Discussion paper

The UK evaluation of the impacts of increases in their minimum wage

Prepared for the research roundtable on 8 March 2018

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1 Introduction

The paper reports on the methods applied in the United Kingdom (UK) to evaluate the impacts of increases in the UK minimum wage, to assist in facilitating broader discussion on whether any of the methods can be applied in Australia.

The paper draws on recent discussions with members of the UK Low Pay Commission (LPC) and UK academics that have relevant experience in this research area[1]. It discusses their ability and experiences in evaluating the introduction of and subsequent increases in the UK National Minimum Wage (NMW), and the potential to estimate the effects of the newly introduced National Living Wage (NLW). A description of the UK data sources that have been applied to these studies and a brief discussion of the main econometric methods used follows. The report concludes with a discussion of Australia's data limitations and insights from UK academics into the possibility of future Australian research. The report however does not express a view about the findings of the UK research or the extent to which any findings might apply to Australia.

Since its inception in 1999, the LPC has commissioned a series of research studies that seek to identify the impacts of the introduction of and increases to the UK NMW. Its NMW has features that are similar to the Australian NMW; specifically, it is national in application, it is adjusted annually, and it has lower rates for youth and apprentices. Its main differences are that in 2016 the LPC was instructed by the UK Government to introduce a higher rate—the NLW—for those aged over 25, on a pathway to reach 60 per cent of median earnings by 2020; it has no higher rates for more skilled workers; the wage bite of its adult rate (up to age 25) is lower than Australia's and a smaller proportion of the workforce is paid at the NMW/NLW than are paid at NMW and award rates in Australia.

Much of the research that the LPC has commissioned has been innovative and of high quality. It has generally (though not universally) found that the increases to the UK NMW have increased the earnings of workers who are affected but have not caused loss of employment or hours of work, or increases in unemployment. These findings have been reached by doing quantitative analysis of data from their UK Office of National Statistics (ONS). In addition, there has been qualitative work that seeks to understand from employers how they have adapted to the increased pay rates.

Australia, by contrast, has seen little research on the impact of increases to the NMW and award rates. For this reason, in forming a view on the likely impact of its decisions, the Expert Panel for annual wage reviews has had to rely quite heavily on international research.

The question is, what can be learned from the UK research strategies that could be applied to the different minimum wage environment in Australia?

2 Lessons from the UK

The principal econometric technique that is used in the UK is "difference in differences" (DiD)[2]. The essence of this method is to identify a treatment group—e.g., those whose wages before the increase in the NMW were below the newly established level, and would have to rise to comply

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[1] A list of persons consulted in the UK for the preparation of this paper is at Appendix A..

[2] Other methods applied in international studies are discussed in Chapter 3, Borland J (2018) 'A review of methods applied in international research on the employment effect of the minimum wage and implications for Australia', Research report 4/2018, Fair Work Commission, February 2018.

with the new level—and a comparison group—e.g. those whose wages were close to the wage that is subject to the adjustment but sufficiently above it not to have to rise in order to comply. The assumption is that the earnings/employment/hours of the treatment group would have the same trajectory as that of the comparison group, in the absence of an increase in the NMW. If the trajectories are observed to be different, then that difference is ascribed to the rise in the NMW. Some studies consider not just whether a worker is below the new NMW, but also the size of the wage gap between their wage before, and the new NMW.

Particularly in the United States of America (US), it is common to focus on young workers rather than on all workers in conducting analysis of this kind. UK studies also consider other vulnerable demographic groups, such as non-English speaking migrants, and those with low education. To isolate the effect of the increase in the NMW, it is usual to control for other factors that affect a person's wage, such as age, gender, education and migrant status of the workforces that are being compared.

The UK LPC has also commissioned work that studies the impact of minimum wage rises by looking at:

- detailed analysis of a specific low wage sector, e.g. the Care Homes sector;

- qualitative surveys of employers, to learn how they have adapted to a rise in the NMW;

- analysis of particular low paying industries (retail, hospitality, cleaning, food processing): quantitative survey and qualitative interviews.

