed coefficient estimate, as total presidential compensation is expected to rise over time. Lastly, the variables in this particular series will, perhaps, exhibit an increasing trend (cascade).

3. Data and empirical strategy

The panel data used in this study represent an unbalanced panel, given that the universities included in the panel do not always employ the same president each year. The selection of private colleges and universities is a natural fit given that they have more freedom than their public counterparts in setting establishing enrollment numbers and determining executive pay. As such, these institutions are more sensitive to market changes and often must compete aggressively with one another.[9] The private universities' presidential compensation data employed in this study cover the 1998-2010 time period and come from the *Chronicle of Higher Education*. As stated previously, Total compensation includes a university president's base pay, bonus pay, deferred compensation (including vested deferred compensation), nontaxable benefits and other pay.[10] Information on the presidents' gender and ethnicity was gathered by the authors from university websites. The variables related to race and gender are coded based on names and photographs of the private university presidents included in the sample.[11] The institutional data were collected from *Peterson's* Licensed Undergraduate Dataset.[12]

9 Interestingly, according to the *American College President Study 2017*, public universities are a bit more likely to hire females to fill presidential openings than are private universities. More specifically, 33 per cent of public universities in the U.S. have female presidents, compared to 27.3 per cent for private universities in the U.S. Moreover, 22.3 per cent of public universities employ non-white presidents, compared to 10.6 per cent for private universities. Given the advantages private institutions have in terms of the freedom to establish enrollment numbers and compensate executives, these statistics support the notion that there are gender and race patterns in the selection of university presidents with regard to the organizational domain (i.e., public vs. private).

10 The original sample included 6,869 observations over 13 years. Of these, 379 observations were lost due to lack of reporting by the *Chronicle of Higher Education* of presidential compensation, resulting in 6,490 observations.

11 In this case, 17 additional observations were lost due to an inability to determine the gender or race of the university president, resulting in 6,473 observations.

12 Among the institutional variables, 26 observations were lost due to a lack of information on total undergraduate enrollment, 307 observations were lost due to missing details on the race of undergraduate students, while an additional 563 observations were lost due to lack of information on university endowments. As a result, 5,577 observations were employed in our statistical analysis.

Summary statistics for the variables included in (1) above are presented in Table 1. As indicated there, total compensation of private college and university presidents is, on average, $380,897. Next, about 77.6 per cent of the private universities in the sample are led by white male presidents, while another 18.6 per cent (approximately) are led by white females. Much smaller percentages of institutions – about 2.3 per cent and 1.5 per cent – are led by led by non-white males and non-white females, respectively.[13] The typical private university in the sample enrolls about 2,697 students, while about 9.6 per cent of the observations in the sample are accounted for by institutions whose minority student enrollments reach or exceed 51 per cent of all undergraduate students enrolled.[14]

In terms of the institutional characteristics, the average institution has an undergraduate enrollment that is about 8.7 per cent black, 0.5 per cent Native American, 5.6 per cent Hispanic and 4.9 per cent Asian. Next, about 17.8 per cent (12.1 per cent) of the private institutions in the sample compete in intercollegiate athletics at the Division 1 (Division 2) level. An additional 47.2 per cent of the sample is accounted for by universities that compete at the Division 3 level, while another 18.5 per cent and 7.6 per cent of the panel are, respectively, accounted for by institutions competing at a level other than the prior three and by institutions whose intercollegiate sports activities is not categorized by *Peterson's*. Additionally, about 26.8 per cent (42.5 per cent) of the private universities in the panel reside in an urban (suburban) setting. Of the remaining institutions, 25.6 per cent reside in a small town setting, while 5.2 per cent are classified by *Peterson's* as rural setting universities. Lastly, the average university endowment exceeds $373 million, while the mean age of the universities sampled is about 122 years.

Table 2 presents presidential compensation by university size (by student enrollment) quartile. As indicated there, mean compensation at the low end of the distribution is $261,557, while it is $570,699 at the high end of the distribution. Mean presidential compensation in the middle quartiles is $319,827 and $370,856, respectively. These summary numbers support our contention that presidents of larger institutions (by student enrollment) receive larger total compensation packages than do their counterparts at smaller institutions. Next, Table 3 shows how presidential compensation varies by university setting (e.g., suburban, urban, etc.). As indicated there, presidents of universities located in rural areas earn an average of $291,026, while those affiliated with universities located in urban settings are paid an average of $455,183. Relatedly, presidents affiliated with universities located in small town and suburban settings are paid $309,377 and $388,116, respectively. These statistics support our contention that presidents of universities located in urban and suburban settings receive larger total compensation packages than those

13 These percentages indicate that the sample includes 4,325 white male presidents, 1,038 white female presidents, 128 non-white male presidents, and 86 non-white female presidents.

14 Given that the variable *MinorityInst* is based on the sum of the proportions of students from non-white backgrounds, it includes information that is also captured by the set of the proportions variables on enrollment characteristics. As such, we computed the simple correlations between *MinorityInst* and these variables. The simple correlations range from 0.03 to 0.49, indicating that there is a good deal of race variation within institution type.

received by presidents who are affiliated with universities that are located in rural and small town settings.[15]

Two specifications of (1) above are estimated by OLS. The first of these includes the broader gender and race interactions – *White × Female*, *NonWhite × Male* and *NonWhite × Female*. The second of these two specifications includes the more finely defined interactions – *NonWhite × Male × MinorityInst*, *White × Male × MinorityInst*, *NonWhite × Female × MinorityInst*, *White × Female × MinorityInst*, *NonWhite × Male × NonMinorityInst*, *NonWhite × Female × NonMinorityInst* and *White × Female × NonMinorityInst*.[16] Establishing these more refined interactions reveals that our sample includes 4,035 white male presidents of non-minority institutions, 915 white female presidents of non-minority institutions, 59 non-white male presidents of non-minority institutions, and 35 non-white female presidents of non-minority institutions. Additionally, our sample includes 290 white male presidents of minority institutions, 123 white female presidents of minority institutions, 69 non-white male presidents of minority institutions, and 51 non-white female presidents of minority institutions. Given the small number of observations in some of these categories, econometric results based on this second, more refined specification will exhibit more statistical noise, and therefore will be taken with greater caution.

Given the panel data set employed in this study, a fixed-effects approach is also used to test both of the specifications of (1) described here, wherein a fixed-effects variable, *i.id,* is included in order to control for differences between and within the institutions included in the sample (Wooldridge, 2010). Results from estimation of each of the four specifications described here are discussed in the section that follows. After this discussion, we offer concluding comments in the final section of the study.

4. Econometric results

Before turning to the econometric results presented in Table 4, it is helpful to establish the baseline effects of gender and race on pay by including a separate variable for gender and another for race. The first of these tasks is done by regressing the natural log of total presidential compensation on the control variables plus the gender dummy (*Female*). Although not shown in Table 4, the coefficient estimate of *Female* is negative and statistically significant, indicating that female presidents earn 8.7 per cent less than their male counterparts. This result sits in the middle of the estimated range (of 7 to 10 per cent) for the male faculty wage premium found in Toutkoushian (1998).[17] The second baseline is established by regressing the natural log of total presidential compensation on the control variables plus the race dummy (*NonWhite*). Although not shown in Table 4, the coefficient estimate of *NonWhite* is positive and statistically

15 Basic regressions indicate that larger universities provide significantly greater (at the .01 level) presidential compensation packages than smaller ones, and that universities located in small towns, suburban and urban areas provide compensation packages to presidents that significantly exceed (at the .10, .01 and .01 level, respectively) those provided to their counterparts at rural universities. In this latter case concerning university setting, the parameter estimates increase monotonically.

16 The omitted variable from this series is *White × Male × NonMinorityInst*.

17 The other OLS results in this case are similar to those presented in Table 4. As such, discussion of these is reserved for our presentation of the OLS results in Table 4.

significant, indicating that non-white presidents earn 7.1 per cent more than their white counterparts. However, this result is due entirely to the presence of an outlier in the sample. When removed, the estimate of *NonWhite* is no longer significant, suggesting that white and non-white presidents are compensated in a similar fashion.[18] The other OLS results are very similar to those found above, and discussed later in this section.

The results of OLS estimation of the more refined (1) above are included in columns 2 and 3 of Table 4. The first set of results comes from a model that regresses the natural log of total presidential compensation on the control variables plus three interaction terms – *NonWhite × Male, NonWhite × Female, and White × Female*. This regression produces an R^2 of 0.393, while eight of the primary coefficient estimates are significant at the 0.10 level or better. First, the coefficient estimate for *White × Female* is negative and statistically significant, indicating that white female presidents of private universities earn 9.8 per cent less per year than their white male counterparts. This result is also consistent with that found in the earlier study of the compensation of university presidents by Monks and McGoldrick (2004). Interestingly, non-white female presidents are compensated at level that is comparable to their white male counterparts, as are private university presidents who are non-white males.

The second set of OLS results comes from a model that regresses the natural log of total presidential compensation on the control variables plus the seven more refined interaction terms discussed above. This regression produces an R^2 of 0.395, while 10 of the primary coefficient estimates are significant at the 0.10 level or better. In this case, white female presidents of private universities whose student bodies consist mostly of non-white students receive 19 per cent less in total compensation than their white male counterparts at private universities whose student bodies consist mostly of white students. When white female presidents are compared to their male counterparts at similar institutions (i.e., private universities whose student bodies consist mostly white students), the male-female difference in total compensation falls to nine per cent. Interestingly, the total compensation of white male presidents at mostly non-white institutions is one per cent above that of their white male counterparts who lead mostly white institutions, although this difference is not statistically significant. Thus, although gender appears to matter, the institutional structure also plays a role in the determination of executive compensation. Lastly, the results also suggest that non-white female presidents of mostly white institutions are the highest paid executives, although this result is driven entirely by an outlier in the sample.[19]

18 When this outlier is omitted before conducting the prior regression, the coefficient estimate for *Female* is again negative and significant, indicating in this case that female presidents earn 9.8 per cent less than their male counterparts.

19 When this outlier is omitted from the sample, this variable, *NonWhite × Female × NonMinorityInst*, is no longer significant. In this case, white female presidents of private universities whose student bodies consist mostly of non-white students receive 18.9 per cent less in total compensation than their white male counterparts at private universities whose student bodies consist mostly of white students. Also, when white female presidents are compared to their male counterparts at similar institutions (i.e., private universities whose student bodies consist mostly white students) in this case, the male-female difference in total compensation falls to 9.1 per cent. These results are almost identical to those found in version (2) of Table 4 when the outlier is included.

In terms of the other OLS results, presidents of private universities that offer Division 1 athletics are paid significantly less than their counterparts at Division 2 and 'non-listed' institutions, while they are paid significantly more than their counterparts at 'other' institutions. These differentials range from 5.4 to 5.8 per cent. Next, presidents of private universities located in urban areas are paid about the same as those at private universities located in rural areas, while presidents of private universities located in small towns are paid about 10.4 per cent less than those at private universities located in rural areas. Additionally, presidents of large private universities, and of relatively wealthy private universities (as measured by the log of an institution's endowment) are paid significantly more than their counterparts at relatively small, and relatively less wealthy, institutions. Lastly, presidential compensation appears to be increasing over time in real terms, as almost all 12 of the variables in the 'year' series are positively signed, with most reaching the 0.10 level of significance or better.

Before turning to the fixed-effects estimations presented in Table 4, baseline estimates similar to those for the OLS estimations discussed above are established for gender and race in the fixed-effects case. Although not shown in Table 4, the coefficient estimate of *Female* is negative and statistically significant, indicating that female presidents earn five per cent less than their male counterparts. When the outlier is removed, the results suggest that female presidents earn 7.1 per cent less than their male counterparts. For the second baseline, the coefficient estimate of *NonWhite* is positive and statistically significant, indicating that non-white presidents earn 25 per cent more than their white counterparts. However, this result is largely due to the presence of an outlier in the sample. When removed, the estimate of *NonWhite* is, although significant, smaller in magnitude, suggesting that non-white presidents earn 12.4 per cent more than their white counterparts.

The results of fixed-effects estimation of the more refined (1) above are included in columns 4 and 5 of Table 4. The first set of results comes from a model that regresses the natural log of total presidential compensation on the control variables plus three interaction terms – *NonWhite* × *Male*, *NonWhite* × *Female*, and *White* × *Female*. This regression produces an R^2 of 0.193, while four of the primary coefficient estimates are significant at the 0.10 level or better.[20] First, the coefficient estimate for *White* × *Female* is negative and statistically significant, indicating that white female presidents of private universities earn six per cent less per year than their white male counterparts. This result is about three-fifths of the size of its OLS counterpart in column 2 of Table 4. Interestingly, both non-white males and non-white females earn substantially *more* than their white male counterparts. The former salary differential is 27.3 per cent, while the latter is 19.2 per cent, although the latter is again driven entirely by an outlier in the sample.[21]

20 As indicated in Table 4, the fixed-effects regressions include fewer regressors than their OLS counterparts.

21 When this outlier is omitted from the sample, this variable, *NonWhite* × *Female*, is no longer significant. In this case, the coefficient estimate for *White* × *Female* is negative and statistically significant, indicating that white female presidents of private universities earn 6.9 per cent less per year than their white male counterparts. This result is almost one percentage point larger (in absolute value) than that found in version (3) of Table 4 when the outlier is included.

The second set of fixed-effects results comes from a model that regresses the natural log of total presidential compensation on the control variables plus the seven more refined interaction terms discussed above. This regression produces an R^2 of 0.195, while again five of the primary coefficient estimates are significant at the 0.10 level or better. In this case, white female presidents of private universities whose student bodies consist mostly of white students receive 6.5 per cent less in total compensation than their white male counterparts at private universities whose student bodies consist mostly of white students. In contrast, the compensation of white female presidents of mostly non-white private universities is essentially the same as their white male counterparts at mostly white universities. Thus, the institutional structure again appears to play an important role in the determination of executive compensation. Interestingly, both non-white males at mostly white universities and non-white females at mostly white universities earn substantially *more* than their white male counterparts at mostly white universities. The former salary differential is 36.7 per cent, while the latter is 23 per cent, although the latter is once again driven entirely by an outlier in the sample.[22]

In terms of the other fixed-effects results, presidents of private universities whose student bodies consist of a larger portion of black undergraduate students are compensated significantly less than their counterparts at institutions with relatively smaller percentages of black students. Additionally, presidents of large private universities are paid significantly more than their counterparts at relatively small institutions. This result is consistent with the results from the OLS estimation in columns 2 and 3 of Table 4. Lastly, presidential compensation appears to be increasing over time in real terms, as all 12 of the variables in the 'year' series are positively signed, with most reaching the 0.10 level of significance or better. This latter result also exhibits an almost perfect monotonic trend.

5. Further empirical exploration

Admittedly, our econometric approach to the compensation of private university presidents fails to control for the productivity of the presidents included in the sample. As such, as a human capital framework, our model is limited in its ability to separate the effects of employee productivity differences from gender and race discrimination in the determination of executive compensation. Productivity of presidents in our sample could be proxied by their ages and tenure in the position, and inclusion of these variables (i.e., *Age* and *Tenure*) would lead to increased precision in our investigation of discrimination. Unfortunately, data for constructing *Age* are not included in the *Chronicle of Higher Education* database, and efforts to obtain them from university webpages indicate that they are available publicly for only a very small subset of the sample.

22 When this outlier is omitted from the sample, this variable, *NonWhite* × *Female* × *NonMinorityInst*, is no longer significant. In this case, white female presidents of private universities whose student bodies consist mostly of white students receive 7.5 per cent less in total compensation than their white male counterparts at private universities whose student bodies consist mostly of white students. In contrast, the compensation of white female presidents of mostly non-white private universities is essentially the same as their white male counterparts at mostly white universities. The former of these two results is one percentage point larger, in absolute value, than that found in version (4) of Table 4 when the outlier is included.

Next, although data on 'time at institution' is no longer available in recent iterations of the Chronicle's database, it was captured in earlier iterations that existed when we began building our sample. However, we were able to build a subsample including data for constructing *Tenure* for only about 25 per cent of our overall sample (i.e., for about 1,400 observations). Thus, results based on this subsample that includes *Tenure* generate more statistical noise than those discussed earlier, so we proceed with caution. Here, the coefficient estimate for *White × Female* is negative and statistically significant, indicating that white female presidents of private universities earn 12.8 per cent less per year than their white male counterparts. This result compares to that in version (1) of Table 4 indicating that white females face a 9.8 per cent penalty when *Tenure* is not included in the model. The differences between these two percentages is largely driven by the differences in the samples.[23] As in version (1) of Table 4, there is no significant difference between the compensation of white males and non-white males when *Tenure* is included.[24] Lastly, attempts to replicate the other specifications and econometric approaches in Table 4 were hindered by the small size of the subsample.

Next, we combined the years into four time periods -- 1998-2000, 2001-2003, 2004-2006, and 2007-2010 – in order to better exploit the panel nature of the dataset by investigating whether the gender and racial biases have changed over time. OLS estimation of a specification that interacts gender and race dummies with dummy variables for these time periods suggest that while larger wealthier institutions provide greater compensation to university presidents than their smaller and less wealthy counterparts, the male-female compensation gap (favoring males) grows over time, reaching 9.8 percentage points in period three and 17.4 percentage points in period four. In terms of the racial component, the male coefficient estimates for these interactions yield mixed results, indicating a non-white penalty that is 3.1 percentage points, –4.9 percentage points, and 2.2 percentage points over the last three time periods. Repeating this process in both cases, but with each year considered separately, yields similar, although statistically noisier, results.

6. Conclusion

This study updates and extends earlier economics research on the compensation of college and university presidents by examining a 13-year panel containing data on the total compensation packages of private college and university presidents in the U.S. The econometric model presented above captures president-level information on gender that is interacted with both race and institution type in order to draw inferences about both the male-female and white-non-white pay gaps (favoring males and whites, respectively) at the highest level in higher education. The latter of these two explorations has not heretofore been included in economics studies examining the compensation of college and university presidents.

23 In other words, if a regression of the version (1) specification in Table 4, which excludes *Tenure*, is conducted using this subsample, white females are found to earn 14.2 per cent less than their white male counterparts.

24 Non-white females are found to earn 57.5 per cent more than their white male counterparts when *Tenure* is included. However, this result is again driven by the outlier, which is even more prominent in the subsample.

Results from both OLS and fixed-effects estimations suggest that white female presidents are paid significantly *less* – ranging from six to 9.8 per cent – than their white male counterparts, depending on the racial makeup of the student body of the institution to which a president is affiliated. Secondarily, we also find that non-white male presidents earn more than their white male counterparts. This gap is also sensitive, although to a lesser degree, to the racial makeup of the student body of the institution to which a president is affiliated. Lastly, returning to the foundational literature as a way of summarizing the remaining results, we note that the study by Monks and McGoldrick (2004) concludes that the remuneration of university presidents rises with tenure, and also with the size and wealth of the institution to which they are affiliated. Our remaining results confirm each of these conclusions, and more.

Overall, the findings presented in this study suggest that future research on the compensation of presidents of public universities in the U.S. would be beneficial. Future research could partition total compensation of university presidents into its subcomponents of base salary, bonuses, and other forms remuneration in order to explore whether gender and/or race discrimination is more or less prevalent in different components of executive compensation in higher education. Limitations of the data set used in this study precluded such an exploration. Future research could also explore the possibility that minority candidates bring more qualifications to leadership roles, which may be explained by inequities in the labor market. For example, Wang and Kelan (2013) report an increase in the average level of qualifications and independence of female directors who were appointed to the boards of Norwegian companies following the introduction of gender quotas – a result they attribute this to a change in the promotions process.

Lastly, future research could also focus on two additional aspects of the employment of university presidents in the U.S. The first of these concerns the apparent decision, given summary statistics reported in this study, of presidential candidates to select into the public university domain on the basis of gender and race. If the distribution of presidents by gender and race across the organizational domain is non-random, then future research could integrate this earlier stage in the employment process by way of a simultaneous system of equations. Finally, the second of these future research opportunities also involves a simultaneous system approach to extend our analysis into a later stage of the employment of university presidents. More specifically, this suggestion takes an interdisciplinary approach to the relationship between the racial characteristics of a university's student body and that of its president by testing whether a more diverse student body cohort increases the likelihood of the appointment of a university president from a minority background, as well as whether the presence of a leader from a non-traditional background increases the diversity of the student body cohort.