The UK has two main sources of survey data on employment, hours and earnings. These are the employer-based Annual Survey of Hours and Earnings (ASHE) and the Labour Force Survey. [The Australian equivalents are, respectively, the Australian Bureau of Statistics (ABS) Survey of Employee Earnings and Hours (EEH) and the ABS Labour Force Survey (LFS).] UK researchers judge the ASHE data to be most reliable, even though it is only annual. The LFS is quarterly and this is an attractive feature, because the level of wages either side of an increase in the NMW can be observed. Most importantly, it includes hours worked and earnings. But the UK LFS is facing substantial problems from low response rates from its sample base. UK researchers have also identified errors arising from the imputation of hourly pay from information about weekly earnings and hours. In the UK they find that with this imputation, there is no spike in the numbers of people employed at the minimum rate, as there should be, and too many are recorded as being low paid.[3] In sum, researchers in the UK believe that the LFS is not a reliable data source for doing quality analysis of the employment effects of rises in the NMW. They prefer to use the ASHE.

A crucial feature of the data that have been used in the UK is the ability to track individual workers over time. In the ASHE survey, employers provide information about a sample of their individual employees. This includes the social security number (SSN) of employees. This SSN is then used by the ONS to track these employees over time. [Only a sample, determined by the last 2 digits of the SSN, is followed over time]. The ONS can identify whether they remain in employment at some later date. If they do, the ONS follows them to the next employer, and asks about their pay and hours in the reference week of their next survey. Because the SSN does not change over a person's lifetime, in principle the labour force status, hours worked and earnings of each person can be tracked indefinitely into the future. This provides the foundation data for analysis of changes

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[3] A low response rate is not a problem for Australia's LFS: the latest survey had a 93 per cent response rate.

in employment, earnings and hours for individual employees when there is an increase in the NMW. It is an essential component of the high quality of the UK's DiD analysis.

But the UK studies that use DiD analysis do not appear to be without problems. One criticism is that the treatment and control groups are often quite small in number,[4] but the claimed statistical robustness (significance) of the estimates is based on the whole sample size: this exaggerates the statistical significance of the findings. A second problem is that only a very small proportion of the treatment and control groups actually loses their job or has a substantial reduction of hours worked following a rise in the NMW. In this case, econometric strategies that use the standard probit approach will tend to predict no job loss—i.e., the most common category.[5]

In discussions, the LPC noted that it is best to focus on employment and earnings as the outcomes of interest, rather than hours worked in the UK. This is because it is quite plausible that a rise in minimum wages will cause some people to reduce their hours of work, which they could do and still earn the same income.

2.1   UK research strategies and difficulties for Australia

Two sets of difficulties were discussed with the LPC and UK academics:

- the nature of minimum wage setting in Australia;[6] and

- the availability of suitable data to make quantitative estimates of the impacts of increases to minimum wages.

There are a number of reasons why it has proved difficult for researchers to identify the impact of increases in minimum wages on employment in Australia. They include:

- The long history of setting minimum wages means that there is no 'before' to use as a counterfactual.

- Small and frequent changes to Australia's minimum wages are so integral to the workings of the labour market that estimating what "the world would look like" without them is not possible.

- The inclusion of the awards structure in the minimum rates that are set means that there is no single minimum wage.

- The uniformity of minimum wages across Australia means that regional variation cannot be used to identify a counterfactual.

- It is difficult to identify who is paid at the award rate:

    – The casual premium is one reason why you cannot simply rely on observing the rate paid, even to identify those on the NMW equivalent.

    – Many employees may not know whether their pay is determined by an award or by some other method.

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[4] see Mike Brewer, Institute of Fiscal Studies:
https://www.ifs.org.uk/people/profile/9?year_published[start]=&year_published[end]=&page=1&

[5] It is possible that an alternative method, such as the Count method, could be more appropriate.

[6] Many of these considerations are also addressed in Chapter 2, Borland J (2018) 'A review of methods applied in international research on the employment effect of the minimum wage and implications for Australia', Research report 4/2018, Fair Work Commission, February.

- While this information could be sourced from employers, employers have little information on some key personal characteristics (especially education and non-English speaking migrant status) of their employees.

- Imputing an hourly wage rate from usual weekly earnings and hours, as is done in household surveys, has substantial error.