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Table 1. Variable Descriptions and Summary Statistics

Variable	*Description*	*Mean*	*Std Dev*
Presidential Characteristics			
TotComp	Total presidential compensation (2010 dollars).	$380,897	$287,728
White × *Male*	Dummy variable equal to 1 if the university president is a white male, and 0 otherwise.	0.7755	0.4173
Nonwhite × *Male*	Dummy variable equal to 1 if the university president is a non-white male, and 0 otherwise.	0.0230	0.1498
White × *Female*	Dummy variable equal to 1 if the university president is a white female, and 0 otherwise.	0.1861	0.3892
Nonwhite × *Female*	Dummy variable equal to 1 if the university president is a non-white female, and 0 otherwise.	0.0154	0.1232
Institutional Characteristics			
UGEnrollment	Total undergraduate enrollment.	2,697.1	2,558.0
RatioBlack	Ratio of black students to total undergraduate enrollment.	0.0867	0.1311
RatioNative	Ratio of native American students to total undergraduate enrollment.	0.0056	0.0097
RatioHispanic	Ratio of Hispanic students to total undergraduate enrollment.	0.0563	0.0761
RatioAsian	Ratio of Asian students to total undergraduate enrollment.	0.0493	0.0630
MinorityInst	Dummy variable equal to 1 if total undergraduate enrollment is at least 51% non-white, and 0 otherwise.	0.0956	0.2940
Division1	Dummy variable equal to 1 if the university participates in NCAA athletics at the Division 1 level, and 0 otherwise.	0.1775	0.3821
Division2	Dummy variable equal to 1 if the university participates in NCAA athletics at the Division 2 level, and 0 otherwise.	0.1214	0.3266
Division3	Dummy variable equal to 1 if the university participates in NCAA athletics at the Division 3 level, and 0 otherwise.	0.4716	0.4992
DivisionOther	Dummy variable equal to 1 if the university participates in athletics at a level other than the NCAA Division 1, Division 2, or Division 3 level, and 0 otherwise.	0.1854	0.3887
DivisionNL	Dummy variable equal to 1 if the level at which the university participates in athletics is not listed, and 0 otherwise.	0.0767	0.2662
Urban	Dummy variable equal to 1 if the university resides in an urban setting, and 0 otherwise.	0.2675	0.4427
Suburban	Dummy variable equal to 1 if the university resides in an suburban setting, and 0 otherwise.	0.4250	0.4944
SmallTown	Dummy variable equal to 1 if the university resides in a small town setting, and 0 otherwise.	0.2559	0.4364
Rural	Dummy variable equal to 1 if the university resides in a rural setting, and 0 otherwise.	0.0516	0.2213
Endowment	Market value of each university's endowment (millions).	373.85	1,569.4
UnivAge	Age of each institution.	122.2	47.7

Data Sources: Data on presidential compensation is provided by the *Chronicle of Higher Education*. Data on other presidential characteristics is taken from university websites. Institutional data collected from *Peterson's* licensed undergraduate dataset.

Table 2. Presidential Compensation by Institution Size Quartile

Enrollment	*Mean Compensation*	*Frequency*
< 1,307	$261,557	1,392
1,307 – 1,949	$319,827	1,396
1,950 – 3,050	$370,856	1,391
> 3,050	$570,699	1,398

Table 3. Presidential Compensation by Campus Setting

Setting	*Mean Compensation*	*Frequency*
Rural	$291,026	288
Small Town	$309,377	1,427
Suburban	$388,116	2,370
Urban	$455,183	1,492

Table 4. Regression Results

Variables	*OLS (1)*	*OLS (2)*	*Fixed Effects (3)*	*Fixed Effects (4)*
NonWhite × *Male*	0.014		0.273***	
	(0.050)		(0.069)	
NonWhite × *Female*	0.088		0.192***	
	(0.060)		(0.071)	
White × *Female*	–0.098***		–0.060**	
	(0.018)		(0.023)	
NonWhite × *Male* × *MinorityInst*		–0.100		–0.019
		(0.082)		(0.137)
White × *Male* × *MinorityInst*		0.010		–0.003
		(0.037)		(0.035)
NonWhite × *Female* × *MinorityInst*		–0.150		0.040
		(0.094)		(0.144)
White × *Female* × *MinorityInst*		–0.190***		0.006
		(0.051)		(0.055)
NonWhite × *Male* × *NonMinorityInst*		0.032		0.367***
		(0.065)		(0.080)
NonWhite × *Female* × *NonMinorityInst*		0.270***		0.230***
		(0.084)		(0.082)
White × *Female* × *NonMinorityInst*		–0.090***		–0.065**
		(0.019)		(0.023)
ln*UGEnrollment*	0.181***	0.177***	0.212***	0.214***
	(0.012)	(0.012)	(0.036)	(0.036)
RatioBlack	–0.074	–0.082	–1.075***	–1.079***
	(0.063)	(0.086)	(0.257)	(0.257)
RatioNative	–0.800	–0.760	–2.112	–2.068
	(0.708)	(0.711)	(1.447)	(1.447)
RatioHispanic	–0.001	0.070	0.319	0.318
	(0.096)	(0.106)	(0.335)	(0.336)
RatioAsian	1.241***	1.246***	0.232	0.325
	(0.125)	(0.135)	(0.343)	(0.346)
Division2	0.063**	–0.060**		
	(0.025)	(0.026)		
Division3	0.030	0.027		
	(0.019)	(0.019)		
DivisionOther	–0.050**	–0.055**		
	(0.023)	(0.023)		
DivisonNL	0.087**	0.086**		
	(0.035)	(0.035)		
Urban	0.015	0.011		
	(0.033)	(0.033)		
Suburban	–0.012	–0.017		
	(0.032)	(0.032)		
SmallTown	–0.106***	–0.106***		
	(0.032)	(0.032)		
ln*Endowment*	0.120***	0.121***	0.009	0.010
	(0.006)	(0.006)	(0.014)	(0.014)

UnivAge	7.42e–5 (1.7e–4)	7.42e–5 (1.7 e–4)		
1999-Year	0.001 (0.038)	–1.43e–4 (0.038)	0.034 (0.024)	0.034 (0.024)
2000-Year	0.067* (0.036)	0.065* (0.036)	0.085*** (0.023)	0.085*** (0.023)
2001-Year	0.080** (0.035)	0.079** (0.035)	0.109*** (0.023)	0.108*** (0.023)
2002-Year	0.149*** (0.035)	0.148*** (0.035)	0.190*** (0.023)	0.189*** (0.023)
2003-Year	0.213*** (0.035)	0.213*** (0.035)	0.227*** (0.023)	0.226*** (0.023)
2004-Year	0.214*** (0.034)	0.214*** (0.034)	0.250*** (0.023)	0.249*** (0.023)
2005-Year	0.271*** (0.034)	0.271*** (0.034)	0.316*** (0.023)	0.313*** (0.023)
2006-Year	0.264*** (0.035)	0.263*** (0.035)	0.322*** (0.024)	0.320*** (0.024)
2007-Year	0.306*** (0.038)	0.304*** (0.038)	0.354*** (0.026)	0.351*** (0.026)
2008-Year	0.309*** (0.037)	0.307*** (0.037)	0.386*** (0.027)	0.382*** (0.027)
2009-Year	0.430*** (0.037)	0.428*** (0.037)	0.483*** (0.027)	0.479*** (0.027)
2010-Year	0.328*** (0.038)	0.327*** (0.038)	0.407*** (0.027)	0.401*** (0.028)
constant	10.56*** (0.100)	10.57*** (0.100)	10.84*** (0.273)	10.83*** (0.273)
n	5,577	5,577	5,577	5,577
R^2	0.393	0.395	0.193	0.195
Number of ipeds			695	695

Notes: The numbers in parentheses are standard errors. ***(**)[*] denotes the .01(.05)[.10] level of significance.

Poverty Transitions in Non-remote Indigenous Households: The Role of Labour Market and Household Dynamics

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Abstract

Using data from the HILDA Survey, this paper estimates year-to-year poverty entry and exit rates for Indigenous and non-Indigenous individuals living in non-remote areas of Australia. Indigenous Australians of working age have a higher probability of entering poverty and a lower probability of exiting than non-Indigenous people, suggesting that Indigenous poverty is likely to be more persistent and have a greater negative impact on well-being. Changes in household size trigger almost half of Indigenous poverty entries and 40% of exits. Indigenous people tend to live in more dynamic households than non-Indigenous people, and also have a greater likelihood of entering poverty and a smaller likelihood of exiting after experiencing changes in household size. The labour market also plays a prominent role in triggering poverty transitions for Indigenous people, while changes in private income, such as business and investment income, play a much smaller role, largely because Indigenous people get far less of their income from such sources.

JEL Codes: D19, J15, I32

Keywords: Indigenous, poverty, employment, household dynamics

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1. Introduction

It is well-documented that Indigenous Australians have higher income poverty rates than non-Indigenous Australians (e.g. Altman and Hunter, 1998; Hunter, 2006; Markham and Biddle, 2018a; Ross and Mikalauskas, 1996; Ross and Whiteford, 1992). Lack of employment has been identified by many authors as a key driver of Indigenous poverty, from the seminal work of Henderson (1975) and the reports he commissioned (Brown *et al*., 1974; Gale and Binnion, 1975) onwards. For example, Altman and Nieuwenhuysen (1979) emphasise the role of labour market disadvantage in driving Indigenous economic status, while Ross and Mikalauskas (1996) conclude that unemployment among family members is the primary factor underlying Indigenous income poverty.

Family dynamics are also likely to contribute to high poverty rates among the Indigenous population. In a series of papers, Daly and Smith (1999; 1995; 1996) examine the implications of Indigenous household structure and mobility for various socioeconomic indicators, including household income. They argue that the prevalence of large, multi-family households and high mobility and visitor rates among Indigenous households is likely to induce economic stress and 'reinforce poverty entrapment for low income households' (Daly and Smith, 1999, p. 11).

Most research on Indigenous income poverty has used cross-sectional data on income and other characteristics, primarily from the Census or the National Aboriginal and Torres Strait Islander Social Survey.[1] The analyses have focused on describing the characteristics of those who are in poverty, as well as the relationships between income poverty and other indicators of financial stress, deprivation and social exclusion (e.g. Hunter, 1999, 2012; Markham and Biddle, 2018a).

However, cross-sectional analysis is limited in its ability to provide insights into the factors that push people into poverty and keep them there. Using longitudinal data, Headey *et al*. (2005) find that relatively few Australians live in persistent poverty, but that the likelihood of exiting poverty falls substantially as poverty duration increases. Policy interventions to alleviate income poverty (such as income support payments) can be targeted at the most needy by identifying those who are currently poor. However, interventions to prevent people falling into poverty in the first place, and help those at most risk of persistent poverty to exit, require a good understanding of poverty dynamics and their drivers (Jenkins, 2000). At current, this is lacking for the Australian Indigenous population.

The study of poverty dynamics in Australia has been facilitated by the increasing availability of longitudinal data, notably the Household Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA Survey is not representative of the Australian Indigenous population because it does not include those living in very remote areas, who are disproportionately Indigenous. Nevertheless, it provides a small but reasonably representative sample of Indigenous people living in non-remote areas of Australia. Analysis by Wilkins (2016) shows that Indigenous people in the HILDA sample are around half as likely to exit poverty each year (and therefore have longer poverty spells)

1 The ABS Survey of Income and Housing, one of the principal sources of information on income and poverty incidence in Australia, does not collect data in very remote areas or Indigenous communities and does not release information on Indigenous status.

as non-Indigenous Australian-born people, all other things equal. Buddelmeyer and Verick (2008) examine the factors associated with poverty entry and persistence and find that employment and education protect people against entering and remaining in poverty, while living in a non-urban area is associated with a greater likelihood of poverty entry. These results suggest that, based on their average characteristics, Indigenous people may be more likely to enter and remain in poverty than non-Indigenous people. However, to our knowledge there are no published estimates of poverty entry and exit rates by Indigenous status, nor specific consideration of the factors that drive differences in poverty dynamics between Indigenous and non-Indigenous Australians.

This paper contributes to the Indigenous poverty literature by presenting estimates of income poverty entry and exit rates for Indigenous adults living in non-remote areas of Australia. It examines the contribution of various 'trigger events' such as changes in household size, the number of workers in the household, labour income and other private income to entry and exit rates to determine which factors are most important in driving Indigenous poverty dynamics. The next section outlines the data and methods used in the analysis. Results are then presented for entry and exit rates and their drivers. The final section discusses the results and their limitations and provides some areas for further research.

2. Data and methods

HILDA Survey

The HILDA Survey is a nationally-representative longitudinal survey of people living in private dwellings aged over 15 years. The survey covers a range of topics including personal, labour market and family characteristics, income, health and well-being. The survey has been conducted annually since 2001. We use data from waves 3 (2003) to 15 (2015), the latest year available at the time of writing. Data on the number of employed persons per household, a key variable in our analysis, were not available in a comparable form in the 2002 wave, so waves 1 and 2 are excluded from the analysis.

All new survey entrants are asked in a face-to-face interview whether they identify as Aboriginal, Torres Strait Islander, both or neither. This information is then used in subsequent waves to identify Indigenous status (we define Indigenous people as those who identify as Aboriginal, Torres Strait Islander or both).

Indigenous people are under-represented in the HILDA Survey for several reasons. First, the survey does not sample people from very remote areas and those in remote areas are under-sampled. Second, Indigenous status is only collected when respondents enter the HILDA sample for the first time. Analysis from the Census shows that significant numbers of people change their Indigenous identification over a five-year period, resulting in a net gain in the number of people identifying as Indigenous between 2006 and 2016 (Biddle and Crawford, 2015; Markham and Biddle, 2018b). It is likely the assumption used in the HILDA Survey that Indigenous status is unchanging will lead to an underestimate of the Indigenous population in the later waves of the HILDA Survey. Finally, attrition rates for the sample of Indigenous people in HILDA are around twice those for non-Indigenous respondents (attrition and its impact on sample representativeness are discussed in more detail below).

Despite these limitations, the HILDA Survey presents the best available source of annual longitudinal data on the incomes of Indigenous Australians (Howlett, *et al*., 2016).[2] We restrict our analysis to look only at Indigenous and non-Indigenous people living in non-remote areas of Australia, for which the HILDA Survey is broadly representative (see below for discussion of the representativeness of the sample). We pool observations across all available waves of the HILDA Survey to ensure that our sample of Indigenous people is large enough to conduct meaningful analysis. Our final sample includes around 3600 observations for around 660 Indigenous adults.

Defining poverty

Defining poverty is fraught with methodological and ideological complexity; defining Indigenous poverty even more so (Altman and Hunter, 1997; Hunter, 2012). Rather than revisiting this debate, we concentrate only on income poverty and adopt a definition of poverty that is comparable with other Australian research on poverty dynamics (Buddelmeyer and Verick, 2008; Headey, *et al*., 2005; Wilkins, 2016). Drawing on previous research findings for Indigenous people (Hunter, *et al*., 2003; Smith and Daly, 1996), we focus on the household rather than the family or income unit, as the primary unit of analysis for income. We leave analysis of the dynamics of other aspects of poverty, such as consumption, deprivation and social exclusion, for future research.

Income poverty is defined in this paper at the individual level as having equivalised household disposable income below 50% of the median. Household disposable income is adjusted for household size using a modified OECD equivalence scale, whereby a weight of one is given to the first adult (aged 15 years and over) in each household, 0.5 to each subsequent adult and 0.3 to each child aged under 15 years.

We test the sensitivity of our results to the definition of poverty by re-estimating poverty transition rates for several alternative poverty thresholds (equivalised gross household income below 50% of the median; equivalised disposable household income below 40% of the median; and equivalised disposable household income below 60% of the median) as well as for three alternative equivalence scales (the 'old' OECD equivalence scale[3]; per capita income; and square root of household size).

The household income variable used is household disposable financial year regular income. The bulk of HILDA Survey interviews are typically conducted between July and December each year (Summerfield et al., 2016), so the financial year income variables in each wave of the data refer to income from the financial year finishing just before the survey is administered. Household financial year income is aggregated across all adult members of each household and imputed in the HILDA data where missing. Tax and some transfer income is imputed in the HILDA data to compile an estimate of household disposable financial year income (Summerfield, *et al*., 2016). We drop from our sample a small number of individuals who live in

2 The Australian Census Longitudinal Dataset links individuals from five-yearly censuses, but does not include annual data on income. The Multi-Agency Data Integration Project links annual income tax data with census and other administrative data, but does not include annual information about household structure or labour market engagement.

3 The 'old' OECD equivalence scale gives a weight of one to the first adult, 0.7 to each subsequent adult and 0.5 to each child in the household.

households with negative disposable household income (less than 0.1% of households).

Aggregation and imputation of household income in the HILDA Survey is based on household composition in the survey year. For example, the 2005 wave of the HILDA survey includes information for household financial year income that is the sum of financial year income for 2004/2005 for each of the household members living in the household in mid-late 2005 (i.e. during the 2005/2006 financial year). Ideally, we would use financial year income for 2005/2006 and household composition data for 2006 (i.e. from the following wave of the survey) to estimate equivalised household financial year income. However, it is not possible to re-aggregate household financial year income for the household members who were present in the previous wave because not all were included in the survey in the previous wave and therefore financial year income data are not available for all. We therefore follow convention in other papers on poverty dynamics using the HILDA Survey (Buddelmeyer and Verick, 2008; Headey, *et al*., 2005; Wilkins, 2016) and use data on household composition and financial year income from the same wave to calculate equivalised household income.

Estimating poverty transition rates

As attrition in the HILDA Indigenous sample is relatively high, we consider only year-to-year poverty transitions. Assume any individual can be either poor (P) or non-poor (NP) at any point in time. We construct two-year pairs of observations for individuals that compare poverty in year *t* and year *t+1*. Two types of transitions can be identified: entry and exit:

$$\Pr(entry) = \Pr(P_{t+1} | NP_t)$$

$$\Pr(exit) = \Pr(NP_{t+1} | P_t)$$

To maximise the sample size for the Indigenous population, we pool two-year pairs across the full HILDA sample from 2003 to 2015 (base year *t=2003-2014*). As a result, each individual may appear in the sample more than once. All estimates are weighted using the cross-sectional person-level weights provided in the HILDA Survey for year *t*. While there are longitudinal weights available, we do not use these are they do not control specifically for attrition by Indigenous status. We discuss the impact of attrition and the representativeness of the resulting sample in more detail below.

Estimating the contribution of trigger events to poverty transitions

We define poverty as having household equivalised disposable income – essentially household income divided by a weighted sum of household size – below a certain threshold. Individuals who live in households that move into or out of poverty must, by definition, have experienced a change in household income, a change in household size/composition, or both. Therefore, following Bane and Ellwood (1983) and Jenkins and Schluter (2003), we can decompose poverty entry and exit rates to determine the contribution of various 'trigger' events such as changes in household size, employment and labour and non-labour income. We can also compare the Indigenous and non-

Indigenous samples to understand how much of the difference in entry/exit rates by Indigenous status can be attributed to differences in the occurrence of each trigger event and how much to differences in the likelihood of poverty entry/exit given the occurrence of a trigger event.

Assume there is an exhaustive set of *J* mutually-exclusive trigger events, E_j that occur between year *t* and year *t+1*. For individuals who are in poverty in year *t*, the probability of exiting poverty between year *t* and year *t+1* can then be written as:

$$\Pr(exit) = \Pr(NP_{t+1}|P_t) = \sum_{j=1}^{J} \Pr\left(exit\middle|E_j\right) \Pr(E_j) \quad (1)$$

For individuals who are not in poverty in year *t*, the probability of entering poverty between year *t* and year *t+1* can be written as:

$$\Pr(entry) = \Pr(P_{t+1}|NP_t) = \sum_{j=1}^{J} \Pr\left(entry\middle|E_j\right) \Pr(E_j) \quad (2)$$

We initially define a series of eight mutually-exclusive trigger events based on changes in household size, the number of employed persons in a household, the amount of labour income earned by the household and the amount of private non-labour income (business and investment income, regular private pensions and regular private transfer income) earned by the household. The trigger events are:

- Increase/decrease in the number of people in household;
- Increase/decrease in the number of employed adults in household, with no change in total household size;
- Increase/decrease in the amount of gross annual household labour earnings, with no change in the number of employed adults or household size; and
- Increase/decrease in the amount of gross annual household private non-labour income, with no change in the amount of gross annual household labour earnings, the number of employed adults or household size.

As our eight events are not exhaustive of all the possible changes in household income and/or composition, we also include a residual category that captures all other changes that affect the likelihood of entry/exit, assuming that there are no other changes in household size, the number of employed adults or labour/non-labour earnings.

The HILDA Survey follows individuals, rather than households, over time and it is important to emphasise that we examine poverty entry and exit at the individual level. We define household size changes based on how many people each individual reports living with at the time of each survey. An individual in our sample can experience increases or decreases in household size in two ways. First, they may live in the same 'household' in years *t* and *t+1*, but other household members may have left or joined the household. Second, the individual may have left their year *t* 'household' and joined a household with a different number of members. In a more detailed version

of this paper (Venn and Hunter, 2018) we extend our analysis by breaking down household size changes into particular life events (e.g. the birth/adoption of a child; partnering or separation; adult children leaving or joining the household; or being an adult child who moves out/in).

We calculate the likelihood of each trigger event and the probability of entry/exit given the occurrence of each event for the Indigenous and non-Indigenous samples separately. We can then compare the relative importance of each type of event in explaining overall entry/exit rates for both populations, as well as look at differences between populations in the likelihood of events and their impact on entry/exit rates.

Sample characteristics

Table 1 presents some descriptive statistics for our sample of non-remote Indigenous people from the HILDA Survey, and compares their characteristics to those of the non-remote Indigenous population from the 2002 and 2014/15 editions of the National Aboriginal and Torres Strait Islander Social Survey (NATSISS) conducted by the Australian Bureau of Statistics. Like the HILDA Survey, the NATSISS samples individuals living in private dwellings. Unlike the HILDA Survey, the NATSISS covers people living in remote areas and discrete Indigenous communities. However, the data presented in Table 1 from the NATSISS refer to the non-remote population.

Table 1: Characteristics of HILDA Indigenous and non-Indigenous non-remote samples (% of sample observations unless otherwise stated)

	Indigenous				*Non-Indigenous*
	HILDA non-remote		*NATSISS non-remote*		*HILDA non-remote*
	Pooled cross-section Base 2003-2014	*Analysis sample[a] Base 2003-2014*	*2002*	*2014/15*	*Analysis sample[a] Base 2003-2014*
Women	54.0	55.2	52.4	52.0	50.9
15-24 years	34.7	33.3	29.5	32.0	16.6
25-34 years	21.3	20.8	25.0	21.3	17.1
35-44 years	17.8	18.1	20.7	17.0	18.1
45-54 years	12.6	13.2	13.8	14.7	17.6
55-64 years	6.6	7.1	6.8	9.4	14.5
65+ years	7.0	7.5	4.3	5.7	16.1
Average age (years)	35.0	35.6	34.7	35.9	44.6
Couple only	10.8	11.2	..	11.9	24.9
Couple + children[b]	35.4	36.2	..	..	44.1
Couple + dependent children[e]	..	..	..	22.5	..
Lone parent + children[b]	19.7	20.5	..	..	8.8
Lone parent + dependent children[e]	..	..	..	11.4	..
Extended one-family household[c]	15.3	13.9	..	..	6.4
Extended one-family household [e] (including those with adult children)	..	..	..	35.7	..
Lone person	9.4	9.9	..	11.3	11.8
Multifamily household	7.8	6.9	..	4.0	2.6
Group household	1.7	1.5	..	3.2	1.3
High school or less	68.6	68.2	70.6	63.6	49.3
Diploma or certificate	24.0	24.1	24.6	30.6	28.5
Tertiary qualification	7.3	7.7	4.0	5.8	22.2
Employed[d]	48.9	49.5	44.1	49.0	63.3
Unemployed	9.5	8.9	16.7	11.7	3.1
Not in labour force	41.6	41.5	39.1	39.3	33.6
Major city	51.4	51.6	..	44.8	72.3
Inner regional	26.1	26.9	..	27.5	18.8
Outer regional	22.5	21.4	..	27.8	8.9
Number of individuals	813	666	6802	5644	23004
Number of observations	4194	3647	6802	5644	153540

a. Analysis sample is pooled sample of respondents with two consecutive years of data required to calculate poverty transitions.
b. Includes children aged under 15 years, dependent students and non-dependent children.
c. Includes couple and lone parent families with extended family members or unrelated people living in the household.
d. Includes CDEP participation in 2002 NATSISS
e. NATSISS household type information does not allow us to distinguish between couple/lone parent households who have non-dependent children and those with 'other' persons present.
.. indicates comparable data not available.
Source: HILDA Survey, NATSISS 2002 accessed through RADL, NATSISS 2014/15, accessed through TableBuilder.

Compared with the NATSISS, the pooled cross-sectional sample of non-remote Indigenous respondents in the HILDA Survey contains more women, fewer young people, fewer unemployed, more people living in major cities and more people living in multi-family households.[4] Comparing the NATSISS 2002 and 2014/15 estimates, it is clear that average education levels and employment rates have increased, and the HILDA sample has education levels somewhere between the two NATSISS estimates (although with tertiary education levels higher than both) and employment rates at around the 2014/15 level. With the exception of geographical location, the differences in characteristics between the samples are relatively small, suggesting that the HILDA non-remote sample is reasonably representative of the non-remote Indigenous population as measured by the NATSISS, but more urbanised.

As discussed above, the sample used in our analysis of poverty transitions contains pooled observations for all respondents for whom we can construct a two-year window of data. Year-to-year attrition rates are higher for Indigenous than non-Indigenous people in the HILDA Survey and also tend to be higher for those who are poor than for those who are non-poor, although the difference for the Indigenous sample is not statistically significant (Venn and Hunter, 2018). However, despite relatively high attrition rates for the Indigenous sample, Table 1 shows that our analysis sample of Indigenous people is not substantially different to the pooled cross-sectional Indigenous sample, with the main differences being that the analysis sample has fewer young people and more older people, as well as slightly more women. We expect that higher attrition rates among poor households will mean that our results under-estimate poverty entry rates and over-estimate poverty exit rates.

3. Results

Poverty transitions

Table 2 shows the incidence of year-to-year poverty transitions for the total population as well as for the population of working age (15-64 years). Where poverty is defined using a threshold of 50% of median modified-OECD equivalised disposable income (our primary definition), around 14% of the non-remote Indigenous population enter income poverty from year to year. Among those who are poor, 38% exit income poverty by the following year. Entry and exit rates are very similar for the working-age population. Poverty entry rates are higher for Indigenous than non-Indigenous people. Exit rates among the total population are not statistically different by Indigenous status, but this is largely because of low exit rates among poor non-Indigenous people aged 65 years and over. Among the working-age population, exit rates are also significantly lower for Indigenous than non-Indigenous people.

4 Comparable data on the proportion of people living in households with a couple/lone parent plus their dependent and non-dependent children only are not available from the 2014/15 NATSISS, so it is difficult to compare the HILDA sample and NATSISS for these households types or for extended one-family households.

Table 2: Year-to-year poverty transition rates (%) among Indigenous and non-Indigenous adults in non-remote areas using different poverty thresholds and equivalence scales

Equivalence scale:	*Poverty threshold:*		*Total population*		*Working-age population*	
			Entry rate	*Exit rate*	*Entry rate*	*Exit rate*
Modified OECD scale	50% of median disposable income	Indigenous	13.6	37.8	13.0	37.7
		Non-Indigenous	6.3	40.4	5.1	48.9
		P-value	0.000	0.208	0.000	0.000
	50% of median gross income	Indigenous	14.6	27.2	13.7	27.1
		Non-Indigenous	7.1	31.3	5.8	39.5
		P-value	0.000	0.016	0.000	0.000
	60% of median disposable income	Indigenous	15.7	25.1	14.5	24.8
		Non-Indigenous	8.0	31.3	6.8	39.1
		P-value	0.000	0.000	0.000	0.000
	40% of median disposable income	Indigenous	8.9	55.8	8.8	56.1
		Non-Indigenous	4.2	65.7	3.3	66.7
		P-value	0.000	0.000	0.000	0.000
Per capita income	50% of median disposable income	Indigenous	11.0	29.0	11.1	28.3
		Non-Indigenous	5.6	50.7	4.9	48.3
		P-value	0.000	0.000	0.000	0.000
Square root of household size	50% of median disposable income	Indigenous	13.0	34.8	12.4	34.8
		Non-Indigenous	6.4	35.5	5.2	45.1
		P-value	0.000	0.801	0.000	0.000
Old OECD scale	50% of median disposable income	Indigenous	13.5	35.6	13.0	34.9
		Non-Indigenous	6.1	47.6	5.0	50.3
		P-value	0.000	0.000	0.000	0.000
Number of observations		Indigenous	2558	1089	2445	993
		Non-Indigenous	131708	21832	115243	12830

Note: Pooled sample with base years 2003-2014. All income measures are for household equivalised income. P-values are for a test of difference in means between Indigenous and non-Indigenous estimates. Working-age population is persons aged 15-64 years.

While the levels are somewhat different, a similar pattern of entry and exit is evident when using alternative definitions of poverty. Each year, between 9% and 16% of Indigenous adults enter poverty, and between around one quarter and one half of Indigenous people in poverty exit. Indigenous people have higher entry rates than non-Indigenous people regardless of the definition of poverty used, while exit rates are generally significantly lower, the exception being for the standard poverty threshold of 50% of median disposable income using either the modified-OECD or square root of household size equivalence scales.

Using a less extreme poverty threshold (less than 60% of median income) increases Indigenous poverty entry rates slightly but greatly reduces exit rates. This suggests that even when Indigenous people escape poverty defined using the 50% threshold, many move only just above the poverty line, thereby risking poverty re-entry. Indigenous exit rates from extreme poverty (defined as less than 40% of median income) are relatively lower than for non-Indigenous people, indicating that the non-Indigenous poor sit closer to the poverty threshold.

While the choice of equivalence scale does not seem to alter the main patterns of poverty entry and exit, it has a different effect for Indigenous and non-Indigenous people. Using a scale which assumes greater economies of size within the household or allocates greater weight to children increases entry rates for both the Indigenous and non-Indigenous samples, but has a different effect on exit rates, which increase for the Indigenous sample and decrease for the non-Indigenous sample.

One reason that poverty entry rates are likely to be higher, on average, for Indigenous than non-Indigenous people is that Indigenous people have lower average incomes and so are closer to the poverty threshold. Among those who are not poor in year *t*, 39% of Indigenous people have household income in the bottom 40% of the distribution, compared with 27% of non-Indigenous people. Therefore a uniform reduction in income is likely to push more Indigenous than non-Indigenous people below the poverty threshold, all other things equal. However, in the three income deciles from which most poverty entries come (deciles 2-4 of the income distribution make up 76% of Indigenous and 72% of non-Indigenous poverty entries), Indigenous people have significantly higher poverty entry rates than non-Indigenous people.[5] This suggests that there is something more than simply differences in income distribution driving differences in poverty entry rates between Indigenous and non-Indigenous people. In order to examine the impact of differences in the income distribution on poverty entry rates in more detail, the analysis of entry rates in the next section is conducted separately for the whole population, the working-age population and the low-income working-age population, defined as individuals aged 15-64 years with household equivalised disposable income in the bottom 40% of the income distribution.

5 Less than 3% of poverty entries are from people in the bottom income decile as most of them are already in poverty in year *t*.

Trigger events and poverty transitions

The previous section has shown that around 14% of non-poor Indigenous people will enter poverty from one year to the next. This section will consider the relative importance of trigger events in contributing to poverty entries.

Two factors account for more than half of all poverty entries by Indigenous people. First, 18-19% of those who are non-poor in any year experience a decrease in household size, and of those, around a quarter of the total population and 40% of the low-income working-age population will move into poverty. Decreases in household size account for 29-36% of all entries into poverty by Indigenous people.[6]

Second, 17% of all non-poor Indigenous people will experience a reduction in labour income not accompanied by a change in either household size or the number of people employed in their household. Around 15% of Indigenous people experiencing falling labour income will enter poverty, with such changes accounting for almost 20% of all poverty entries. Decreases in labour income are less common among the low-income working-age population, possibly because they are less likely to be employed (and have labour income) in the first place. However, low-income people experiencing falling labour income are more than twice as likely as the total Indigenous population to enter poverty. By contrast, increases in labour income seem to be protective against poverty entry. More than one quarter of non-poor Indigenous people experience an increase in labour income (that is not accompanied by a change in household size or the number of people employed) and only 1-2% of these will enter poverty.[7]

6 Changes in household size may also be accompanied by changes in the number of employed people, labour income and other private income.

7 While it may seem counterintuitive that increases in labour income result in poverty entry for a small number of people, this can occur because we are holding constant only household size and the number of employed persons per household. Those experiencing an increase in labour income may be also simultaneously experiencing changes in other income sources, including welfare payments. It is likely to be the combination of changes in labour and other income that result in poverty entry rather than the change in labour income itself.

Table 3: Trigger events contributing to poverty entry among non-remote population, by Indigenous status

		Total population			*Working-age population*			*Low-income working-age population*		
		Indigenous	*Non-Indigenous*	*P-value*[a]	*Indigenous*	*Non-Indigenous*	*P-value*[a]	*Indigenous*	*Non-Indigenous*	*P-value*[a]
		%	%		%	%		%	%	
Entry probability: Pr(poort+1 lnon-poort)		13.6	6.3	0.000	13.0	5.1	0.000	25.6	12.9	0.000
Increase in household size	Pr(event)	12.3	7.6	0.000	12.8	8.4	0.000	13.2	9.1	0.001
	Pr(entrylevent)	9.4	4.2	0.002	9.6	4.1	0.001	19.0	12.1	0.061
	% of all entries	8.5	5.1		9.5	6.8		9.9	8.6	
Decrease in household size	Pr(event)	17.7	11.7	0.000	18.3	12.6	0.000	19.1	11.7	0.000
	Pr(entrylevent)	27.7	12.9	0.000	26.5	11.8	0.000	41.0	25.9	0.001
	% of all entries	36.2	24.0		37.4	29.4		30.6	23.6	
Increase in employed persons[b]	Pr(event)	10.9	10.5	0.652	11.2	11.5	0.745	12.5	14.9	0.134
	Pr(entrylevent)	11.4	5.0	0.037	11.7	4.7	0.024	23.1	10.2	0.045
	% of all entries	9.1	8.4		10.1	10.6		11.3	11.9	
Decrease in employed persons[b]	Pr(event)	7.8	7.9	0.936	7.9	8.1	0.784	8.1	8.2	0.947
	Pr(entrylevent)	10.6	5.7	0.026	11.1	5.2	0.010	24.1	12.2	0.027
	% of all entries	6.1	7.1		6.8	8.3		7.7	7.8	
Increase in labour income[c]	Pr(event)	27.2	32.8	0.000	27.9	35.6	0.000	22.3	32.4	0.000
	Pr(entrylevent)	0.8	1.0	0.552	0.8	0.9	0.792	2.5	3.3	0.507
	% of all entries	1.6	5.1		1.7	6.3		2.2	8.2	
Decrease in labour income[c]	Pr(event)	16.8	17.9	0.198	16.6	18.7	0.021	13.0	13.1	0.917
	Pr(entrylevent)	15.9	6.8	0.000	14.7	6.4	0.000	36.0	20.4	0.003
	% of all entries	19.7	19.2		18.8	23.5		18.3	20.8	

Increase in other private income[d]	Pr(event)	1.8	4.8	0.000	1.3	2.0	0.002	2.7	4.2	0.006
	Pr(entry|event)	16.3	5.6	0.072	14.3	4.8	0.079	16.6	7.8	0.165
	% of all entries	2.2	4.2		1.4	1.8		1.8	2.6	
Decrease in other private income[d]	Pr(event)	2.5	5.4	0.000	1.6	2.1	0.078	3.5	3.8	0.628
	Pr(entry|event)	36.5	24.2	0.058	42.1	21.0	0.013	48.9	34.0	0.132
	% of all entries	6.9	20.6		5.3	8.8		6.7	10.2	
Other entries	% of all entries	9.6	6.3		9.1	4.5		11.6	6.4	
Number of observations		2558	131708		2445	115243		920	26716	

Note: Pooled sample with base years 2003-2014. Poverty defined as living in a household with equivalised disposable household income below 50% of the median. Figures shown in bold are statistically significantly different from non-Indigenous estimates at 95% confidence level or higher.
a. P-value from a test of difference of means between non-Indigenous and Indigenous samples.
b. No change in household size.
c. No change in the number of employed persons in the household or in household size.
d. No change in labour income, in the number of employed persons in the household or in household size.

Changes in the number of people employed in the household (in households where there is no overall change in household size) account for around 15-18% of poverty entries by Indigenous people. Somewhat counterintuitively, increases and decreases in the number of people employed carry with them a similar risk of poverty entry (11% among the total population, increasing to around 24% for the low-income working age population). It may be that changes in the number of people employed are sufficiently offset by changes in other sources of income so that total income is relatively unchanged.

The incidence of changes in other private income among the Indigenous sample is low, but decreases carry a high poverty entry risk: 37-49% of those who experience a fall in other private income enter poverty.

Comparing the Indigenous and non-Indigenous samples, several results are worthy of note. First, Indigenous people are significantly more likely to enter poverty after experiencing most types of trigger event, with the poverty entry risk for Indigenous people typically around twice that for non-Indigenous people. As discussed in the previous section, this is likely to be, in part, because Indigenous people have lower average incomes than non-Indigenous people so require a smaller change to income or household composition to push them over the poverty threshold. However, the difference in poverty entry risk between Indigenous and non-Indigenous people is only slightly ameliorated when the sample is restricted to those in the bottom 40% of the income distribution.

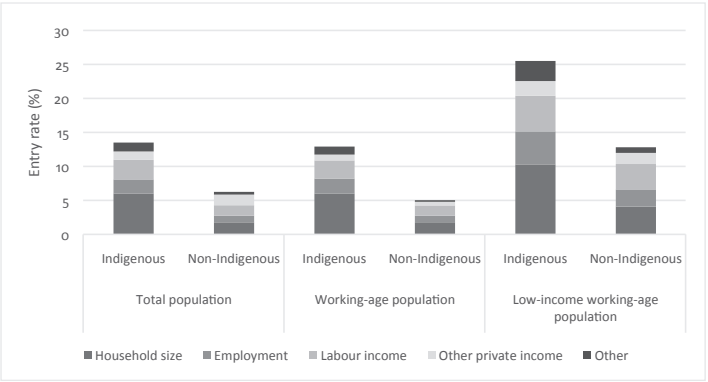
Second, Indigenous people are much more likely than non-Indigenous people to experience events relating to changes in household size. Only 19-21% of non-Indigenous people experience a change in household size from year-to-year compared with 30-32% of Indigenous people. In particular, Indigenous people are about 1.5 times more likely to experience a decrease in household size, the event associated with the highest risk of poverty entry except decreases in private income for both Indigenous and non-Indigenous people. As a result, a much larger share of poverty entries for Indigenous people are attributable to changes in household size (41-47%) compared to non-Indigenous people (29-36%). In a more detailed analysis of household size changes, we find that the household size changes most likely to trigger poverty entry for Indigenous people are being an adult child who leaves home (12.5% of all poverty entries) and being in a household where a family member leaves (13.5% of all poverty entries). These events account for only 11% of all poverty entries combined in non-Indigenous households, both because these events are far less common than in Indigenous households and because they carry with them a smaller risk of poverty entry (Venn and Hunter, 2018).

By contrast, Indigenous people are significantly less likely than non-Indigenous people to experience events relating to changes in income – both increases and decreases – that are not linked to changes in either household size or the number of people employed in their household. This may reflect their lower average reliance on wages/salaries and other private income than non-Indigenous people (Howlett, *et al*., 2016)

Figure 1 shows the contribution of each type of trigger event to the total poverty entry rate for Indigenous and non-Indigenous people. The largest contribution to the difference between Indigenous and non-Indigenous poverty entry rates comes from differences in the incidence and effect of changes to household size, with household size changes contributing to more than three times as many poverty entries for Indigenous than non-Indigenous people. As discussed above, this is due to both a

higher incidence of household size changes among the Indigenous population and a higher risk of poverty entry for those experiencing household size changes.

Figure 1: Contribution of trigger events to total poverty entry rate by Indigenous status



Note: Pooled sample with base years 2003-2014.

Changes in employment trigger more than twice as many poverty entries for Indigenous than non-Indigenous people, due to the higher risk of poverty entry for Indigenous people experiencing changes in household employment rather than the probability of the event itself. The difference in contribution of events relating to changes in income is smaller. This is because while Indigenous people are less likely to experience such events, they typically have a higher risk of poverty entry if they do.

Trigger events and poverty exits

In this section we examine the contribution of trigger events to poverty exit rates for those who are in poverty in year *t*. We show the results for the total population in poverty in year *t* as well as the working-age population in poverty in year *t*. The low-income working-age population is not shown separately as in the previous section because the samples used in this section are by definition low income already. The single biggest contributor to Indigenous poverty exit rates is decreases in household size (Table 4). Around 37-40% of Indigenous people in poverty experience a decrease in household size, and more than half of these will exit poverty. In total, decreases in household size contribute to 44-47% of all poverty exits for the Indigenous sample. Among household size changes, the biggest contributors to poverty exit are having a family member (other than a partner or child) move into your household (9.3% of exits for Indigenous people), partnering (7.7% of exits), having a family member leave your household (7.5% of exits) and the birth or adoption of a child (5.3% of exits) (Venn and Hunter, 2018). A further third of exits are accounted for by increases in either labour income or the number of workers in the household. More than 70% of people experiencing one of these labour market events in their household will exit poverty.

Table 4: Trigger events contributing to poverty exits among non-remote population

		Total population			*Working-age population*		
		Indigenous	*Non-Indigenous*	*P-value*[a]	*Indigenous*	*Non-Indigenous*	*P-value*[a]
		%	%		%	%	
Exit probability: Pr(non-poort+1 |poort)		37.8	40.4	0.208	37.7	48.9	0.000
Increase in household size	Pr(event)	17.8	6.7	0.000	19.2	10.4	0.000
	Pr(exitlevent)	44.1	68.4	0.000	42.4	67.8	0.000
	% of all exits	20.8	11.4		21.6	14.4	
Decrease in household size	Pr(event)	19.9	6.8	0.000	22.5	9.7	0.000
	Pr(exitlevent)	35.0	47.9	0.012	33.9	53.1	0.000
	% of all exits	18.4	8.1		20.2	10.6	
Increase in employed persons[b]	Pr(event)	8.6	8.2	0.634	9.6	12.7	0.008
	Pr(exitlevent)	61.5	55.4	0.295	63.8	54.9	0.045
	% of all exits	14.0	11.2		16.2	14.2	
Decrease in employed persons[b]	Pr(event)	4.8	5.1	0.827	4.1	7.1	0.000
	Pr(exitlevent)	45.8	54.1	0.519	32.4	56.9	0.002
	% of all exits	5.9	6.8		3.5	8.3	
Increase in labour income[c]	Pr(event)	14.2	13.9	0.856	14.7	21.0	0.000
	Pr(exitlevent)	61.5	74.5	0.025	57.7	74.1	0.009
	% of all exits	23.0	25.5		22.4	31.9	
Decrease in labour income[c]	Pr(event)	5.2	4.9	0.775	5.9	7.0	0.268
	Pr(exitlevent)	28.8	32.7	0.610	29.1	32.9	0.619
	% of all exits	4.0	4.0		4.6	4.7	
Increase in other private income[d]	Pr(event)	6.4	19.1	0.000	4.9	9.1	0.000
	Pr(exitlevent)	25.2	45.8	0.001	27.7	50.8	0.003
	% of all exits	4.3	21.7		3.6	9.5	

Decrease in other private income[d]	Pr(event)	2.5	12.5	0.000	2.0	5.3	0.000
	Pr(exitlevent)	19.3	14.3	0.616	5.2	12.6	0.074
	% of all exits	1.3	4.4		0.3	1.4	
Other exits	% of all exits	8.4	7.0		7.7	5.0	
Number of observations		1089	21832		993	12830	

Note: Pooled sample with base years 2003-2014. a. P-value from a test of difference of means between non-Indigenous and Indigenous samples.
b. No change in household size.
c. No change in the number of employed persons in the household or in household size.
d. No change in labour income, in the number of employed persons in the household or in household size.