2.1.1 Issue – comparison group

In order to perform a DiD analysis, it is necessary to be able to identify the treatment group—those whose wages are required to rise to comply with an increase in minimum wages—and the comparison group—those who share similar characteristics, but whose wages do not need to rise. A detailed discussion of this method is set out in Appendix 2 of Borland (2018).

In the UK, the comparison group is typically the set of workers whose wage is just above the new NMW. It is noted that these studies express a concern that there will be some spillover from the new NMW to the comparison group, as employers seek to avoid a compression of wage relativities within their firm: to the extent that this happens, the effects of the rise in the NMW will be underestimated.

In Australia, rises in the (nominal value of the) NMW have been accompanied by rises in all award rates—usually, in more recent years, by the same percentage increase as for the NMW. This means that the problem of 'spillover' is embedded in the way in which minimum rates are set in Australia. There are also many bargained and individually-set rates whose increase is influenced by rises in the NMW and award rates. The RBA estimates that a little over 40 per cent of employees have their pay directly or indirectly affected by minimum wage decisions[7]. For this reason, the particular form of the DiD strategy that has been widely applied in the UK (and in the US) cannot be used in Australia in any straightforward way: as finding a comparator group may prove difficult.

It would be possible to find some groups of employees among the approximately 65 per cent whose wages do not move in response to changes in minimum wages (e.g. resource sector workers). But this is not sufficient for these employees to be used as a control group. It is also necessary that the increases in those employees' wages and employment would have followed the same path as that of the minimum wage group, had there not been a rise in minimum wages.[8]

In the UK, the introduction of the NMW in 1999 provided a valuable opportunity to compare employment effects before and after the imposition of a NMW. This was seen as a natural experiment, with a sizeable rise in the level of low pay rates and a before and after discontinuity. The introduction of the NMW triggered significant research, during which the DiD methods were refined. The recent requirement for the LPC to introduce a NLW for workers over age 25, and to increase it to 60 per cent of median earnings by 2020, is also seen as an opportunity to evaluate

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[7] RBA (2017), *Statement on Monetary Policy*, August at pp. 42–43.

[8] This requirement has defeated most efforts to use DiD methods in Australia (in addition to limitations on suitable data on employee hours, award status and earnings). One Australian study which did use the increase in the minimum wage that is payable to employees on junior rates when they have a birthday, as the basis for distinguishing treatment and control groups. Another (Leigh, 2003) used differences in the WA profile of state based awards over a number of years compared with the rest of the country, with WA being the treatment group and the rest of Australia being the control group. Findings were based on the assumption that otherwise WA employment outcomes would have been the same as in the rest of Australia.

the impact of a discontinuity in pay (those below and above age 25) and of a large increase in minimum wages. It is noted that Australia does not have either of these opportunities. The fact that there have been minimum wages in some form since 1907 and their regular adjustment since 1922 means that they are now fully embedded in the Australian workplace: there is no 'before and after'. Furthermore, increases in minimum wages have been mostly modest and in line with movements in other wages, so that there has not been much change in the relative pay of those on minimum rates. The changes that have occurred in more recent times are mostly declines in the *relative* value of minimum wages, as seen in the falls in the minimum wage bite and in the real and relative value of higher award rates[9].

A further complication, that is not peculiar to Australia, is that the Fair Work Commission and its predecessors are required to take into account the likely effects of its decision on employment. To the extent that it is possible to do this, the employment effects cannot be seen as the result of an external and independent shock to the system from the wage rise: rather, the anticipated employment effects influence the size of the rise in minimum wages, as well as the increase in the minimum affecting the levels of employment. This makes identifying the latter much more complicated. In this regard, the introduction of the NLW in the UK is an interesting exception. In directing the LPC to increase the NLW to 60 per cent of median earnings, the UK Government acknowledged that this was likely to cause some decline in the number of jobs that would otherwise have been created[10].

2.1.2 Issue – suitable data sources

The way in which data on the Australian labour market are collected (mainly by the ABS) makes it particularly difficult to do systematic quantitative research on the employment effects of changes to minimum wages. The key problem is that there is no data set that captures all the information that is needed, namely, not one data set:

- has reasonably frequent observations, so that levels of wages and employment can be observed before and after an increase in minimum wages.

- follows the same employees over time (i.e., longitudinal data).