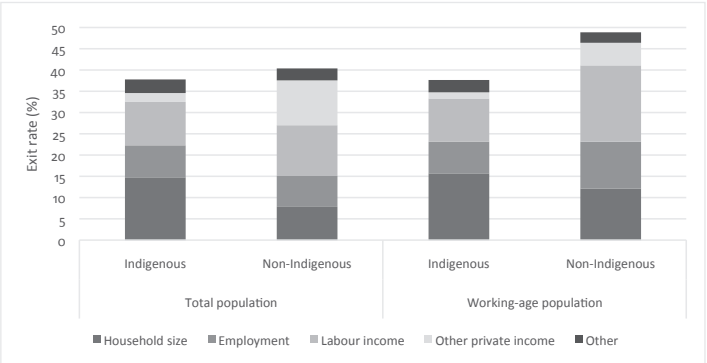
Comparing the Indigenous and non-Indigenous samples, we see that changes in household size are again more common among the Indigenous sample, but they are less likely to lead to poverty exit than for non-Indigenous people. For example, around 55% of Indigenous people in poverty who experience a decrease in household size exit poverty, compared with around 70% of non-Indigenous people. As a result, the overall contribution of changes in household size to exit rates is similar for Indigenous and non-Indigenous people.

The incidence of increases in the number of workers in the household is similar for Indigenous and non-Indigenous people, but results in a higher chance of poverty exit for Indigenous people (although this difference is only marginally significant). The chance of exiting poverty after experiencing an increase in labour income is routinely high: around three quarters for both Indigenous and non-Indigenous people.

Indigenous people are far less likely to experience changes in private income than non-Indigenous people. This is partly explained by the age distribution of the non-Indigenous sample (with those of retirement age having more private non-labour income (e.g. from superannuation) than those of working age), but the effect is still evident within the working-age population. Increases in private income are significantly less likely to result in poverty exit for Indigenous people: around 22-24% of Indigenous people experiencing increases in private income exit poverty compared with 47-52% of non-Indigenous people.

Figure 2 shows that, among the total population, exit rates are similar for Indigenous and non-Indigenous people, with higher exits attributable to family composition and labour income changes for Indigenous people offset by a smaller contribution from other private income. The higher exit rate for working-age non-Indigenous than Indigenous people results from a slightly larger number of exits among non-Indigenous people for all of the events examined. As discussed above, this is due to both an increased likelihood of particular events for non-Indigenous people (e.g. changes in the number of workers or other private income) as well as a higher likelihood of exit among those who experience particular events (e.g. changes in household size, the number of workers and other private income).

Figure 2: Contribution of trigger events to total poverty exit rate by Indigenous status



Note: Pooled sample with base years 2003-2014.

4. Discussion

This paper presents estimates of income poverty entry and exit rates for Indigenous Australians living in non-remote areas. Around one in seven non-poor Indigenous adults will enter poverty from one year to the next, while 38% of those who are in poverty will exit, where poverty is defined as having household equivalised disposable income less than 50% of the median level. Indigenous people generally have higher entry and lower exit rates than non-Indigenous people.

The observed pattern of poverty dynamics among the non-remote Indigenous population is perhaps not surprising given their average characteristics and what is already known about the importance of employment and education in driving poverty transitions (Buddelmeyer and Verick, 2008). It also concurs with the findings of Wilkins (2016) that Indigenous people are less likely than non-Indigenous people to exit poverty. Nevertheless, our results provide further evidence that Indigenous poverty is likely to be more persistent than non-Indigenous poverty, thus having a bigger negative impact on the ability to accumulate income and wealth over the longer term.

One of the reasons that poverty entry rates are higher for Indigenous people than non-Indigenous people is that they have lower average household income and therefore are closer to the poverty threshold. Policies that raise average income levels for Indigenous households are likely to reduce the risk of poverty entry. For example, Venn and Hunter (2018) show that higher educational attainment reduces the risk of poverty entry for most types of trigger events and that Indigenous people with Year 12 or higher qualifications are less than half as likely to fall into poverty as those without Year 12.

Initial income explains only part of the difference in poverty entry rates: entry rates are significantly higher for Indigenous than non-Indigenous people across much of the income distribution, suggesting that other factors are also in play. A major contribution of this paper is to establish the relative importance of changes in household composition, employment, labour income and other non-private income in triggering poverty entry and exit for Indigenous Australians. Changes in household size are the biggest triggers of poverty entry and exit for Indigenous people, accounting for almost half of poverty entries and 40% of poverty exits. Changes in household size are more prevalent for Indigenous than non-Indigenous people, partly due to higher birth and partnering rates and partly due to the greater proportion of Indigenous people who live in dynamic extended or multi-family households (Venn and Hunter, 2018).

Changes in household size can have two possible effects on equivalised income and therefore on the risk of poverty. First, an arriving (or departing) household member may bring (take) some income, either directly as in the case of an adult with labour, social security or other income, or indirectly in the case of a child who carries with them an entitlement to social security income or child support. Second, an arriving (departing) household member consumes a proportion of household income (with the amount assumed to vary according in line with the type of equivalence scale used), reducing the amount left for other household members. The balance of these two effects will determine whether household equivalised income falls or rises when household size changes.

A key finding of our results is that, on average, the income effect outweighs the consumption effect. Poverty entries are much more common when household size falls than when it rises: 27% of Indigenous people living in a household that has decreased in size enter poverty, compared with 9% of those living in households that have increased in size. Likewise, increases in household size carry a higher chance of poverty exit (44%) than decreases in household size (35%), although the difference here is smaller. These results challenge existing research that suggests that increases in household size have a largely negative effect on household economic well-being (e.g. Smith and Daly, 1996). However, our analysis assumes that new household members share their income with existing household members, something that may not always be the case (Schwab, 1995).

Among the roughly two-thirds of Indigenous people who do not experience changes in household size from one year to the next, the labour market plays a prominent role in triggering poverty transitions. For those in poverty, increased exposure to the labour market (either by having more household members working or higher labour earnings) results in a 62% likelihood of exiting poverty, while reductions in employment and labour earnings trigger around one-quarter of all poverty entries for Indigenous people. Changes in private income, such as business and investment income, play a much smaller role in triggering poverty entries and exits for Indigenous than non-Indigenous people, largely because Indigenous people get far less of their income from such sources (Howlett, *et al*., 2016).

These results highlight the importance of employment in general, and stable employment in particular, in reducing poverty incidence and persistence among the Indigenous population. For those in poverty, increasing employment leads to an increased chance of exiting. However, it is important to ensure that employment is sustained: Indigenous people are significantly more likely to move from employment to non-employment than non-Indigenous people (Hunter and Gray, 2016), risking poverty re-entry.

There is mounting evidence that the impact of equivalence scales on poverty estimates is likely to differ by Indigenous status (Hunter, *et al*., 2004; Hunter, *et al*., 2003). We show that the choice of equivalence scale has differential effects on poverty exit rates for Indigenous and non-Indigenous people, with scales that assume greater economies of size and allocate a higher weight to children reducing exit rates for Indigenous people but increasing exit rates for non-Indigenous people. However, our main results – that poverty entry rates are higher and exit rates lower for Indigenous than non-Indigenous people and that changes in household size account for a large proportion of poverty transitions in the Indigenous population – are quite robust to using alternative equivalence scales.

Our analysis has several limitations that should be taken into account when examining the results. First, due to sample attrition, we were only above to examine poverty transitions over two consecutive years. As such, exit rates are calculated for the entire poor population and do not take into account that some people may have already been in poverty for several years before being observed in year *t*, the so-called 'initial conditions effect' (Cappellari and Jenkins, 2002). Previous research using HILDA for the total Australian population has shown that the likelihood of exiting poverty falls

quickly with poverty duration (Headey, *et al*., 2005). It is likely that the relatively low exit rates for Indigenous people capture both a lower likelihood of exiting for a given duration, as well as a larger proportion of the in-poverty sample who have relatively long poverty duration when we observe them at year *t*. However, it is not possible to differentiate between these two effects. We are also not able to observe intra-year poverty transitions nor changes in household composition or labour market status that occur more frequently than annually. Ethnographic research shows that short-term mobility rates are high within Indigenous households (Schwab, 1995), but we are unable to determine the extent to which these changes trigger poverty transitions.

Second, household disposable income data from the HILDA Survey is not measured concurrently with household composition. Recall that household income is for the financial year preceding the survey, and is aggregated over all current household members. Where household composition is unchanged, this assumption will have little effect on the results. But as we have found, around one third of Indigenous people live in households that change size from year to year. This introduces measurement error in our poverty measures that is likely to vary by Indigenous status. It also means that some poverty entries and exits are likely to be the drivers of, rather than the results of, changes in household size.

Finally, our results are based on analysis of Indigenous Australians living in non-remote areas, and due to attrition our sample is probably more urbanised than the non-remote Indigenous population in general. Our results suggest that Indigenous people living in remote areas are likely to experience even higher poverty entry rates and lower poverty exit rates than those in non-remote areas, based on existing research that shows that they have higher transitions out of employment (Hunter and Gray, 2016) and are more likely to live in extended family and multi-family households than Indigenous people in non-remote areas. However, caution should be used when generalising our results to the wider Indigenous population.

Despite these limitations our results provide important insights into the dynamics of income poverty in Indigenous households. Future research could usefully extend this analysis to examine the extent to which changes in income poverty translate into changes in household well-being, using measures of deprivation or financial stress that are included in the HILDA Survey. This approach may shed some light on the extent to which financial resources and costs are shared within Indigenous households.

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Digitalisation and Women's Workforce Participation in the Indo-Pacific

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Abstract

Between 2000 and 2016 the gap between women and men's workforce participation in the Indo-Pacific has narrowed, while indicators of digital connectivity and Internet use have grown rapidly. We find a robust and statistically significant correlation between Internet use and women's workforce participation controlling for country fixed effects, a time trend, and numerous other controls. The most conservative estimate suggests that, on average, growth in Internet use has been associated with around four-fifths of the increase in women's participation in the Indo-Pacific between 2000 and 2016. Instrumental variables estimation finds a stronger positive association between women's workforce participation and exogenously determined Internet use. Despite finding a positive association between Internet use and women's participation, a number of barriers exist that are preventing women from fully sharing in the benefits of the digital economy. Based on findings from the G20 Taskforce on Digitalisation, we consider a range of measures that policymakers in the Indo-Pacific can pursue to address these barriers.

Keywords: labour economics; gender; technological change

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1. Introduction

The digital economy is expanding rapidly in the Indo-Pacific, helping boost growth and expand economic opportunities at a time of otherwise disappointing global productivity growth. In low and middle-income countries digital platforms are helping micro-businesses access new, in some cases global, markets and supplement traditional sources of income (Vial and Hanoteau, 2015). The rapid increase in mobile phone availability and use in the region has helped reduce the costs of obtaining information and other transaction costs, lowered the costs of money transfer and financial services, improved access to credit, and helped women to coordinate their work and family lives (Jacobsen, 2011). In both developed and developing economies, automation and skill-biased technological change have increased the demand for 'brains' relative to 'brawn' which has helped women close participation and pay gaps (see World Bank, 2012; and Black and Spitz-Oener, 2010). While in developed economies the Internet has increased women's workforce participation through supporting teleworking and flexible work arrangements, and reduced the time spent undertaking household labour (Dettling, 2017).

Despite this potential, concerns have been raised that the benefits of digitalisation are not being shared equally by women; that women face higher barriers to participation in the digital economy compared to men; and that digitisation may see a reduction in job quality for women. For instance, Martinez and Nguyen (2014) observe that a lack of digital skills; lower access to finance and purchasing power; and a range of cultural and normative barriers are preventing women in Asia from gaining the full benefits of the digital revolution.

This paper seeks to address two questions. First, what is the relationship between women's workforce participation and the digital economy in the Indo-Pacific since the turn of the century focusing on Internet usage as an indicator of digital activity? Second, based on early insights gained from the work of the G20 Taskforce on Digitalisation on bridging the digital gender divide, what policies can countries in the Indo-Pacific prioritise to ensure that women can fully share in all the benefits the digital economy has to offer?

For the purposes of our analysis the Indo-Pacific countries include all countries in Asia, Oceania and the Pacific coast of the Americas where relevant data is available. Without providing an exhaustive list, these cover a diverse range of countries including: The United States and Canada in North America; Mexico in Central America; Chile and Nicaragua in South America; Saudi Arabia, Turkey and Jordan in the Middle-East; countries such as Russia, Georgia and Azerbaijan in Central and West Asia; China and Japan in East Asia; India, Pakistan and Sri Lanka in South Asia; Southeast Asian countries such as Indonesia, Cambodia and Myanmar; and Australia, Papua New Guinea and New Zealand in Oceania.

We find a robust and statistically significant correlation between Internet use and women's workforce participation in the Indo-Pacific controlling for country and time fixed effects, and numerous other controls identified in the literature. The most conservative estimate suggests that growth in Internet use has been associated with around four-fifths of the increase in women's workforce participation in the Indo-Pacific between 2000 and 2016. Instrumental variables estimation finds support

for a stronger positive association between exogenously determined Internet use and women's participation for the 2008-2014 period, and indirectly points to the importance of the free flow of information online for women's workforce participation in the region. Although we find a positive and significant relationship between Internet use and women's workforce participation, there remain a number of barriers, both globally and in the region, that are preventing women from fully sharing in the benefits of the digital economy. Drawing on work of the G20 Taskforce on Digitalisation, we discuss a range of measures that policy makers in the Indo-Pacific can consider to address these barriers.

2. Literature review

Despite the rapid and ubiquitous digital transformation of the global economy over the past generation, surprisingly few studies have assessed the consequences of digitalisation for labour market outcomes, and especially for women and in developing economies. This is perhaps especially surprising given the predictions of Frey and Osborne (2017) that 'computerisation' will result in significant job losses. Results concerning the impact of digitalisation on job search have been somewhat mixed with Stevenson (2009) and Kuhn and Mansour (2014) finding that Internet job search reduces unemployment duration; Kuhn and Skuterad (2004) finding the opposite result; and Kroft and Pope (2014) finding no relationship. Atasoy (2013) has found a positive relationship between broadband penetration and employment rates in the United States.

Over the past generation digital technologies have had a transformative impact on the organisation of economic activity, increasing the demand and returns for cognitive and non-routine skills relative to manual and routine skills (World Bank, 2012). There is some evidence that this has been more beneficial to women relative to men. For example, Black and Spitz-Oener (2010) found that women had experienced an increase in non-routine analytical and interactive tasks relative to men as a consequence of digitisation and automation in West Germany between 1979 and 1999. These tasks were associated with higher skill levels, and therefore higher remuneration levels, which helped to reduce the gender pay gap.

Dettling (2017) has found high-speed Internet use contributed to a 4.1 percentage point increase in workforce participation for married women in the United States between 2000 and 2009, with no benefits for single women or men.[1] Among married women, college educated women with children experienced the greatest benefits. Using the Internet to telework and saving time in home production were the two key drivers of increased participation.

From a methodological perspective, Dettling (2017) estimates a reduced form labour supply relationship with women's workforce participation as the dependent variable; high-speed Internet connections as the key explanatory variable which is also instrumented for using the proportion of multi-dimensional dwellings in the state; time and state fixed effects; and a range of control variables including state

1 High-speed Internet use was also found to cause married women to work an additional four hours per week, and increase full-time employment by 3.7 percentage points for married women relative to single women and men. High-speed Internet use is also found to increase married women's employment by 3 percentage points.

level income per capita, wages, population density, housing prices, unemployment and various measures of Internet-intensive business activity.

This paper is also related to studies that have focused on the implications of technological change, and improvements in labour saving household technologies in particular, for women's workforce participation (see Greenwood, Seshadri, and Yorukoglu, 2005; and Cavalcanti and Tavares, 2008). Cavalcanti and Tavares (2008) for instance argue that the decline in relative prices of home appliances in the United Kingdom between 1975 and 1999 accounted for about 10 to 15 per cent of the increase in women's workforce participation over this period using ordinary least squares estimation, increasing to 33 to 55 per cent under instrumental variables estimation. They estimate a panel model of women's workforce participation for OECD countries regressing women's workforce participation on an index of relative price change of household appliances with respect to the consumer price index; country dummies; a common time trend; government spending as a proportion of GDP; the urban population; GDP growth; and a measure of GDP per head of male population. Following Blau (1998), urban population is used as an instrument for fertility rates. To test for exogeneity the authors use the manufacturing price index and the terms of trade as instruments for the relative price decline in household appliances, and find evidence of a causal relationship between the relative decline in prices of labour saving household technologies and women's workforce participation.

This paper is also situated in a broader literature concerning the determinants of women's workforce participation. Goldin (1995) showed that women's workforce participation tends to fall as countries move from low to middle-income status, however tends to rise again as countries move from middle to high-income status as the opportunity costs of women remaining out of the labour force rise. When country income levels are low and the agricultural share of production is high, poverty and necessity are the primary drivers of high female workforce participation rates.

As countries transition to middle-income status, greater economic prosperity provides women with more choices concerning work, and some may choose to withdraw due to the income and status effect (ILO, 2014). The transition from subsistence agriculture into manufacturing activity is also typically associated with increased use of capital-intensive technologies, which are often more complementary to male rather than female labour (Olivetti, 2013).

Moving from middle to high-income status, women's workforce participation tends to rise again when women's education levels improve, and the opportunity cost of women's time in market sector employment rises. Some countries within the Indo-Pacific display within-country U-shaped relationships between incomes and women's participation. For example, women's workforce participation has remained relatively flat in Indonesia between 2000 and 2016. Schaner and Das (2016) attribute this to rising educational attainment and wage employment in urban Indonesia offsetting declines in workforce participation in rural Indonesia as women opt out of unpaid, informal employment.

Looking at the OECD economies, Jaumotte (2003) finds that cultural beliefs and attitudes, education, labour market conditions, and tax and transfer policies can all influence the level of women's workforce participation. More recently Thevenon

(2013) again highlights the contribution of educational attainment, declining fertility rates, cyclical labour market conditions, growth in services employment, and increases in part-time employment as key contributors to the increase in women's workforce participation in OECD countries, with no relationship found between government employment and women's participation. Tax, transfer, parenting leave and childcare policies are all found to have a positive relationship with women's participation. This analysis is based on a panel model of labour force participation in OECD countries featuring a range of policy measures, country and time dummies, and a range of control variables that are likely to influence women's participation including fertility rates, average years of educational attainment, services and government employment shares, unemployment, incidence of part-time employment, and GDP growth.

ADB (2015) highlight the importance of increasing educational attainment, declining fertility rates, and changing cultural norms for recent increases in women's workforce participation in the Asia-Pacific. They observe that women's workforce participation tends to be higher in countries with larger agricultural and services sectors, and women's ability to participate in the labour market can be impaired by unequal access to technology, credit and land. Dasgupta *et al*. (2015) find that women in China are more likely to be employed in the agricultural and services sector, and that declining women's workforce participation in recent years has been driven by young women spending longer in education, and more women withdrawing from the labour force during child-bearing age.

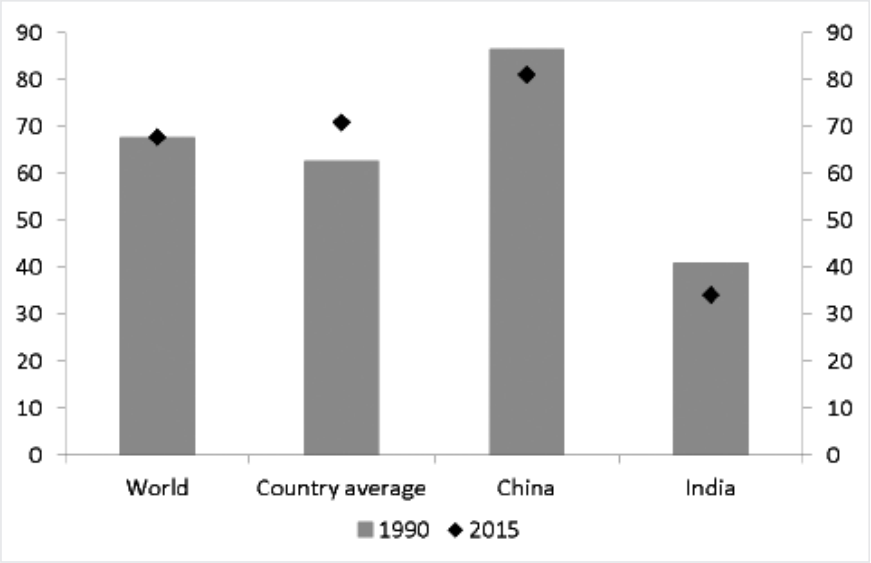
Contreras and Plaza (2010) find cultural factors and education are key determinants of women's workforce participation in Chile, while Srivastava and Srivastava (2010) suggest similar drivers of women's workforce participation in rural India. Klasen and Pieters (2013) suggest rising household incomes, husbands' educational attainment and demand-side factors were responsible for declining women's workforce participation in urban India between 1987 and 2009. Blau (1998) attributes the 23 percentage point increase in women's workforce participation in the United States between 1970 and 1995 to the positive substitution effect generated by increasing wives' real wages exceeding the income effect of rising husbands' real wages; increasing educational attainment and divorce rates; and declining fertility and marriage rates. Evans and Kelley (2004) identify rising educational attainment and declining fertility rates as key drivers of women's workforce participation in Australia in the 1980s and 1990s. Dayıoğlu and Kirdar (2010) argue that urbanisation was a key factor behind the decline in women's workforce participation in Turkey between 1988 and 2010, with some offsetting gains attributable to rising educational attainment in urban areas and declining fertility rates.

However, it also remains the case that a substantial amount of the increase in women's workforce participation recently observed in many countries has not been explained by variables conventionally used in econometric analysis. Standard concerns about model uncertainty, omitted variables and endogeneity in undertaking cross-country empirical analysis using aggregate time-series data (see Durlauf, 2009; and Sims, 1980) suggest that results should be interpreted as indicative in nature. Indeed, this paper endeavors to undertake cross-country empirical analysis in the spirit of Durlauf (2009), as a 'tool for pattern recognition and construction of stylized facts.'

3. Women's workforce participation and digitisation in the Indo-Pacific: What does the data show?

The global female-male participation ratio has remained effectively steady for a quarter-of-a-century between 1990 and 2015 at just under 68 per cent (Chart 1). However, the average participation ratio across all countries actually increased by 8.4 percentage points over the same period. The main reason for this divergence is that the world's two most populace economies, India and China, both experienced declines in the participation ratio over this period. This reflects the fact that economic development is the primary driver of women's labour force participation, with women's participation following a U-shaped trajectory as countries move from low to high-income status (Goldin, 1995).

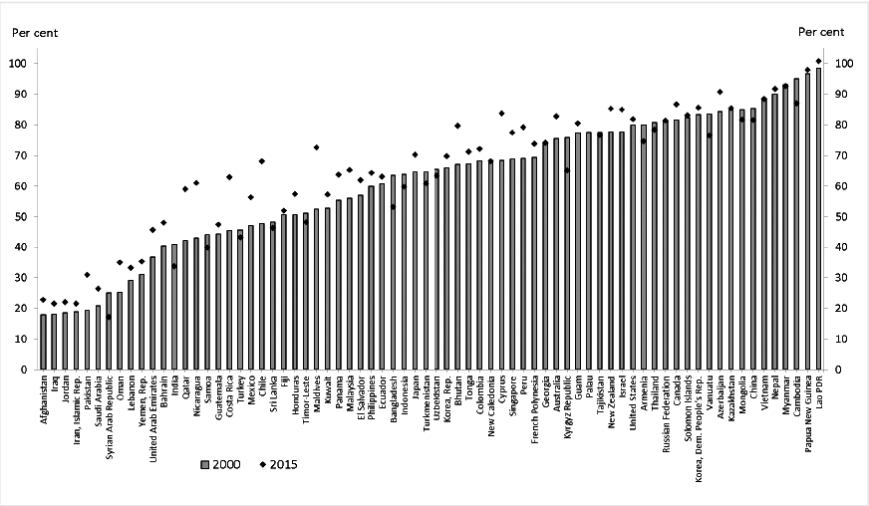
Chart 1: Female-male participation ratio, per cent



Source: World Bank

Between 2000 and 2015 most countries in the Indo-Pacific experienced an improvement in women's labour force participation relative to men (Chart 2). However, it remains the case that many countries in the Indo-Pacific region have very low levels of women's participation, and some experienced declining women's representation in the labour force relative to men. In most cases the decline in female-male participation ratios most likely reflects the development process; however, in the case of Syria, conflict and emigration clearly played a significant role.

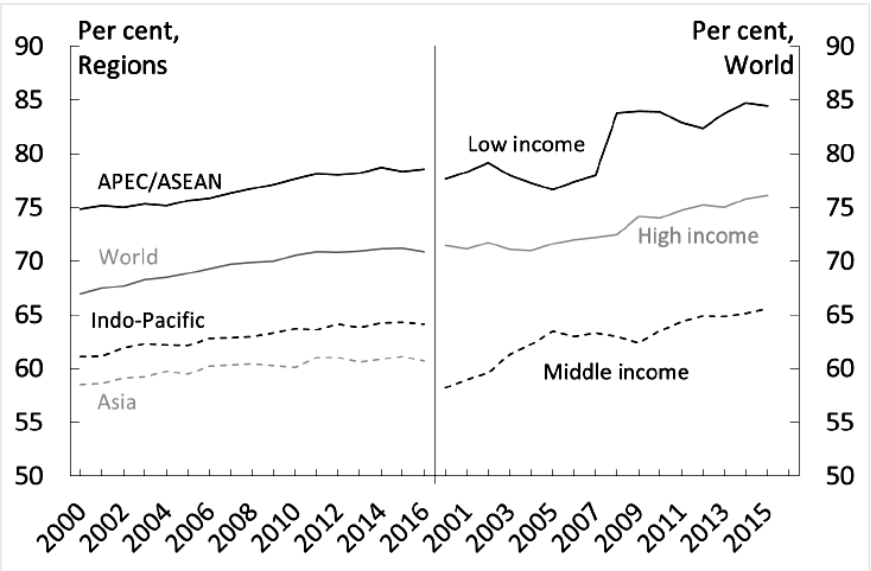
Chart 2: Female-male participation ratio by Indo-Pacific country, 2000 to 2015



Source: World Bank

Between 2000 and 2015 the average gap between female and male labour force participation in the Indo-Pacific region also declined (Chart 3). However, it appears that progress in closing the gap has stalled somewhat over the past five years, a trend that also seems to be apparent globally. In the first panel of Chart 3 it is interesting to note the level differences between different country groupings. The APEC/ASEAN countries have much higher participation ratios relative to the Asian countries which include the Middle East and the sub-continent, and the Indo-Pacific countries which include all Asian countries, as well as the Pacific island nations and the west coast of the Americas. The second panel of Chart 3 clearly reveals the U-shaped pattern between growth and development. Interestingly, female-male participation ratios have been growing within all income categories and regions over time. The global and regional plateauing of the participation ratio evident in the first panel of Chart 3 appears to be predominantly driven by a plateauing of participation ratios in low-income countries.

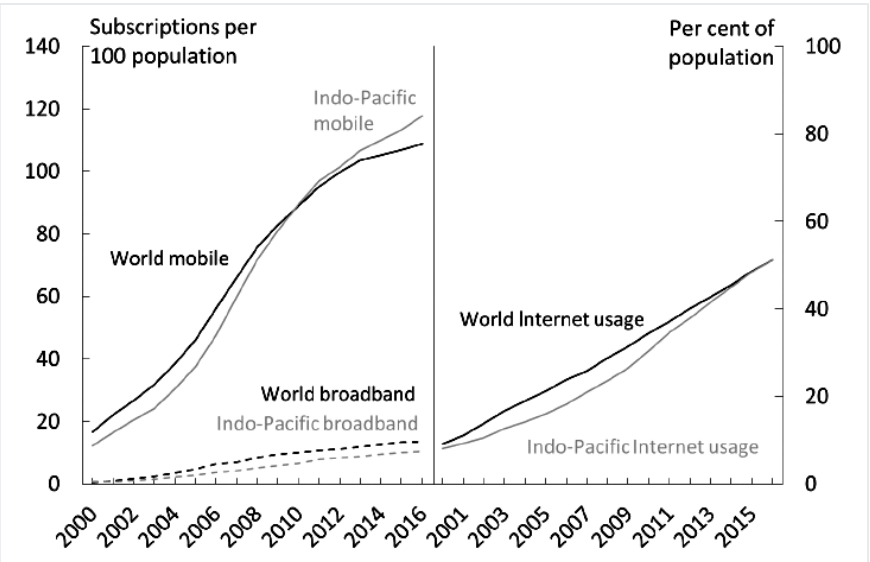
Chart 3: Female-male participation ratio by region and income, per cent



Source: World Bank

Chart 4 demonstrates that indicators of digital activity have also increased significantly between 2000 and 2016, both globally and in the Indo-Pacific. In recent years growth in mobile penetration in the Indo-Pacific has actually outpaced the global average, while broadband penetration rates have grown at a rate below the global average. In recent years the average level of Internet usage in the Indo-Pacific has caught up with the global average driven by the rapid growth in mobile penetration.

Chart 4: ICT connectivity by region



Source: International Telecommunications Union

4. Modelling framework

To obtain a more formal sense of the relationship between digitalisation and women's workforce participation in the Indo-Pacific, a reduced form labour supply relationship along the lines of that estimated in Dettling (2017) and Cavalcanti and Tavares (2008) was estimated for the region using panel regression techniques controlling for time and country fixed effects, and a selection of other correlates with women's workforce participation identified in the literature. The basic modelling specification is as follows:

$$WPR_{it} = \alpha + \beta_0 \cdot INTERNET_{it} + \beta_1 \cdot Z_{it} + \gamma_i + \delta_t + \varepsilon_{it} \quad (1)$$

WPR_{it} is the workforce participation rate for women aged over 15 years in country i in period t. $INTERNET_{it}$ is Internet use as a proportion of the population which acts as our indicator of digital activity. Z_{it} is a vector of additional control variables including GDP per capita; the urban population as an instrument for fertility rates; government spending as a proportion of GDP; and the agricultural share of the economy. The model specification also includes time and country dummy variables δ_t and γ_i to control for time and country specific fixed effects. The use of country dummies to model country specific fixed effects assumes that sources of time invariant heterogeneity between countries related to factors such as cultural norms, religious beliefs or legal systems may be correlated with explanatory variables used in the regression. All data used in estimation was sourced from the World Bank Development Indicators Database with the exception of Internet use data which is sourced from the International Telecommunications Union (Table 1).

Table 1: Descriptive statistics

Description	*Obs.*	*Mean*	*Std. Dev.*	*Minimum*	*Maximum*
Women's workforce participation rate (per cent women's population 15+)	1,207	48.08	16.66	10.96	82.27
Internet usage (per cent of population)	1,100	26.70	25.79	0.00	98.00
GDP per capita (PPP, constant international dollars)	1,190	15,934.83	20,492.06	875.52	129,349.90
Urban population (per cent total population)	1,309	58.04	24.43	12.98	100.00
Government expenditure (per cent of GDP)	720	23.25	12.12	3.89	134.77
Agriculture share (per cent of GDP)	1,023	13.61	10.55	0.04	57.24

Sources: World Bank Development Indicators Database, International Telecommunications Union

Following Goldin (1995) GDP per capita in purchasing power parity terms is included in estimation to control for the influence of the general level of economic development between countries, and to reflect the fact that labour supply is expected to increase in response to rising income levels. Given that GDP can be decomposed into cyclical and structural components, including GDP per capita also helps control for cyclical factors that may influence women's workforce participation. Annual real GDP growth was also trialed as a potential control for business cycle dynamics; however, it was found to be insignificant in all model specifications, and was hence excluded from reported results. Unlike some previous studies we have not included unemployment as an explanatory variable because unemployed women are included in the women's workforce participation rate.

Following Blau (1998) and Cavalcanti and Tavares (2008) we include the urban population as an instrument for women's fertility. These studies argue that the prevalence of use of birth control and lower fertility rates are exogenously predicted by the proportion of the population living in urban areas. An instrument for fertility rates is included to control for the fact that lower fertility rates and dependency ratios are likely to be associated with higher levels of women's labour supply. The fertility rate is instrumented for because family planning decisions may be driven by a desire to work, and therefore there is potentially some reverse causality.

Government spending as a share of GDP was included as an additional control variable as suggested by Cavalcanti and Tavares (2008, 2016). Unfortunately detailed data concerning specific tax, transfer and social policies that might be expected to be positively associated with women's workforce participation (see Thévenon, 2013) are not broadly available for the Indo-Pacific region. However, higher government spending as a share of GDP may be used as an indicator of the presence of government policies that support women's education, child rearing and childcare, which are expected to be positively associated with increasing levels of women's workforce participation.

Agriculture's share of GDP is included as a control variable following the suggestion from Goldin (1995) and ADB (2015) that the least developed countries with high levels of subsistence agricultural activity are also expected to have high levels of women's workforce participation. Also following ADB (2015), models were estimated including the service sectors share of GDP as an additional control. A higher services share is also commonly associated with higher levels of women's participation because services industries can be viewed as more culturally appropriate for women in some societies, and are typically more conducive to part-time and flexible work arrangements that tend to enable higher levels of participation for people with caring responsibilities who are disproportionately female. However, the services share was insignificant in all model specifications, and therefore it has been excluded from reported results.[2]

The model was estimated using the Prais-Winsten technique with panel corrected standard errors (PCSEs). PCSEs are robust to contemporaneous correlation and heteroscedasticity between panels, and first order serial autocorrelation within panels making them ideal for estimation with a panel including aggregate time-series data.

5. Results

Table 1 reports regression results for all model specifications revealing a statistically significant and positive association between Internet use and women's workforce participation that is relatively stable between model specifications. Based on the range of parameter estimates reported in Table 1, the average 43.1 percentage point increase in Internet use in the Indo-Pacific between 2000 and 2016 is associated with between a 1.5 and 2.5 percentage point increase in the women's participation rate over the corresponding period. That is equivalent to between approximately 80 and 130 per cent of the increase in the women's participation rate between 2000 and 2016. While these estimates are large and highly significant, they sit comfortably within the estimate of the impact of broadband Internet on married women's workforce participation in the United States from Dettling (2017). Consistent with the findings of Cavalcanti and Tavares (2008), technological change, this time represented by increasing Internet usage, has the largest impact on women's workforce participation relative to the other control variables.

It is also important to note that there have been divergent influences on women's workforce participation over the period. The average decline in agriculture's share of production has been associated with reductions in women's workforce participation in the Indo-Pacific during the period. For example, the average decline in agriculture's share of production is associated with a decline in women's workforce participation of around 1.1 percentage points in the Indo-Pacific region between 2000 and 2016 based on equation 5 in Table 2.

2 We did find a positive relationship between services' share of GDP and women's workforce participation using global data, and for high income countries in particular (not reported).

Table 2: Determinants of women's labour force participation in the Indo-Pacific (PCSE)

Dependent variable: Women's workforce participation rate, 2000-2016					
Equation	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*
Internet use	0.05*** (5.91)	0.06*** (5.96)	0.06*** (6.13)	0.04** (2.69)	0.04** (3.12)
GDP per capita		0.09*** (4.80)	0.09*** (4.92)	0.14*** (4.69)	0.18*** (5.17)
Urban population			0.11*** (3.18)	0.26** (2.73)	0.22*** (3.71)
Gov. exp. share				0.02** (2.35)	0.02** (2.61)
Ag. share					0.18*** (4.18)
Country dummies (p>F)	0.00	0.00	0.00	0.00	0.00
Time dummies (p>F)	0.00	0.00	0.00	0.01	0.00
N	1053	995	995	632	548
R^2	0.99	0.99	0.99	0.99	0.99
Wald test (p>χ^2)	0.00	0.00	0.00	0.00	0.00

Notes: * p<0.05; ** p<0.01; *** p<0.001. Constants are omitted from reported results. z statistics are in brackets. Wald tests are on the null of all parameters being equal to zero. GDP per capita enters the equation in thousands of constant international dollars. Dividing parameter estimates by a factor of 1,000 returns the relationship between GDP per capita in constant international dollar terms and women's workforce participation.

We find stronger empirical support for a linear relationship between GDP per capita and the women's workforce participation rate in the Indo-Pacific, rather than the U-shaped relationship predicted in the literature (see Goldin (1995) for instance).[3] This is mostly driven by the fact that there is a lack of data availability for low-income countries in the region, and therefore the results largely reflect the relationship between GDP per capita and women's participation in middle and high-income countries in the region. That is, from the bottom to the top right hand corner of the U. We also include agriculture's share of GDP in some of our model specifications which may help explain some of the decline in women's workforce participation when countries move from low to middle-income status.

3 In results not reported we found evidence in favour of the quadratic relationship in models estimated using global data, including for high, middle and low-income sub samples.

A positive statistically and economically significant relationship is found between the urban population and women's workforce participation as anticipated. Depending on model specification, increasing urbanisation accounts for up to 60 per cent of the increase in women's workforce participation in the region between 2000 and 2016. Interpreting urbanisation as an instrument for fertility rates, this indicates an economically and statistically significant negative relationship between fertility rates and women's workforce participation as well.

A positive and statistically significant relationship was also found between government expenditure as a proportion of GDP and women's workforce participation. However, in economic terms the average contribution of government spending contributes less than one per cent of the increase in women's workforce participation in the region between 2000 and 2016.

6. Causality

So why might higher levels of Internet usage be positively associated with women's workforce participation? Since the turn of the century the Internet has enabled an increase in the pace of knowledge and technology transfer across borders, helping to drive increases in productivity. For example, the World Bank (2009) estimated that a 10 percentage point increase in Internet use is associated with a 0.77 percentage point increase in GDP growth in high income countries and a 1.12 percentage point increase in growth in low and middle-income countries. Between 2000 and 2016 Internet use increased by 43.1 percentage points on average in the Indo-Pacific. There is also some evidence suggesting that the productivity benefits of digitalisation and the Internet may be under-measured in national accounts. For example, Coyle and Mitra-Kahn (2017) find that mismeasurement of GDP growth related to fixed and mobile broadband data use could add up to 1.5 percentage points per annum to UK real GDP growth between 2010 and 2015. Increased output and productivity related to the Internet and digitisation, combined with changing social attitudes towards women in the workforce as reflected in our time fixed effects, should translate into increased demand for female workers, and higher women's workforce participation.

In developing countries digitalisation has helped expand the provision of financial services to under-served communities, helping to support women's entrepreneurship. Digital platforms such as Alibaba are helping small and medium-sized businesses access global markets, while others such as Go-Jek help support the many small household-based businesses that account for the bulk of businesses, employment and GDP in countries such as Indonesia. The digital economy may also support greater services employment, and part-time and flexible work arrangements, which have traditionally benefitted women's workforce participation. As Dettling (2017) finds, the Internet and digital technologies can support teleworking arrangements and reduce time spent on home production activities which may help men and women better balance work and family responsibilities. Digital technologies may also help generate efficiencies in labour market search and home production which could support higher levels of women's workforce participation.

However, a statistically significant association between Internet usage and increasing women's workforce participation does not imply that Internet use causes increases in women's workforce participation. Some of the increase in Internet use in the region has potentially been driven by increased levels of women's workforce participation (demand directed technical change). However, it should be noted that it is practically unlikely that much of the 43.1 percentage point average increase in Internet usage between 2000 and 2016 could be attributed to a 1.9 percentage point average increase in women's participation over the same period. The great majority of the increase in Internet use is likely to have been driven by rapid innovation in ICT products and services, and the related rapid decline in the relative price of ICT products and services over the period.

To formally assess the association between exogenously determined Internet use and women's workforce participation, we need to find instrumental variables that are strongly related to increases in Internet use, and unlikely to directly affect women's participation. We anticipate that variables representing the absence of state control over Internet access will be strongly positively related to Internet use, and not directly related to women's workforce participation. State control of Internet access in particular is also of interest from a policy perspective because it provides an insight into how important the free flow of information online is to Internet usage, and broader economic outcomes such as women's workforce participation.

It is theoretically possible that the degree of Internet freedom or state control of Internet access could be directly related to women's workforce participation to the extent that the nature of these controls directly prevented women from engaging in e-commerce, conducting job search, or advertising their availability to work online for example. This would invalidate the use of state control of Internet access as an instrumental variable. However, in practice we find no empirical support for a direct relationship between state control of Internet access and women's workforce participation in the Indo-Pacific countries used in our empirical analysis. This could be because even governments in the region that seek to restrict access to the Internet are generally supportive of citizens using the Internet to conduct commercial activity, or look for work. It is typically other online activities that they seek to suppress, such as political communication or the publication of information critical of the government.

Further, it is anticipated that variables reflecting state control over traditional media sources, such as access to foreign newspapers and television channels, should be negatively correlated with Internet use, and not directly related to women's participation. State control over traditional media sources should be negatively correlated with Internet use because it is likely to encourage citizens to substitute towards different information sources, such as the Internet, that may be inherently more difficult for governments to control due to technologies such as Virtual Private Networks (VPNs). It is again theoretically possible that state control over traditional media sources could act as a direct impediment to women's workforce participation to the extent that women were banned from advertising their businesses in traditional media outlets for instance. However, in practice we find no evidence of a direct empirical relationship between state control over traditional media sources and

women's workforce participation in the Indo-Pacific countries used in our empirical analysis, suggesting that these variables are also suitable to use as instruments for Internet usage.