- records:

  - the award status of each employee;

  - the casual status of each employee;

  - the contractual hours paid for;

  - the sector (especially private/public/not-for-profit);

  - pay—hourly if possible;

  - age;

  - sex; and

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[9] Fair Work Commission, *Statistical report—Annual Wage Review 2017–18*, Table 8.1; Chart 8.1; Chart 8.3; Chart 9.1.

[10] Low Pay Commission (2017), *National Minimum Wage*, November at p. 84.

- (preferably) other demographic information, so that it is possible to make different workforces comparable, and to see the effects of minimum wage rises on different groups—such as youth, non-English migrants, rural workers, women, low education.

In Australia, the main labour force surveys are the ABS, Survey of Employee Earnings and Hours (EEH) and the ABS LFS[11]. The EEH is an employer survey and has reliable data for a large and representative sample (53,000 employees) on award status, type of contract, earnings and contractual hours, from which hourly wage may be imputed. It also has data on sex, age, occupation, sector and business size, which are all valuable. But it is only conducted every 2 years and is cross-section—that is, neither specific firms nor workers are followed over time. Further, the data are collected for May of the survey year. Since increases to minimum wages occur on 1 July of each year, this means that any shorter term response to the most recent rise in minimum wages cannot be observed. These limitations suggest that this data set could not be used on its own to estimate employment effects of annual changes to minimum wages. It may be possible to use these data if the minimum wage changes that were evaluated were combined to cover a two-year period, to match the interval for the EEH survey.

The LFS is a survey of households (ie, the information comes directly from employees or from someone else in the household who answers the questions on their behalf). It follows households monthly for 8 months and has some information on personal characteristics. But as it does not have data on wages or on weekly earnings or on award status, it is unlikely to be considered a suitable data set on its own. A set of supplementary surveys is attached to the LFS, with different questions asked each month. None asks about award status, but it might be possible to impute award status. If the LFS could include a question about pay in each of the 8 months that an individual participates in the survey, then it may have potential to be a useable data set.

A new ABS data set—Labour Accounts—combines information from a number of different sources. It includes data on employment status, hours worked and wages. It does not have data on award status and does not follow employees over time. Among other things, it combines the information from the LFS and all of its supplementary sets of questions. Of the ABS data sets, it probably has the most potential. But because the data come from existing data sets, it retains many of the weaknesses identified above. It has only recently been released.

Of the non-ABS surveys, the Household, Income and Labour Dynamics in Australia (HILDA) survey is the best known and has the most appropriate information. It is longitudinal (i.e., follows the same individuals over time), has data on weekly earnings and hours and a great deal of demographic information. Its main limitation is its smaller sample size. The UK has an equivalent household longitudinal survey (the British Household Panel Survey, BHPS) but it is not much used in research on the employment effects of minimum wages, possibly because of its smaller sample size, the fact that the hourly wage has to be imputed from household reports of weekly earnings and hours, and the fact that the date of interview is distributed across the year (so that only a fraction will have data that incorporates the recent effects of a particular rise in the NMW). These limitations all apply to HILDA. In addition, it is acknowledged that many employees do not know whether they are paid at

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[11] A discussion of other Australian data sources is provided at Table 2: Borland J (2018) 'A review of methods applied in international research on the employment effect of the minimum wage and implications for Australia', Research report 4/2018, Fair Work Commission, February.

the award rate.[12] The timing of the annual HILDA survey will for many households not coincide with a rise in minimum wages—i.e., it will occur prior to the wage rise or many months afterwards.

Further, the smaller sample size (of the HILDA than the ABS survey) means that it may be expected that only a very small number of people will be observed to have lost their job in a way that could be attributed to a rise in minimum wages. This can be illustrated by the following example.

Suppose there is a wage increase that causes a 1% fall in employment. There are 10,700 employees in Wave 15 of the HILDA survey. If it is representative, 23 per cent of these are directly affected by an increase in the NMW and award wages. Suppose that half of the HILDA employees are surveyed at a time that is within 4 months of a rise in minimum wages. This makes a relevant sample of 0.23*0.5 of 10,700=1,230. Hence a 1% change in employment equates to 12 employees. Twelve employees is too small a number with which to establish a robust cause and effect relationship.