Helpfully for estimation purposes, the CATO Human Freedom Index includes subindexes representing 'state control over Internet access' reflecting the 'freedom of access, navigation, and publication on the Internet' (CATO Institute, 2017), 'laws and regulations that influence media content', 'political pressures and controls on the media', and 'access to foreign information' in the form of foreign newspapers and television channels. The CATO Human Freedom Index is described by CATO Institute (2017) as a broad measure of human freedom made up of 79 sub-indexes relating to economic and personal freedom in areas such as the rule of law; personal safety and security; freedom of movement and assembly; freedom of expression and access to information covering 159 countries. A score of 10 under each sub-index represents the highest degree of freedom, and zero the absence of freedom. This information is available for 2008 and the 2010-2014 period, with small sample sizes exacerbating the loss of estimation efficiency associated with two-stage least squares estimation.

In experimenting with different first stage regressions, state control over Internet access, combined with either laws influencing media content or political pressure on the media outlets appeared the most promising instruments. That is to say they had the most statistically significant relationships with Internet usage. However, somewhat paradoxically, in second stage regressions state control of the Internet and access to foreign information were the best performing instrumental variables. First stage regressions regressing Internet usage on state control of the Internet, access to foreign information and all the other right hand side variables used in estimation are reported in Table A1 of the Appendix. Wald tests also reject the null hypothesis that coefficients for the instrumental variables are jointly equal to zero in the first stage regressions for four equations at the 5 per cent significance level, and two equations at the 10 per cent level.

Table 3 reports second stage regressions for the women's workforce participation rate where we instrument for Internet use using state control of the Internet and access to foreign information. Consistent with Cavalcanti and Tavares (2008), all model specifications estimated using instrumental variables suggest a stronger relationship between exogenously determined Internet usage and women's workforce participation than under standard estimation. Indeed parameter estimates are on average around three times larger than under standard estimation techniques, which is again broadly consistent with Cavalcanti and Tavares (2008). Given the different sample periods used in estimation, it may have been that Internet use became a more important enabler of women's workforce participation in more recent years. However, models estimated without instrumenting for Internet usage for the post-2008 period indicate that this does not appear to be the case (see Appendix Table A2). Sargan-Hansen over-identification tests strongly support the null of instrument validity in each model specification. Less efficient parameter estimation under instrumental variables estimation is to be expected, which is exacerbated by relatively small sample sizes.

Table 3: Determinants of women's labour force participation in the Indo-Pacific - Instrumental variables (PCSE)

Dependent variable: Women's workforce participation rate (2008, 2010-2014)					
Eq.	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*
Internet use	0.16** (2.94)	0.15*** (3.52)	0.12** (3.44)	0.17** (3.11)	0.22** (3.26)
GDP per capita		0.11*** (3.72)	0.12*** (3.80)	0.11** (2.87)	0.16*** (4.00)
Urban population			0.27* (2.11)	0.48* (2.18)	0.68** (2.72)
Gov. share				-0.02 (-0.58)	-0.02 (-0.81)
Ag. share					0.06 (0.68)
Country dummies (p>F)	0.00	0.00	0.00	0.00	0.00
Time dummies (p>F)	0.00	0.00	0.00	0.00	0.00
N	300	300	300	238	223
R^2	0.99	0.99	0.99	0.99	0.99
Wald test (p> χ^2)	0.00	0.00	0.00	0.00	0.00
Overid. test (p> χ^2)	0.32	0.30	0.37	0.22	0.18

Notes: * p<0.05; ** p<0.01; *** p<0.001. Constants are omitted from reported results. z statistics are in brackets. Wald tests are on the null of all parameters being equal to zero. Over-identification test is the Sargan-Hansen test with null of valid instrumental variables. GDP per capita enters the equation in thousands of constant international dollars. Dividing parameter estimates by a factor of 1,000 returns the relationship between GDP per capita in constant international dollar terms and women's workforce participation.

In summary, our results suggest a positive and significant association between women's workforce participation and exogenously determined Internet use in the Indo-Pacific region, at least since 2008. The evidence in favour of a positive relationship between Internet use and women's workforce participation is robust to the introduction of a range of controls, including country and time dummies, and a range of factors associated with women's workforce participation identified in the literature. Indirectly, we also find evidence that freedom of the Internet from state interference and the free flow of information online are associated with higher levels of women's workforce participation in the Indo-Pacific.

7. Policies to bridge the gender divide in the Indo-Pacific

Conceptual framework

While we find a statistically significant and positive relationship between Internet use and women's workforce participation for countries in the Indo-Pacific region, there are still many barriers that are preventing women from fully sharing in the benefits of the digital economy. Policy actions to address these barriers can be roughly divided into four separate categories: Access, skills and entrepreneurship, norms, and data. Access relates to ensuring universal access to digital connectivity as an essential underpinning of active participation in the digital economy. Once access is enabled digital skills are critical to allow for the effective use of digital technologies. Norms refer to the stereotypical views about the suitability of women for digital careers, and other societal barriers often embedded in regulations and institutions that can hold women back from more actively participating in the digital economy. A final barrier to women's participation in the digital economy is the lack of gender-specific ICT data in national statistics which can make it difficult for policy makers to apply a gender lens in evidence-based policy development and evaluation.

Overarching issues

The first insight gleaned from the G20 Taskforce on Digitalisation's ongoing focus on bridging the digital gender divide is that national broadband, digital and entrepreneurship policies and strategies should incorporate a gender perspective that addresses women's needs, circumstances, capabilities and preferences.[4] Governments should also consider incorporating gender equality targets for Internet and broadband access and use in these strategies as and where appropriate. Governments should apply formal gender impact analysis to all new policy proposals in these areas, and take into account gender equality and information and communications technology (ICT) linkages within sectoral strategies and innovation systems.

It goes without saying that digital development and innovation is proceeding at a more rapid pace in the private sector than the public sector. Businesses, governments and civil society all share a common interest in fostering digital inclusion, and this presents a range of opportunities for government to partner with the business and not-for-profit sector. Therefore, it may be valuable for policy makers in the Indo-Pacific region to consider leveraging existing private sector and civil society initiatives as a means to increase universal, equitable, safe, and affordable access to the Internet and other digital technologies, as well as increase women and girls' engagement in STEM, where these programs have proven to be effective.

4 In 2016 less than 50 per cent of countries globally incorporated relevant references, actions and goals to address gender equality in national broadband policies (Australian Government, 2017).

Access

Our empirical analysis provides some evidence of an economically significant and positive association between Internet usage and women's participation in the Indo-Pacific region, reinforcing the link between access to fast and reliable connectivity and participation in the digital economy. However, globally around 1.7 billion women in low and middle-income countries do not own a mobile phone (GSMA, 2015); nearly 60 per cent of the world's population have no access to the Internet; and there are 250 million fewer women online than men (ITU, 2016).

For many women in the region, access to digital connectivity is not just about access to digital or telecommunications infrastructure. In many low-income countries in particular, providing women with access to essential services that reduce the burden of household work, including ensuring access to potable water, sanitation, electricity, and cooking fuel (Gill *et al*., 2010), is critical to enable women to allocate more time to participate in the workforce and digital economy. The digital economy also relies heavily on access to traditional transport, logistics and utility infrastructures, of which significant needs have been identified in the Asia-Pacific up to the year 2030 (see ADB, 2017).[5]

As with other forms of infrastructure, the maintenance of open and competitive markets for the provision of communications infrastructure should be the primary policy approach to providing affordable access to digital connectivity. Respect for the rule of law and the protection of property rights are also critical enablers of investment in digital infrastructure. Where there are market failures that result in a lack of access to connectivity in particular regions or communities, there may be a role for governments to step in and directly fund or deliver infrastructure. As an intermediate option, governments may consider introducing universal service obligations for private telecommunications providers. However, care needs to be taken to ensure that these regulatory interventions do not discourage private investment.

Encouraging investment in mobile networks in low-income countries in particular can be a powerful driver of digital financial inclusion, underpinning women's entrepreneurship and participation in the digital economy. It is also clear that governments need to be concerned not only with connecting the unconnected, but also with the quality and speed of network connectivity. More comprehensive high-speed Internet coverage supports higher levels of digital economic activity and women's workforce participation. For example in Australia, regions with access to the high-speed National Broadband Network (NBN) experienced 2.2 percentage points higher growth in women's entrepreneurship than areas without NBN (AlphaBeta, 2018).

Given how critical access to connectivity is to functioning in the information society of the 21st century, policy makers should view access to connectivity in a similar way as they view access to other essential services such as electricity and water when considering welfare adequacy and consumer protections such as financial hardship

5 The Asian Development Bank (ADB, 2017) forecast that between 2016 and 2030 developing Asia will require US$14.7 trillion for power infrastructure, US$8.4 billion for transport infrastructure, and US$800 billion for water and sanitation. By comparison the ADB assess telecommunications infrastructure needs of US$2.3 trillion. A huge increase in private sector financing will be required to augment public provision if these needs are to be accommodated.

provisions. The most efficient way to address affordability is via the tax and transfer system, and there may be merit in reviewing the adequacy of welfare arrangements to ensure that they are keeping pace with the costs of connectivity. Policy options that support low-income individuals, women and household secondary income earners to participate in the labour market, such as earned income tax credits or other wage subsidies, are also well adapted to supporting participation in the 'gig' economy and the future of work.

In some communities in the region it is still the case that prevailing norms and social practices combined with limited financial resources may restrict many women from accessing mobile phones, the Internet and other digital technologies. In these circumstances governments have a role to play in leading cultural change, which may include expanding anti-discrimination laws into areas of technological discrimination, as well as providing women in the most disadvantaged circumstances with direct access to technology. Initiatives to provide free wi-fi access at public buildings such as schools and libraries should be supported. Business incubators, accelerators, and maker or hacker spaces provide another avenue to provide access to connectivity and digital office space for women (World Bank, 2012).

Our results also indicate an important indirect relationship between maintaining a free and open Internet and women's workforce participation. The free flow of data online is a critical enabler of participation in global value chains, and opportunities for trade and employment in the future of work. Data flows are important not only because they underpin trading relationships, but also because they provide women with access to knowledge and skills to help improve their productivity and employment prospects. The free flow of information also allows people to access information that may challenge traditional ideas about the appropriate role of women in society and the economy. It can also facilitate access to information concerning positive role models for women in the technology sector for example, which may help encourage women to pursue digital careers. Respecting the free flow of data online in domestic regulation, and advocating for the benefits of the open Internet in international trade negotiations and diplomacy can be important drivers of reducing the gap in workforce participation between women and men in the Indo-Pacific region.

Skills and entrepreneurship

Women also face a skills gap, preventing them from fully participating as either consumers or producers of digital technologies and financial services. Globally, women make up fewer than 20 per cent of the ICT workforce; 9 per cent of ICT sector CEOs; and only 6 per cent of app developers (ITU, 2016). Given that 95 per cent of jobs now have a digital component (ITU, 2012), it is essential to equip young women with the digital skills and competencies necessary for them to succeed in the digital economy. Already there are reasons for optimism, with women beginning to thrive in the Indo-Pacific's rapidly expanding digital economy. For example, women-owned businesses account for 35 per cent of total revenue earned via Tokopedia, Indonesia's largest online marketplace; and 55 per cent of new digital businesses in China are founded by women (Tonby and Madgavkar, 2018).

In low to middle-income countries in the region, providing universal education to secondary school level is a necessary condition for improving women's representation in the digital economy; however, it will most likely not be a sufficient condition in the absence of other supporting interventions (Sudarshan, 2014). In India for example, recent research suggests that formal education alone has a limited impact on shifting entrenched gender norms (Manjrekar, 2013; Mukherjee, 2013; Santhya *et al*., 2013).

Early exposure to digital technologies has been shown to be of particular benefit to girls, helping them build confidence and overcome cultural stereotypes (Powell and Chang, 2016). In this regard policymakers should consider expanding national primary and secondary curricula to incorporate coding, computational thinking and other digital skills. Consideration should also be given to including gender-appropriate teaching material in these curricula, and providing training and support to teachers to enable them to deliver a digital skills curriculum. Extra-curricular activities aimed at enhancing digital skills for young women and promoting digital careers should also be encouraged.[6] Governments can also help facilitate partnerships between industry and secondary schools to improve STEM related vocational pathways for young women.[7] Alongside a greater focus on STEM skills, curricula should also foster creativity, and the development of interpersonal and uniquely human skills that complement rather than compete with digital technologies (Future of Work Commission, 2018).

The Association of Academies and Societies of Science in Asia has found that only 18 per cent of Computer Science (CS) graduates in Asia are women (RMIT, 2017). However, evidence is emerging about a range of relatively simple interventions that can significantly increase female entry and graduation rates in CS and information technology (IT) degrees. For example, under the Building, Recruiting and Inclusion for Diversity (BRAID) initiative in the United States, each BRAID school commits to undertaking a range of evidence-based actions modelled on the example set by BRAID Beacon schools.[8] Results from BRAID Beacon schools to date have been impressive (Table 4), with schools implementing BRAID commitments experiencing a 2.3 per cent increase in the representation of women in CS studies between 2014 and 2017.

6 For example, as part of it's A$13 million Women in STEM and Entrepreneurship grant program under the National Innovation and Science Agenda, the Australian Government is supporting initiatives such as Girl Geek Academy, which encourages early participation in STEM by teaching 5-8 years girls to code (National Innovation and Science Agenda, 2017).

7 For example, the Australian Government is investing A$5.1 million to pilot two Pathways in Technology (P-TECH) sites to support the building of STEM capability and improving the quality of vocational pathways available for young people, including young women (Skilling Australia Foundation, 2017). The Australian Government has also committed to expanding the P-TECH pilot to 12 additional sites across Australia. P-TECH is an innovative approach to education-industry collaboration, which was adapted from the US Pathways in Technology Early College High School (P-TECH) model using existing qualifications and operating under current education system requirements. Key features of the program include: collaboration between education and industry sectors; innovative curriculum design; hands-on workplace experience for students; industry mentoring and support for students; and industry supported pathways for students to successfully transition to post-school study and/or work.

8 The Initiative is financially supported by Facebook, Google, Intel, Microsoft, the Computing Research Association and the National Science Foundation in partnership with participating institutions.

Table 4: BRAID Beacon schools improvements in female representation

School	*Years*	*Change in Representation*	*Unit of Measurement*
Cal Poly-SLO	2008-2016	8% to 27% (Computer Science) 9% to 29% (Software Engineering)	Women admitted to programs
Harvey Mudd College	2006-2016	12% to 47.5%	Women majoring in computing
University of British Columbia	1997-2016	16% to 32%	Women majoring in computing
University of Washington	2007-2015	19% to 33%	Women majoring in computing

Sources: Reproduced from https://anitab.org/braid-building-recruiting-and-inclusion-for-diversity/.

BRAID commitments to date have included: Making introductory CS more engaging for inexperienced students, with women typically overrepresented in this group; outreach programs to help develop digital and CS teaching skills; supporting events, camps and after school programs to encourage more girls to engage in CS; creating student societies and mentoring programs for women in computing; promoting positive female role models in computer science and STEM; offering interdisciplinary majors or double-degrees allowing CS to be combined with other fields of study based on evidence that women prefer to combine CS studies with other studies that address broader social betterment objectives; supporting summer STEM research opportunities for undergraduate students based on evidence this contributes to increasing graduation rates; hiring more female staff members; and introducing 'flipped learning' and other active learning and peer instruction methodologies (BRAID, 2017).

As the above list indicates, not all interventions to reduce the digital gender divide in CS studies are necessarily costly or out of reach for developing economies. They often involve simply changing the way existing classroom activities are structured or run. For example, Booth, Cardona Sosa and Nolen (2013) show that single-sex introductory classes for technical subjects, like STEM subjects, can significantly improve women's performance and university course completion rates, at no cost and with no adverse consequences for male students.[9] Policymakers can also encourage national universities and research institutions to sign on to initiatives such as the Athena SWAN (Scientific Women's Academic

9 Booth, Cardona Sosa and Nolen (2013) suggest that enhanced female performance is attributed to a lowering of stereotype effects where women inhibited by culturally driven norms about the appropriate mode of female behaviour—avoiding risk—find it easier to make riskier choices once placed in an all-female environment. An all-female group may also facilitate the formation of friendships within a faculty environment that is disproportionately male. These friendships may enhance the confidence of these women and facilitate the formation of networks, leading them to feel more comfortable in making riskier choices than women in co-ed classes.

Network) Charter and support other national initiatives that promote gender equality and diversity in STEM fields.[10]

Lifelong learning is also critical, with Singapore's SkillsFuture platform providing an excellent model of how governments can equip people of all ages with the skills necessary to participate in a rapidly evolving digital economy. Under this initiative employers provide input on the skills they believe workers will require over the next three to five years. Individuals can then learn these skills in short, industry and digitally relevant courses, while they are working or undertaking study. The scheme provides a coherent framework for micro-skilling and lifelong learning, with course completion providing individuals with recognised qualifications in skills relevant to the digital economy. The initiative is heavily subsidised by employers, and the Singapore Government provides an opening credit of S$500 and periodic top-ups into individual learning accounts to apply towards courses.

Policy-makers in the Indo-Pacific should also consider developing policies or strategies that support women who wish to become digital entrepreneurs. Programs, such as Australia's *New Enterprise Incentive Scheme* (Department of Employment, 2017), can encourage women to participate in digital careers by supporting job seekers to become small business owners. Programs such as these can help women participate in the digital economy, for example by starting a small business that trades online using digital platforms. The World Bank *Women Entrepreneurs Finance Initiative* (We-Fi), of which the Australian Government is a founding partner, will leverage more than US$1 billion in financing to improve access to capital and technical assistance for female entrepreneurs, including those engaged in digital entrepreneurship.

In low to middle-income countries in particular, governments and other service providers should consider providing employment and training programs that help women develop their digital skills and direct them towards technology oriented careers. These programs can provide gateways into micro-business opportunities undertaking various services such as online sales, data monitoring, digitisation, cataloguing and transcription. For example, Wobe is a social enterprise that helps Indonesian women earn additional income from trading mobile data. The app works over 3G connections and on old smartphone operating systems, helping women earn additional income from the home. When used to augment household income earned from more traditional sources, these opportunities provide higher and more stable wages, and opportunities for further education and human capital development (Powell and Chang, 2016; Vial and Hanoteau, 2015).

10 The Athena SWAN Charter is an evaluation and accreditation program aimed at enhancing gender equity for STEM fields (Equality Challenge Unit, 2017). Through the accreditation process, the charter recognises excellence in employment practices that advance the careers of women and gender minorities in STEM fields. Currently, 137 institutions belong to the UK Athena SWAN Charter. Science in Australia Gender Equity (SAGE), the Australian pilot of the Athena SWAN Charter, has adapted the UK processes to the Australian context, running training workshops on gender equity and providing accreditation for universities, medical research centres and government research organisations who will participate in the SAGE Pilot.

Norms

Despite advances in educational attainment, women in the region remain subject to traditional attitudes and norms that prevent them from participating in fast-growing information technology and related sectors (Sudarshan, 2014; Tonby and Madgavkar, 2018). Our research points to the relevance of country specific heterogeneity reflecting time invariant cultural, religious and other value systems in determining women's workforce participation in the Indo-Pacific. This reinforces the fact that the challenge of bridging the digital gender divide is not simply a matter of providing equal access to digital technologies or digital skills; it is also about changing community attitudes and norms.

Women consistently report lower levels of self-confidence in their computing and STEM ability than men, despite high school level academic results revealing that women typically outperform men in these fields (Sax and Lehman, 2016). The stereotypical image of a person interested in studying or working in information technology as a 'geek', 'hacker' or 'gamer' can also be unappealing to many women. Therefore, policymakers should consider initiating national advocacy campaigns and events that promote positive female role models in the digital economy to help counteract these perceptions.[11]

A further challenge to higher levels of female participation in the digital economy is that digital technologies can be used to harass and perpetrate violence against women and girls, creating an impression that the digital economy is not a safe space for women. Policymakers should consider supporting risk-based policy interventions that aim to lower the probability of cybercrime against women and girls taking place, as well as reducing the impact of these crimes on victims. This may include initiatives that enhance women and girls' resilience and ability to protect and defend themselves in a digital environment, such as digital literacy programs, and promoting awareness of support networks and counselling services for victims of cyber violence.[12]

Policy-makers should also consider introducing or reforming national legislation on violence against women to include technology-related forms of violence. Fundamentally, human rights and the rule of law should apply online as they do offline. This means enacting and enforcing laws that make it illegal to use the Internet to threaten, harass or offend women, and cooperating in international enforcement actions given the

11 For example, as part of the EQUALS initiative, a number of Girls in ICT Day events have been planned to promote ICT studies and careers to girls and young women before they make decisions related to tertiary education, including hands-on workshops that introduce girls and young women to coding, mobile apps development and programming robots (ITU, 2017). Girls in ICT Day organisers can also be leveraged to provide coding and mobile app training throughout the year to young women and girls.