2.2 UK discussion on possible research strategies for Australia

Despite the obstacles to applying the main UK research strategies in Australia as discussed above, the UK academics consulted suggested that there may be ways to obtain some greater knowledge of the impacts of minimum wage rises, even if the DiD approach was not feasible in Australia.

The UK academics all submitted that the first step to identifying an employment effect is to quantify the impact of an increase in minimum wages on hourly wages received and on weekly earnings. The UK academics then posited that if there is little effect, then it may not be worth spending time looking for the consequences of that effect. They noted that studies are much more likely to get valid results for estimates of employment effects when the rise in pay and earnings is large enough to be clearly seen in the data. That is, if there is a rise (or fall) in the real and/or relative value of minimum wages that is large enough to have a measurable impact on hourly wages and weekly earnings, then it is likely to have some consequences for the economy.

Many possible impacts have been identified, including those cited in the Annual Wage Review Decision 2016–17[13], such as:

- reductions in hours, employment;
- lower wage rises for other workers in the firm;
- reductions in non-wage benefits;
- changes in training;
- higher quality job applicants;
- a fall in labour turnover;
- falls in profit margins;
- higher demand for the types of products with the highest demand from low wage households; and

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[12] Southwell A, Elliot S, Stafford N and French G (2010), *Consolidated Social Research Report,* TNS Social Research, Research report 10/2010, Fair Work Australia, June.

[13] [2017] FWCFB 3500; Chapter 6.

- higher prices.

Some of the UK researchers suggested that, if a meaningful rise in earnings is detected, the next research step may be to try to quantify the size of some or all these types of responses, perhaps concentrating on enterprises that are particularly award-reliant. Their thought was that a change in employment is only one of a number of possible responses to a rise in earnings, and it would be worthwhile looking more widely to understand (and if possible, to quantify) the predominant types of responses, which are likely to vary by type of employer and by industry.

Qualitative interviews with employers (as has been done as part of the Annual Wage Review Research program[14]) find many types of response to minimum wage increases, with little capacity for generalization or quantification. The UK LPC commissioned research of this nature in 2017—'The National Living Wage—Employers' responses to the 2017 increase'. In brief, the report found that most employers responded to the increase without substantial cuts to employment or hours. The productivity-enhancing actions that employers had taken in the past year were mostly independent of the introduction of the NLW (exceptions were some acceleration in the introduction of new technology and some squeezing of intra-firm pay differentials). The 2017 increase in the NLW was much bigger than any recent increase in Australia's minimum wages. With the small numbers of firms that it is usually feasible to survey/interview (there were 120 surveyed and 10 interviewed in the UK study), small real and/or relative increases in minimum wages are unlikely to produce responses that can be directly linked to the wage rise and are observed in a high proportion of respondent employers.

Several of the UK researchers supported the idea that a potential source of variation in the impact of nationally uniform changes to minimum wages is to examine the wage bite, by region and/or by industry. While the value of minimum wages would be the same for each area, the level of median earnings, and hence the wage bite, would vary. For this to be useful, data on earnings, hours and employment by quite small geographic areas (small enough to be local labour markets and to provide a large enough number of areas for statistical analysis to be reliable) is required. The area data would benefit from other information such as average levels of education, age and prevalence of non-English speaking migrants for the area, to be used as controls.[15]

UK researchers thought that if such area data were available, then one strategy could be to seek the cooperation of some large national employers that face different minimum wage bites in different locations and which employ a workforce that has reasonably similar characteristics to the award-reliant. Examples would be fast food chains, big retailers, and possibly accommodation chains. Research could look for differences in employee exit rates, including those that are and are not voluntary, and changes in hours worked, that are systematically linked to differences in the minimum wages bite.

Both of the above possible research strategies require a careful consideration of how the wage bite is measured. There may be better measures than the median wage or median full-time earnings of full-time adult workers. Many of the award reliant work part-time, and/or are youth. It is particularly

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[14] See Fair Work Australia (2011), 'Enterprise case studies: Effects of minimum wage-setting at an enterprise level', Research report 7/2010, February.

[15] An example of this approach is Mark B Stewart, 'Estimating the impact of the minimum wage using geographical wage variation', *Oxford Bulletin of Economics and Statistics*, Vol 64 Dec. 2002: pp. 583–605.

necessary to consider the role of youth wages and minimum rates, since workers aged 15-24 provide 65 per cent of all hours worked by those earning at or below the C12 rate, and 47 per cent of the hours worked by those who are at or below C10. Note that of those under age 21 who are on an award, 50 per cent receive the junior rate, 27 per cent receive the adult rate and 21 per cent receive an apprentice rate.[16]

A further reason for deeper thinking about the minimum wage bite is that only about 2 per cent of adults on awards are paid at the NMW rate.[17] Several years ago the Commonwealth submission to the Annual Wage Review included the construction of an award wage bite.[18] The idea could be worth considering if a widely accepted version was developed.

A further possible research strategy considered and also discussed in Borland (2018) would be to emulate the UK research that is studying in depth the Care Homes sector, to observe how it responds to increases in the NMW and NLW. The Care Homes sector is a large employer of low wage labour, and restricted in its ability to raise prices in response to an increase in wage costs. The researchers have been able to obtain the cooperation of most of the providers in this sector, to study their responses.[19]

A possible approach for high quality Australian work on the employment effects of rises in minimum wages would be to adopt the UK data strategy as applied to their ASHE (the UK equivalent of Australia's EEH). That is, for each employee in the sample, the firm would supply their tax file number. [20] This tax file number could then be used to trace the future employment and earnings of a sample of the individual employees who, at the time of the survey, were paid at the award rate, and compared with others who were not, controlling for age, sex, occupation, industry and sector at the time of the survey.[21] A variation on this would be to adopt the strategy used in Scandinavia and Germany. These countries draw a sample from PAYE tax records and survey the individuals in this sample to find their hours worked and education, which can then be linked to their age, sex, occupation and earnings as found in the tax data.

3 Summary

No single piece of research will provide a complete answer to the question of the employment effects of changes in minimum wages. This is true for the UK, and is illustrated also by the decades of research that has been conducted in the US without a conclusive outcome. However, there would be benefit in a number of studies being done that use the most up-to-date empirical techniques and the best data that can be obtained, as low quality research would just muddy the waters.

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[16] Fair Work Commission, *Statistical report—Annual Wage Review 2017–18*, Table 7.5.

[17] Yuen K, Ellis G and Nelms L (2018), 'Characteristics of workers earning the national minimum wage rage and of the low paid', Research report 3/2018, Fair Work Commission, February at p. 6.

[18] Australian Government, *Submission to the Annual Wage Review 2014–15,* at para. 62. The award wage bite measure uses the earnings of the median award-reliant worker in place of the NMW.

[19] Machin S and Johnston J (2004), 'Minimum wages in a low-wage labour market: Care homes in the UK', *Economic Journal,* vol. 114, pp. C102–C109.

[20] Use of tax data that are attached to data on individual employees in the EEH would not remove all the limitations of the EEH. It would still be a drawback that the EEH collects data for a specific week in May, that it occurs only every second year and it does not collect information on education or non-English language background.

[21] It might then be possible to link this TFN to Centrelink data, so that researchers could observe, for each employee, whether and for how long they obtained unemployment benefits.

Research could also concentrate on asking whether there are longer term trends [these would need to be clearly articulated] in access to decent employment and earnings, in total or for particular groups. If the answer is yes, then close studies of the affected groups could be done, most probably requiring both qualitative and quantitative data, some of which would need to be newly collected. The question could then be asked whether excessive or too low levels of minimum wages have contributed to the changes that are identified.

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[2017] FWCFB 3500

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Appendix A

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Discussions with the UK LPC and academics

The author attended the LPC Fifth Annual Research Symposium and international workshop, at which current research the LPC had sponsored was presented. In addition, the author had individual discussions with:

- Members and staff of the LPC, including Professors Richard Dickens and Sarah Brown.

- Professor Alan Manning, LSE.

- Professor Jonathan Wadsworth, LSE.

- Professor Steve Machin, LSE.

- Dr Grace Lordan, LSE.

- Professor Willy Brown, formerly Cambridge University and LPC.

- Dr Rebecca Riley, National Institute of Economic and Social Research.

- The Resolution Foundation.