12 Internationally, the American National Network to End Domestic Violence is a model of best practice. It undertakes research and provides instruction on how to recognise and address technology facilitated abuse, and provides training and support to frontline workers. The Australian Government also funds a range of initiatives to raise awareness about technology facilitated abuse and provide tools for community and front line services on how to identify it and provide victims with support such as 1800RESPECT, ThinkUKnow and eSafety Women.

global reach of the Internet.[13] Governments should also continue to place pressure on social media and other digital platforms to immediately remove extremist and unlawful content, including that intended to threaten and intimidate women.

Socials norms also influence policy settings that have a critical role to play in supporting women's participation in digital careers. At a basic level workplace relations policies should support flexible work practices, and promote a non-discriminatory workplace, including with respect to pay and career progression. Evidence from Thévenon (2013) suggests that reducing effective marginal tax rates on household secondary income earners, supporting access to childcare, and the provision of child and family benefit payments all support higher levels of women's workforce participation. However, care needs to be taken in the design of parenting leave arrangements to ensure these do not act as a labour market 'off ramp' for women. Transparency regimes for gender pay and participation gaps can also help shine a light on economically costly discrimination.

Governments also have a role to play in changing perceptions about women in technology leadership positions, and ensuring that women are more highly represented in executive positions and board appointments. Internationally, the EQUALS initiative founded by the International Telecommunications Union, UN Women, the International Trade Centre, GSMA and the United Nations University promotes leadership opportunities for women in the digital workforce and women's entrepreneurship, and aims to work with private sector and governmental partners to facilitate more women in leadership roles (Equals.org, 2017). In Australia, the Male Champions of Change in STEM Group drawn from male leaders of technology companies and research institutions seeks to use its individual and collective influence to achieve a significant increase in the representation of women in leadership positions in STEM industries and research.

Data

A final barrier to women's participation in the digital economy is the lack of gender-specific ICT data in national statistics which can make it difficult for policy makers to apply a gender lens in evidence-based policy development and evaluation. A better evidence base is urgently required to help inform the development and evaluation of policy actions to bridge the digital gender divide. A common feature of the digital economy and women's work is that a lot of productive activity takes place in the home without remuneration that is not recorded in official statistics. National macroeconomic statistics are in need of an upgrade to provide better visibility of the impact that the digital economy and home production are having on productivity and output. Better labour market data is also required to understand trends in contingent work arrangements and 'gig' employment.

13 Policy-makers should also consider comprehensive policy responses to prevent the nonconsensual sharing of images online and laws outlawing the use of the Internet to prepare or plan to cause harm to, procure, or engage in sexual activity with children.

Subject to capacity, countries in the Indo-Pacific region should consider collecting sex-disaggregated ICT statistics to better identify participation or usage gaps between the sexes. Developed economies in particular should consider running more frequent and comprehensive time-use surveys to fully measure women's contribution to national output and value created in the digital economy. Digital satellite accounts may be a useful vehicle to develop innovative approaches to measuring value created in the digital economy. Initiatives such as these will improve the evidence base for policies aiming to make digital development more inclusive. Countries in the region should also consider increasing their engagement with multilateral efforts already underway to improve the measurement of the digital economy in macroeconomic statistics.

8. Conclusions

On a country-by-country basis, the average labour force participation gap between men and women in the Indo-Pacific narrowed between the years 2000 and 2016 at a time of rapid growth in Internet usage and digital connectivity. Perhaps unsurprisingly, we find a positive and statistically significant association between Internet use and women's workforce participation in the Indo-Pacific, even after controlling for a number a variables commonly associated with women's workforce participation, time and country specific fixed effects. The magnitude of the association is economically significant, with the most conservative estimate suggesting that, on average, growth in Internet use has been associated with four-fifths of the increase in women's workforce participation between 2000 and 2016.

After 2008 we find evidence of an even stronger positive association between exogenously determined Internet usage and women's workforce participation using an instrumental variables approach. The use of state control of the Internet as an instrument for Internet use also points to the important role that the free flow of information online can play in supporting a thriving digital economy, and indirectly higher levels of women's workforce participation. Despite the positive association between digitisation and women's workforce participation, a number of barriers remain which are preventing women from fully participating in the digital economy. The G20 Taskforce on Digitalisation is focused on addressing the access, skills, normative and evidentiary barriers to higher levels of female participation in the digital economy, and better job quality for women in the future of work.

Appendix

A1: First stage regression

Dependent variable: Internet use (2008, 2010-2014)					
Eq.	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*
State control Internet	0.29 (1.87)	0.30* (1.96)	0.39* (2.35)	0.29* (2.13)	0.28* (2.03)
Access foreign info	-0.19** (-2.59)	-0.20** (-2.70)	-0.27** (-3.45)	-0.19* (-2.21)	-0.20* (-2.11)
GDP per capita		-0.23 (-1.46)	-0.38* (-2.44)	-0.61*** (-4.30)	-0.52* (-2.42)
Urban population			-3.54*** (-7.29)	-3.87*** (-9.29)	-3.57*** (-7.97)
Gov. share				0.44** (3.16)	0.42** (2.93)
Ag. share					0.56* (2.31)
Country dummies (p>F)	0.00	0.00	0.00	0.00	0.00
Time dummies (p>F)	0.00	0.00	0.00	0.00	0.00
N	300	300	300	238	223
R^2	0.97	0.97	0.98	0.98	0.98
Wald test all (p> χ^2)	0.00	0.00	0.00	0.00	0.00
Wald test IVs (p> χ^2)	0.03	0.02	0.00	0.06	0.07

Notes: * p<0.05; ** p<0.01; *** p<0.001. Constants are omitted from reported results. z statistics are in brackets. Wald tests are on the null of all parameters being equal to zero, and parameters on state control of the Internet and access to foreign information both equaling zero. GDP per capita enters the equation in thousands of constant international dollars. Dividing parameter estimates by a factor of 1,000 returns the relationship between GDP per capita in constant international dollar terms and Internet use.

A2: Determinants of women's workforce participation in the Indo-Pacific (PCSE)

Dependent variable: Women's workforce participation rate (2008-16)					
Equation	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*
Internet use	0.02* (2.59)	0.02** (3.03)	0.02** (2.68)	0.02* (2.18)	0.02 (1.59)
GDP per capita		0.07** (2.84)	0.07** (2.87)	0.16 (1.20)	0.07* (2.41)
Urban population			-0.08 (-1.31)	-0.10 (-1.21)	-0.07 (-0.75)
Gov. share				0.03 (1.70)	0.03 (1.74)
Ag. share					0.18* (2.09)
Country dummies (p>F)	0.00	0.00	0.00	0.00	0.00
Time dummies (p>F)	0.00	0.00	0.00	0.04	0.21
N	566	534	534	366	322
R^2	0.99	0.99	0.99	0.99	0.99
Wald test (p> χ^2)	0.00	0.00	0.00	0.00	0.00

Notes: * p<0.05; ** p<0.01; *** p<0.001. Constants are omitted from reported results. z statistics are in brackets. Wald tests are on the null of all parameters being equal to zero. GDP per capita enters the equation in thousands of constant international dollars. Dividing parameter estimates by a factor of 1,000 returns the relationship between GDP per capita in constant international dollar terms and women's workforce participation.

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Employment Relations Reforms and New Zealand's 'Productivity Paradox'

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Abstract

In Australia, it has been debated whether the Fair Work Act (FWA) has a negative or positive impact on productivity growth. Likewise, in New Zealand, there has also been considerable interest and debate about that country's so-called 'productivity paradox', though this has yet to be linked to employment relations legislation in recent debates. This is surprising since it has been an explicit aim to raise productivity growth of the two last employment relations reforms. This paper will focus on how employment relations has been supposed to impact on productivity growth during the Employment Contracts Act 1991 and the Employment Relations Act 2000 periods. It will discuss why employment relations reforms have yet to shift the productivity growth and explanations of the 'productivity paradox' so far. This includes how employer attitudes and behaviours may be part of the productivity 'paradox' as well as a brief overview of the research and approaches of the Productivity Commission. The paper suggests that, while employment relations can play a part in lifting productivity levels, what is crucial are contextual factors and how employment relations and other policies combine to reinforce each other.

JEL Classification Codes:
E24 Aggregate Labour Productivity
J24 Labour Productivity
J5 Labour-Management Relations, Trade Unions and Collective Bargaining
J8 Labour Standards

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1. Introduction

There is a current concern about productivity growth in several OECD countries (see, for example, Andrews, Criscuolo, & Gal, 2016; Askenazy, Bellmann, Bryson, & Galbis, 2016), including in Australia (Peetz, 2012; Productivity Commission, 2017). This is also the case in New Zealand but the difference is that New Zealand concerns over lack-lustre productivity growth have now existed for several decades. These concerns were part of the economic rationale for the so-called New Zealand 'experiment' with radical neo-liberal policies in the 1980s and 1990s (Castles et al., 1996; Kelsey, 1997) and yet neither that program nor the subsequent Labour Government's centre left policies resulted in any significant improvement in New Zealand's productivity growth rates.

This paper focuses on the New Zealand productivity debate and how employment relations has been supposed to impact on productivity growth during the 1991 – 1999 Employment Contracts Act (ECA) and the post-2000 Employment Relations Act (ERA) periods. It draws on employment relations analyses, official statistics, research on productivity and our own empirical research to discuss why employment relations reforms have yet to shift the productivity growth rate and what explanations have been provided for this 'paradox' so far. In particular, it addresses two issues. First, what is the influence of employers on public policy changes and to what extent are employer attitudes and behaviours part of the productivity 'paradox'? Second, it will briefly overview the research and approaches of the New Zealand Productivity Commission and how the Government has responded to its public policy suggestions (New Zealand Productivity Commission, 2016).

There has been a heated debate in Australia over the economic and productivity impact of the Fair Work Act (FWA) where there has been strong employer criticism of the FWA framework (see Bray & Stewart, 2013, pp. 20-22). While a review of the FWA by McCullum, Moore and Edwards (2012) came to a positive evaluation of the FWA's impact on Australia's prosperity it also stressed: "The exception has been productivity growth, which has been disappointing in the FW Act framework and in the two preceding frameworks over the last decade." (McCullum *et al*. 2012, p. 19). The Australian Productivity Commission has specifically considered the place of employment relations in contributing to productivity growth (Productivity Commission, 2015a, 2015b) and noted that the growth in multifactor productivity during the 1990s had been attributed to the reforms of the 1970s and 1980s including 'the shift away from centralised wage determination to enterprise bargaining' (Productivity Commission, 2017, p.11). Their conclusion in their 2015 enquiry into the Australian workplace relations framework, however, was that '[d]espite strong theoretical grounds for expecting productivity effects from [workplace relations] reform, Australian studies have found little evidence of such a relationship. The absence of evidence is attributable to limited data and, more fundamentally, the difficulty of disentangling the determinants of productivity growth' (Productivity Commission, 2015b, p.1134). Finally, Peetz (2012) has downplayed the FWA's possible productivity impact and raised doubt whether such legislative framework changes will have much productivity impact.

Unlike in Australia, there has been limited debate in New Zealand on the link between the ERA and productivity growth (though see Haworth, 2010). It is, for example, noticeable that the New Zealand Productivity Commission has yet to produce a detailed analysis of the possible links between employment relations and increased productivity growth. This is somewhat surprising given that, as we discuss below, employment relations reforms have been driven by productivity concerns, with employment relations changes expected to have a positive impact on productivity growth. The ECA period and the ERA period reflect rather different understandings of how employment relations change would facilitate such growth but a clear linkage was advocated by the political proponents in both cases. While the productivity effects of employment relations may have been overstated (Peetz, 2012) our analysis suggests that while employment relations can indeed play a part in lifting productivity levels, what is really crucial are the contextual factors and how employment relations and other policies are combined to reinforce each other.

2. New Zealand's productivity trends and its productivity 'paradox'

New Zealand's long-run productivity growth performance over the last three or four decades has been lack-lustre compared with other OECD countries (Conway & Meehan, 2013; de Serres, Yashiro, & Boulohol, 2014). Over the period 1978 to 2011, labour productivity growth in the measured sector has averaged only 1.9 per cent per annum (see Table 1) and GDP per capita has fallen from above the OECD average in the 1970s to 79 per cent of the mean by 2010 (see Figure 1) (Conway & Meehan, 2013).

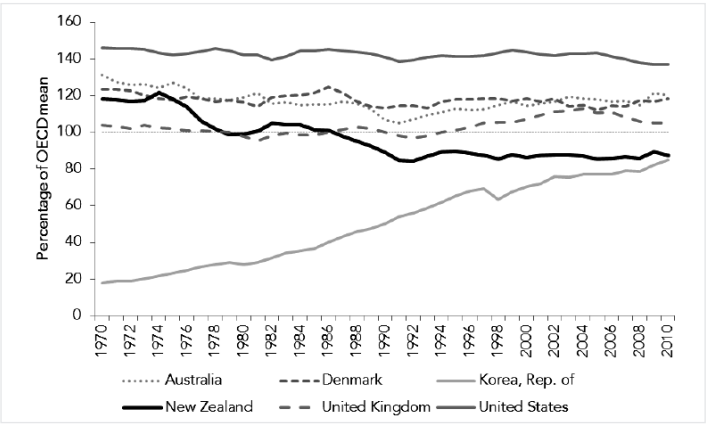
Table 1: Labour productivity growth by sector for selected time periods (annual average percentage growth rate)

Period	*Measured sector*	*Primary sector*	*Goods sector*	*Services sector*	*ICT-intensive industries*
1978-1985	1.8	2.3	2.2	0.6	2.5
1985-1990	2.7	6.8	1.8	1.5	0.5
1990-2000	2.6	4.6	1.5	2.1	3.3
2000-2008	1.3	1.3	0.6	1.7	2.0
2008-2011*	0.5	1.3	0.8	0.1	1.0
1978-2011	1.9	3.3	1.4	1.4	2.2

Source: Conway and Meehan, (2013, p. 13). *2008-2011 is an incomplete productivity cycle.

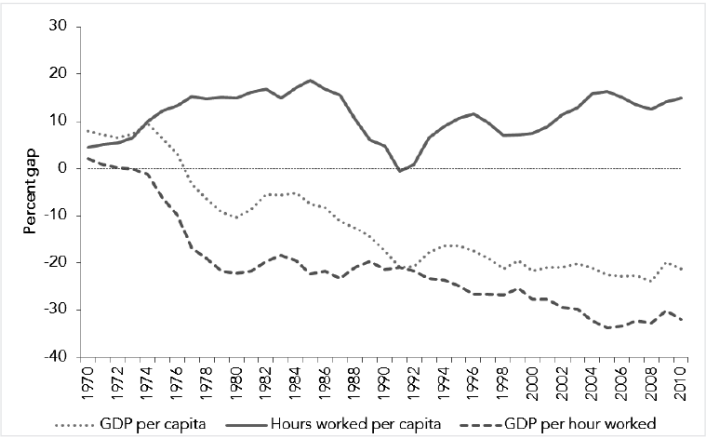
Output per capita, which had fallen substantially during the 1970s and 1980s, has remained more or less constant over the period since 2000, however, as Conway and Meehan (2013: 24) point out, this was due primarily to increased labour force participation and lower unemployment. Output per hour worked has continued to slip relative to the average across 19 other OECD countries (see Figure 2).

Figure 1: GDP per capita as a percentage of the OECD mean (US$ PPPs)



Source: Conway and Meehan, 2013, p.23

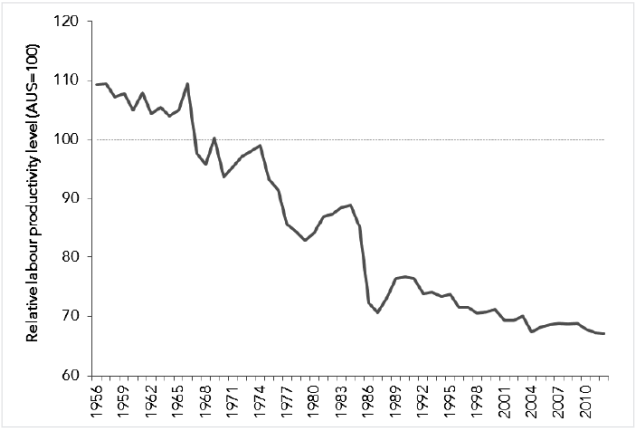
Figure 2: Productivity gaps expressed as percentage of the average of selected OECD countries



Source: Conway and Meehan, 2013, p.24

The same trend is observed in New Zealand's labour productivity performance relative to Australia's (see Figure 3). From a situation of higher GDP per hour worked at the beginning of the 1970s, New Zealand has declined dramatically to around two-thirds of Australia's output per hour. The sharpest falls were in the 1970s and 1980s, but the decline has continued since then. Figure 3 puts the current Australian concerns about labour productivity growth in a relative perspective: though neither country can be pleased about their productivity growth it is clear that New Zealand's productivity performance is at a different and much more concerning level.

Figure 3: GDP per hour worked in New Zealand relative to Australia



Source: The Conference Board data, cited in Conway and Meehan, 2013, p.27

New Zealand's poor productivity performance has been described as a 'paradox' (De Serres *et al*., 2014). This paradox has two aspects. First, the supposedly favourable policy setting should have resulted in stronger average productivity growth rates. One OECD study puts the gap in New Zealand's GDP per capita compared to the OECD average at about 40 percentage points on this basis (Barnes, *et al*., 2011). Second, and given the favourable policy settings, economic theory suggests a process of convergence should occur with New Zealand moving towards higher productivity countries as productivity enhancements are introduced into, and diffuse through, the New Zealand economy and labour market (Conway & Meehan, 2013, p. 33).

De Serres, *et al*. (2014) identify two main factors for New Zealand's productivity gap. Using different methods from Barnes *et al*., they estimate that 'remote access to markets and suppliers, and low investment in innovation (as measured by R&D intensity) could together account for between 17 to 22 percentage points of the 27 per cent productivity gap vis-à-vis the average of 20 OECD countries' (de Serres *et al*., 2014, p. iii). They note also that there is 'room for catch up' in managerial practices – as discussed further below - but do not identify employment relations as an issue. While these factors may help explain the productivity gap, remoteness cannot explain the deterioration in New Zealand's performance, given that its trading patterns have, if anything become geographically closer rather more remote over time.

The New Zealand Productivity Commission has published a series of reports, including *Achieving New Zealand's productivity potential* (Productivity Commission, 2016) but do not identify employment relations as a key issue. *Achieving New Zealand's productivity potential* focuses on five key areas – international connections, innovation and science, the labour market, competitive intensity and policy capability (Productivity Commission, 2016, p. 51). The labour market-related recommendations relate to three areas, skills, housing and migration. The discussion on skills emphasises improving the

education sector and on reducing skills mismatch. Employment relations, the potential productivity-enhancing role of employers in workplace training, and incentives on employers to improve their existing workforce's productivity (including the role of increased employee participation), are only indirectly mentioned. This is a surprising omission given the obvious fact that the great majority of the workforce of the next ten years are already in the workforce today. The analysis of migration notes that 'within industries, migrants tend to be relatively poorly paid and migrant employment has increased strongly in some lower-productivity industries such as hospitality and tourism, retail trade, support services, and primary' (New Zealand Productivity Commission, 2016, p. 66). The link is also made between inflows of low-skilled migrants possibly restricting wage growth and firms opting for a 'reliance on cheap labour' rather than investment and productivity improvements. This is an important point. In recent years, expansion of the supply of labour through immigration has acted to dampen wage growth pressure which, in turn, reduces the incentive on firms to invest in productivity-enhancing human and physical capital growth.

3. Employment relations reforms and productivity

The so-called 'New Zealand experiment', starting under a Labour Government in 1984, was driven by radical policy changes that sought to transform the economy towards being open, market-orientated and flexible. While it was a very comprehensive transformation (Castles *et al*., 1996; Kelsey, 1997), the associated employment relations changes were more timid in the 1980s (Deeks, 1990; Walsh, 1989). There was ongoing pressure to adjust the century-old conciliation and arbitration system and there were some key adjustments such as compulsory arbitration being abolished in 1984, radical public sector reforms in 1986, 1988 and 1989, and the passage of the Labour Relations Act in 1987 (see Rasmussen, 2009, pp. 67-74). These adjustments and an economic downturn started to influence bargaining strategies and outcomes, especially in the public sectors, in the late 1980s but gathered momentum after the election of the centre-right National Government in 1990 and the passage of the Employment Contracts Act 1991.

The Employment Contracts Act 1991 was the result of sustained employer advocacy for radical change to decentralise and individualise bargaining and allow for 'more flexibility' (Harris & Twiname, 1998). It was a minimalistic, non-prescriptive Act[1] which sought 'to promote an efficient labour market' through a *laissez faire* approach to bargaining. It abolished the conciliation and arbitration system, 'forgot' to mention unions and raised the significance and protection of individual employment contracts. This facilitated dramatic changes in collective bargaining, union membership and employment conditions during 1991-1995. At the time the ECA 1991 was introduced,

1 It is important for Australian readers to understand that the ECA 1991 was a very different type of legislation compared to the Work Choices Act (the Workplace Relations Amendment (Work Choices) Act 2005). For example, the ECA 1991 had very few legislative prescriptions and was only 90 pages long, compared to the 762 pages long Work Choices Act. The ECA 1991 also had an immediate effect by abolishing the award system, by making unions one of many possible 'bargaining agents', by covering both collective and individual employment contracts and by extending the personal grievance right to all employees.

unemployment levels were over ten per cent and drastic cuts in unemployment benefits and other social welfare payments had been implemented in the December 1990 mini-budget. Unsurprisingly, there were strong downward pressures on pay and employment conditions and many employers took the opportunity to reduce or abolish penal rates and overtime payments, and to change working times and other employment contractual arrangements (Conway, 1999; Harbridge, 1993; McLaughlin; 2000). In short, the ECA gave employers greater freedom to institute 'more flexibility' in their workplaces:

> 'The proponents of the Employment Contract Act clearly believed that, by introducing voluntary unionism and altering the collective bargaining principles, they would overcome the ingrained productivity problems. This expectation was shared by many opponents of the Act since the notion of union practices being a constraint on labour productivity had been accepted widely amongst New Zealand analysts.' (Rasmussen, 2009, p. 449).

However, by the mid-1990s studies were suggesting that the expected productivity effect had failed to occur (for an overview of estimates, see Rasmussen, 2009, p. 449).[2] This is the start of the so-called New Zealand 'productivity paradox'. It was so firmly expected that an open economy, reduction of competition barriers and in particular, decentralised bargaining and employer driven flexibility would deliver higher productivity growth that many researchers and commentators were puzzled. How could this rather disappointing level of productivity growth be explained? There were several possible explanations offered at the time. These ranged from advocacy of more radical free-market reforms by the Business Roundtable to a 'third way' approach to economic management and more state intervention by left-wing analysts. The lack of consensus, radically different public policy prescriptions and often profound bewilderment were key characteristics of the productivity debate in the late-1990s. For the purpose of this paper, it is interesting to highlight the explanatory factors which were prevalent in the 1990s debate (Douglas, 1993; Easton, 1996; Rasmussen, 2009):

- The reforms had their own detrimental effects where the sheer scale created their own turmoil and productivity barriers. This included a rise in transaction costs through the many new regulations, fragmentation of bargaining, and loss of organisational 'memory'. The notion that institutional change itself impairs subsequent economic performance has recently been given empirical support by Brandl and Ibsen (2017).
- There was a lack of positive synergy between the various reforms, with government strategies often at loggerheads (Kelsey, 1997). This was also an argument that prompted unhappiness with the radical state sector reforms (see Boston, 1999).

2 Five out of seven studies published between 1996 and 1998 estimated annual average labour productivity growth of less than one per cent. Later analysis of the same period did, however, suggest a higher rate than this. Conway *et al*. (2015) for example estimate labour productivity growth averaged 2.9 per cent in the 1990s (compared to their estimate of 2.5 per cent average in the 1980s, although they attribute a part of the late-1980s and early-1990s growth to labour-shedding associated with the economic reforms and low economic growth (Conway *et al*., 2015 p. 37).

- There had been inadequate investment in infrastructure, education and training, and business renewal (NZCTU, 1996). Besides the low level of public expenditures in the 1987-1995 crisis years, commentators arguing this view also pointed to the privatisation of publicly-owned assets and out-flows of business profits to overseas owners.
- Finally, some questioned whether collective bargaining and unions were ever such a constraint on efficient work practices and whether employer driven flexibility would raise productivity growth levels as expected (Easton, 1997).

These debates clearly influenced the very different economic and social policies of the incoming Labour-led government in 1999 and reinforced the new Government's commitment to a different employment relations framework introduced in the form of the Employment Relations Act 2000. As emphasised by the then Minister of Labour, Margaret Wilson the new ERA framework was explicitly intended to improve labour productivity:

> 'The policies of structural adjustment that dominated the New Zealand policy environment from 1984 to 1999 were premised on the withdrawal of government economic decision-making except at the highest level, and on market forces being the governor of economic activity. The application of this approach to the labour market and the workplace was seen in the Employment Contracts Act. The consequences of this form of regulation were a low-wage, low-skill and low-labour-productivity workforce. …the Employment Relations Act was an attempt to improved labour productivity through an inclusive approach to employment relations.' (Wilson, 2004, p. 9).

In addition to the ERA framework, the Government also established a Workplace Productivity Working Group in 2004 to develop more information and awareness about productivity growth factors, including a number of detailed workplace case studies (Department of Labour, 2008a). Interestingly, survey research found that many employers had an understanding of practices that could support productivity growth: better workplace culture, embedded skill development, better-trained managers, and so on (Department of Labour, 2008b). However, the same research also found that some employers reported facing significant cost, time and support barriers that prevented them from introducing new productive work practices.

Another initiative was the Workplace Partnership Centre, which highlighted and supported innovative workplace practices (Rasmussen & Tedestedt, 2017). The Centre drew – as had the Productivity Working Group – on international debates and experiences as well as on positive New Zealand case studies. However, the Centre also had a much more hands-on approach in supporting new working practices in two respects. First, the partnership approach surfaced in several collective bargaining negotiations, particularly in the public sector as the major public sector union Public Service Association was a strong supporter of public sector partnerships (Scoping a Partnership Resource, 2004). Second, the Centre worked with number of 'change agents' or consultants who had experience in workplace change and were trained in partnership approaches and techniques. These 'change agents' were available to

support organisations interested in exploring or implementing such workplace changes.

Thus, there were survey indications that many employers were aware of employment practices that could drive productivity growth and there was considerable support available to employers seeking to implement new work practices. However, these practices had limited coverage across the economy and had – as highlighted in Figures 1, 2 and 3 - little effect on the official productivity statistics during the 2000-2008 period.

Low productivity growth was clearly still a major public policy issue in the mid-2000s. Again, there were different explanations though it was noticeable that strong employment growth (bringing low-productivity workers into the workforce) and inadequate managerial capabilities appeared more frequently in the debate (Rasmussen & Foster, 2011). There were also more focus on low-paying jobs (Haworth, 2010), including the inability to constrain inefficient employers and work practices (Foster *et al*., 2011; McLaughlin, 2010) than there had been in the 1990s. These explanations continue to influence the current debate in New Zealand and we will return to them below.

Still, there were also a re-appearance of some of the explanations from the 1990s. In particular, lack of investment was often highlighted and came in two different versions. First, the overhang of insufficient infrastructure investments during the post-1987 period was frequently mentioned as an issue that would take many years to recover from. Second, inadequate investments in training and skills surfaced in broadly based skill shortages and a 'greying' of skilled workers; a problem further exacerbated by high staff turnover and the emigration of skilled workers.

A variant of the lack of synergy argument was also raised. Haworth (2010, p. 157) highlights that a clear policy focus and delivering effective outcomes was difficult to achieve when key interventions were spread over several ministries and 'co-ordination became a challenge.' As Haworth notes, the Labour Government established a high-powered tripartite Growth and Innovation Advisory Board intended to advise on and promote its growth strategy. However, this proved to have little impact, largely because it had little direct power, and was soon side-lined.

Finally, it is notable that there were few mentions in these more recent debates of unions' negative impact on productivity. This was probably a reflection of their limited involvement in workplace decision-making, plus the fact that the ERA's assumption that more collectivism and inclusiveness would benefit productivity was never really tested because bargaining processes and outcomes failed to diverge radically from the patterns of the 1990s (Foster *et al*., 2011).

The National-led government elected in 2008 decided to keep the ERA in place. The employment relations changes they introduced between 2008 and 2017 supported more employer-driven flexibility by constraining union activities and reducing employee rights (for an overview, see Table 2 in Foster & Rasmussen, 2017 p. 102). As mentioned above, it also instituted the New Zealand Productivity Commission. Again, the level of productivity growth was disappointing during the 2008 - 2017 period and again, the search for explanations is underway. It looks likely that some of the same explanatory factors will surface: insufficient investment, lack of positive reform synergies and issues surrounding low-paying, inefficient employers. At the same time, as is discussed further below, the Productivity Commission itself highlights a somewhat different set of factors.

There has been a stronger focus on employer behaviour and employment standards in the new millennium (Foster *et al*., 2011; Rasmussen *et al*., 2016) and, as mentioned above, there is now less focus on productivity barriers associated with unions and collective employment agreements. Instead management capabilities are generally seen as being weak and there are especially issues in the areas of employee engagement and innovation facilitation (Birchfield, 2011). While the weakness of management capabilities has been tested through research by the New Zealand Institute of Management (for example, see Matheson, 2009) it remains unclear why this is the case. It has been argued that the smallness of the economy, the predominance of small- and medium-sized firms with limited budgets and resources, and a short-term culture could be part of the explanation.

Insufficient and unfair employment standards have also been blamed on employer strategies and actions, especially in some of the fast-growing service sectors. This forced the National-led government to constrain zero-hours agreements, intervene in favour of higher wages in the age-care sector, and develop new employment standards legislation (Foster & Rasmussen, 2017). Still, surveys have shown that employers have generally been in favour of the National-led Government's reductions of employee rights and constraining union activities in the post-2008 period (Rasmussen & Foster, 2011; Rasmussen *et al*., 2016). Rasmussen *et al*.'s analysis showed that employers particularly favoured changes that reduced constraints on their management of employment relations, such as the introduction of trial employment periods, the requirement for union representatives to obtain employer consent before entering a workplace and the ability for workers to 'cash up' their fourth week of annual leave (see Table 2).

Table 2: Employers in favour of, or opposed to, employment legislation changes

Legislative changes	*% Responses*				
	VMF	*SWF*	*N*	*SWO*	*VMO*
90-day trial periods in firms with <20 employees	60.6	20.6	14.6	1.5	2.7
Union requires consent to enter workplace	58.5	18.7	16.9	2.7	3.1
Penalties re-enter workplace	37.1	29.5	28.7	2.5	2.2
Employers must keep copy of EA	64.0	24.7	9.9	0.5	0.9
Extension of trial period option to all employers	66.3	21.0	9.6	2.0	1.1
Test of justification fair & reasonable in PGs	30.5	45.0	15.7	6.5	2.3
Must consider substance of case in dismissals & PGs	68.1	24.1	5.8	0.8	1.2
Reinstatement made one possible remedy	5.4	19.2	26.0	29.3	20.1
Option to cash up one week's annual leave	47.4	28.6	13.8	6.1	4.1
Transfer of public holiday to another day	39.2	26.6	21.3	5.0	7.9
Can require proof of sick leave within 3 days	73.0	21.4	4.1	0.8	0.7

Note: N=765. The abbreviations used to describe responses are: very much in favour (VMF), somewhat in favour (SWF), neutral (N), somewhat opposed (SWO), very much opposed (VMO). EA = Employment agreement. PG = personal grievance
Source: Rasmussen *et al*., 2016, Table 5 (wording amended).

The empirical research of Rasmussen *et al*. (2016) also showed that despite these changes the majority of employers wanted *further* flexibility enhancements. Moreover, there is a firm-size effect, with small- to medium-sized firms most strongly in favour of greater flexibility. On the basis of these findings it must be questioned, therefore, whether the National-led government and mainstream employers are really that interested in fostering better employment standards across New Zealand workplaces and how the 2008-2017 employment relations policies could ever lead to a high-wage, high-productivity economy.

It is too early to say much with precision about the new Labour-led government's likely approach to productivity increases. The Employment Relations Amendment Bill recently introduced into the House focuses primarily on reversing some of the changes made by the previous government and on equity issues. While these changes were expected, they have also been described as being "largely focused on the margins" by the President of Council of Trade Unions, Richard Wagstaff (2018, p. B4): "These changes alone won't be enough to achieve the Government's vision of productive, safe and well-paid working lives for all New Zealanders."

It appears likely, however, that the new Government will continue the same productivity thinking as the previous 2000 – 2008 Clark Governments, though with a stronger emphasis on investment in 'hard and soft infrastructure', collective bargaining, and minimum employment standards. This will re-affirm that collective bargaining and unions have a positive role to play (as stated in the ERA's Object Clause), that stronger investments in infrastructure, education and vocational training will underpin productivity and that targeting low-paying, inefficient employers can bolster overall productivity growth.

Thus, implementation of election promises appears to be underway (see Foster & Rasmussen, 2017; Wagstaff, 2018). So far, that includes a willingness to put more emphasis on sectoral collective agreements through proposed 'Fair Pay Agreements', effective policing of employment standards (a doubling of the number of labour inspectors has been promised), a substantially higher statutory minimum wage, improved legislative protection of contractors and enhancing pay and employment equity (following on from the recent tripartite approach in the age-care sector). Whether this will actually eventuate and whether it will lift the level of productivity growth will need to be analysed at a later stage.

There are, however, a number of possible interventions that are missing from the Labour-led Government's interventions and election promises. As mentioned, the Workplace Productivity Working Group and the Partnership Resource Centre were seeking to highlight productivity workplaces and embed productivity-enhancing work practices in the 2000-2008 period. In 2017 the Labour Party's election policies included an emphasis on high engagement-high performance initiatives but that emphasis appears to have disappeared during coalition negotiations with the New Zealand First Party. Currently, there are no firm initiatives mentioned in the public debate and, in particular, it has yet to be discussed how such productivity-enhancing work practices could be disseminated across the economy. It is also noticeable that there appears to be no inclination towards driving productivity through increased employee participation (Rasmussen & Tedestedt, 2017). Health and safety committees

in organisations with more than 20 employees is the only statutory employee participation structure in New Zealand. These committees are clearly expected to play a major role in overcoming New Zealand's problematic accident and fatality record supported by stronger penalties of managers and board members (Pashorina-Nichols, 2016). The potential productivity impact is seldom mentioned (however, see Lamm, 2010). There appears to be no plans to enhance productivity growth through other statutory employee participation structures – for example, works councils or employee directors – or through government support of voluntary participation schemes.

4. How might employment relations play a part in lifting productivity levels?

The Australian Productivity Commission concluded that its inability to find the expected productivity impacts of employment relations reforms was due to 'limited data and, more fundamentally, the difficulty of disentangling the determinants of productivity growth' (Productivity Commission, 2015b, p. 1134). Peetz, in his review of employment relations and economic performance, concludes that it is not possible to say that 'if IR policy is altered at the national level, it is going to have a widespread or noticeable impact on productivity', arguing rather that it is what happens at the workplace that matters (Peetz, 2012, p. 286).

Are there, then, reasons for thinking that employment relations policy changes under the 2017 Labour-led Government may have more success in raising productivity growth in New Zealand? On their own, probably not. However, in the current economic and labour market context and in conjunction with other policies, there are grounds for a more optimistic view. This optimistic view is rather speculative since the low level of state intervention and fragmented workplace and individualised bargaining have dominated public policy for several decades (Blumenfeld & Donelly, 2017). Fragmented bargaining patterns have continued under the Employment Relations Act – despite its objectives of further collectivism – and private sector employers can determine most employment conditions in their workplaces (Rasmussen *et al*., 2016). Thus, although neo-liberalism may not have been the underpinning philosophy behind *new* policy initiatives for some time now, it may take years to unwind its presence in existing policy settings and for behaviours to change. We point to three important areas of change: contextual change, support of high-wage, high-skills strategies, and implementation of new forms of workplace partnerships.

Parts of the contextual change have already happened. Macroeconomic monetary and fiscal policies are on a steady course and with the new Labour-led Government signalling a more expansionary path. It is possible too that the high labour utilisation, low productivity settings, which have characterised much of the period since the early 1990s are over. During that period first high unemployment, then rising labour force participation followed by high net inward migration contributed downward pressure on wage growth, lessening incentives on employers to invest in productivity enhancements. It is possible that tighter labour market conditions and lower migration (especially of less highly skilled workers) will predispose businesses to productivity-enhancing investments in skills and training. There are already signs of this happening

in the fast-growing hospitality industry, with an increasing focus on industry training. Such policies are also expected to be coupled with increased government investment in infrastructure, research and development (R&D) subsidies and regional growth. The effectiveness of these investments would be further enhanced by some of the high-wage, high-skills interventions in employment relations.

In this productivity-enhancing context, employment relations policies that promote higher wage growth, such as higher minimum wages, industry-wide Fair Pay Agreements, and other support for collective bargaining may result in employers facing stronger incentives to increase output per hour worked. This is consistent with the Productivity Commission's point that the high cost of capital encourages labour-intensive production methods (New Zealand Productivity Commission, 2015). It is also in line with the OECD's findings that collective bargaining is associated with higher wages and higher productivity (OECD, 2018). As mentioned, the new Labour-led government appears set to take a much more forceful approach to collective bargaining and employee protection. Besides the proposed intervention to curtail contracting in the Film Production Industry, there have also been suggestions that contractors will be covered by minimum employment standards (aligned with previous regulatory intervention sought by the Labour Party – see Fenton, 2011) which would avoid an unanticipated rise on contracting. The development of higher skills will take the form of a strong expansion of vocational training and education where higher investment levels will be combined with more effective collaboration with industry training organisations and, maybe, the relevant employer associations. Under the 2000-2008 Labour-led governments there was a considerable push to enhance vocational training and education (Rasmussen, 2009, pp 257-259). This included the development of a tripartite approach to enhance skill levels – Skill Strategy for New Zealand – that was launched in January 2008. Whether there will be a return to such a tripartite approach to vocational training and education is still unclear. Likewise, suggestions that Fair Pay Agreements could contain skill-enhancing measures are yet to be confirmed. There have been similar attempts in the past where, for example, the multi-employer agreement in the plastics industry was partly driven by the industry's particular vocational training and education needs. There are also some academic discussions of how social welfare interventions can support a more flexible labour market and in particular, deal with the persistent high level of youth unemployment while also strengthening the social security safety net (Child Poverty Action Group, 2017; Fletcher, 2017). It remains to be seen whether the proposed welfare reform policy process will take a bold approach or simply tinker with existing policy settings.

As Peetz (2012) has highlighted the workplace plays a particularly important role in lifting productivity levels. However, this is an area, as mentioned above, where the Labour-led government has yet to make any announcements. The two major initiatives in the 2000-2008 period - the Workplace Productivity Working Group and the Partnership Resource Centre - established a platform to build on if the new Labour-led government wants to pursue a workplace-focused strategy. The two initiatives produced a number of organisational case studies that indicated what kinds of interventions were implemented and, in particular, how they facilitated higher levels of productivity (see Partnership Resource Centre, 2008). Besides a joint employer-union commitment to productivity-improving measures, they also benefited from the

access to a consultancy service that could present a number of different approaches and techniques to lift productivity levels. While the case studies presented employers and unions with information about the benefit of productivity-enhancing measures it became a major difficulty to disseminate such work practices across the economy in the relatively short period where the two initiatives existed. This is where either the Fair Pay Agreements or, potentially, the Industry Training Organisations may make a difference. The industry focus of the proposed Fair Pay Agreements and of the Industry Training Organisations make them suitable vehicles for establishing more broadly based productive work practices.

It is clear from recent statements of Prime Minister Jacinda Ardern that the Labour-led government envisages strong links between a modern economy, meeting the productivity challenge and enhancing skills (eg. Trevett, 2018). However, the prevalence of small and medium sized employers with limited ability and/or inclination to invest in vocational training and education presents a substantial barrier. Some of the ITOs have started to tackle this barrier by spreading apprenticeships and other upskilling measures across several employers as well as having stronger links between workplaces and polytechnic institutes. This has been successful in various trades where ITOs can boast of record numbers of apprenticeships (eg. BCITO, 2018). The Labour-led government's announcements about more funding, more direct interventions and a new strategy for polytechnic institutes also indicate that the current government intends to play a stronger role in aligning productivity measures and upskilling.

Finally, it has been highlighted that employee participation in managerial decision-making has witnessed limited progress in New Zealand (Rasmussen & Tedestedt 2017). This is clearly an area where new public policy thinking and research could contribute to lifting workplace productivity levels. Anderson (2017) in his support of increased employee participation also stresses that mandatory schemes need to be put in place: "What must be enshrined in law, however, is that effective participative and representational structures within employing entities are a matter of right, a condition of employing labour, and not a matter of employer benevolence." (Anderson, 2017, p. 107). However, it is an area where there appears to have been no policy debate within the Labour Party so far.

5. Conclusion

It is no longer questioned that New Zealand has had poor productivity growth for many decades. Legislative changes to employment relations have sought to enhance productivity growth but have had very little impact. Decentralised workplace, individualised bargaining and considerable employer-driven flexibility have dominated employment relations in nearly 30 years and the claims about the associated productivity growth benefits now seem unrealistic. On the other hand, the suggestions associated with the Employment Relations Act that collective bargaining and unions could be part of the solution – rather than being seen as the problem – have not been tested so far. Instead, the productivity debate has highlighted the complexity of the issues, the importance of contextual changes, and the necessity of state intervention. The debate has also emphasised the problematic nature of employer strategies and management capabilities.

In this paper we have speculated that the new Labour-led government could accelerate productivity growth through public policy and contextual changes, stronger support of high-wage, high-skills strategies, and implementing new forms of workplace partnerships. There are clearly some moves in the two first areas which sets this government apart from previous governments and which may give new impetus to the Employment Relations Act's aspiration of facilitating 'productive employment relationships'. There have not been, so far, initiatives in the areas of workplace partnerships and employee participation. Interestingly, most of the announced changes have been promoted on the grounds of fairness and equality, and the productivity-enhancing aspects have yet to feature strongly in the debate. Although it is possible that measures introduced to increase fairness and employee protections will flow through to an improvement in productivity by forcing inefficient firms and those relying on a low-wage, low-cost business model to rethink their approach.

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