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Minimum Wages and Employment: Comment

Ian Watson*
Australian Centre for Industrial Relations Research and Training
The University of Sydney

Abstract

Does increasing the minimum wage lead to employment losses? For many years most economists thought that the answer to this was a straightforward 'yes'. However, research during the 1990s began to overturn this conventional wisdom and showed that increases in the minimum wage did not automatically lead to employment losses. A recent Australian study, by Leigh (2003), examined the impact of statutory minimum wages in Western Australia and reached conclusions which supported the conventional view. However, close scrutiny of Leigh's article shows that it is fundamentally flawed. Despite Leigh's efforts, it remains the case that we simply do not know a great deal about the employment impact of Australia's system of minimum wages.

* This article has benefited considerably from the comments of Lorraine Dearden. Valuable feedback has also come from John Buchanan, Jan O'Leary and Grant Belchamber.

1. Debating the Impact of Minimum Wages

Does increasing the minimum wage lead to employment losses? In recent decades this question has intrigued economists, particularly since the mid-1990s when seminal work by American economists, Card and Krueger, unsettled the conventional wisdom (see the consolidated research in Card and Krueger 1995). That wisdom was largely based on theoretical considerations which decreed that if the minimum wage was set at a level above the market-clearing wage, then labour demand would drop and employment would fall. In the words of Brown (1995, p. 828): 'attempts to raise poorly paid workers' wages will cost some of them their jobs'. What Card and Krueger did was challenge this wisdom by showing empirically that increases in the minimum wage in some American states did not lead to job losses.

As is well known, Card and Krueger popularised the notion of 'natural experiments', in which the impact of an economic policy was evaluated by comparing its before-and-after status with that of a suitable control group. What made Card and Krueger's research so important was its controversial findings alongside its methodological rigour. It reversed the conventional wisdom by showing that increasing statutory minimum wages had no deleterious effects on employment, and it did so in a way which survived critical scrutiny. Subsequent criticism (for example, Welch 1995; Neumark and Wascher 2000) was answered by means of a reanalysis of the New Jersey wage increase using payroll data (Card and Krueger 1998,

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2000). This study confirmed Card and Krueger's earlier survey-based findings.

It may be the case, as Machin and Manning (1997, p. 735) pointed out, that increasing the minimum wage has less impact on employment in the United States because the minimum wage is so low in that country. It might be argued that in countries where the ratio of minimum wages to average wages is much higher—such as in Europe and Australia—the adverse effect on employment of increasing minimum wages will be much more pronounced. The European research is divided: some studies (for example, Dolado et al. 1996; Dickens, Machin and Manning 1999; Machin and Manning 1997; Stewart 2001) find little or no evidence for adverse employment outcomes;[1] other studies confirm the conventional wisdom (for example, Abowd, Kramarz and Margolis 1999; Bazen and Skourias 1997). An OECD summary of the literature which looked at over 20 major studies concluded that there were no clear, unambiguous findings (OECD 1998).

While a number of recent local studies have looked at wages and employment outcomes (for example, Daly et al. 1998; Debelle and Vickery 1998; Borland and Woodbridge 1999; Mangan and Johnston 1999; Junankar, Waite and Belchamber 2000; Hyslop and Stillman 2004), the article by Leigh (2003) is the first Australian study to make use of a quasi-experimental design in the style of the Card and Krueger natural experiments. For this reason alone it deserves serious attention.

2. Leigh's Quasi-Experiment

Leigh conducted a quasi-experiment, in which he examined six statutory minimum wage increases which occurred in Western Australia between 1994 and 2001. He compared employment rates before and after the increases, making use of a 'control group' (the rest of Australia). Leigh concluded that increases in minimum wages were associated with relative employment losses in Western Australia.[2] Leigh located his analysis in the tradition of natural experiments (see, for example, Meyer 1995; Kennan 1995), the framework behind the Card and Krueger studies mentioned above (Card and Krueger 1994, 1995). This approach tests the impact of policy changes, such as increases in statutory minimum wages, by comparing a treatment group (a group subject to the change) and a control group (a group not subject to the change). The techniques for assessing the differences between the treatment group and the control group vary. Some studies have used fixed effects models, where regressions are fitted to the data, using controls for state-fixed effects and year effects (see the overview in Besley and Case 2000, pp. F681–5). Other studies have used 'difference-in-difference' estimators, where the observations from both groups are pooled and then analysed in one of two ways. Either simple differences across states and across time are calculated, or regressions are run against the data. It is important to note that difference-in-difference estimators have been subject to considerable criticism in recent years (see, for example, Bertrand, Duflo and Mullainathan 2002; Johansson and Selén 2002).

Leigh's approach made use of difference-in-difference estimators, using Australian Bureau of Statistics (ABS) time-series data for seasonally adjusted, full-time equivalent employment to population ratios. He calculated the before-and-after difference in these employment rates for Western Australia by subtracting the employment rate three months after a minimum wage increase from the employment rate which prevailed three months before. Leigh did this for six occasions when minimum wage increases occurred in Western Australia between 1994 and 2001. His control group was the rest of Australia, so he repeated the before-and-after differencing for this control group. He then calculated the difference-in-difference between the Western Australia figure and the rest of Australia figure. His findings showed that on five of these six occasions, the employment effect of the wage increase was negative, with the magnitude varying from –0.027 percentage points to –0.412 percentage points.

Leigh also used regression analysis, with the difference-in-difference estimates as the dependent variable. His findings suggested that the elasticity of labour demand was –0.290

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(Leigh 2004). Leigh also reported a second set of regressions based on breaking down the data into sub-groups based on age and sex and these also showed negative elasticities.

3. A Flawed Study?

Has Leigh indeed shown that increases in statutory minimum wages in Western Australia caused employment losses? I would argue that the answer is a definite 'no'. There are a number of reasons for why his study is flawed.

Leigh conceded that he had reluctantly used ABS macrodata aggregates—such as employment to population ratios—instead of the kind of microdata which other researchers using the natural experiments approach have employed. Obviously there is a place for the use of macrodata aggregates in research, such as studies into the impact of large movements in average wages on employment. But when it comes to studies into the impact of small movements in relative wages on a small subset of the population, macrodata aggregates are inappropriate.[3] As Machin and Manning (1994) argued, macro models which attempt this task assume that all sectors of the labour market are roughly equivalent, an assumption which cannot be sustained in serious empirical research.

An absence of adequate statistical controls is a weakness in Leigh's approach. In his regression modelling, Leigh made use of no other controls, such as age composition of the workforce or industry composition, to mention just two considerations. It is worth noting that many of the other natural experiment approaches used elsewhere have routinely employed a range of statistical controls as well as the use of a control group. Now it might be argued that the use of a control group obviates the need for statistical controls. According to this logic, the difference-in-difference estimators should ensure that only the effects of the treatment show up in the results. However, such confidence is misplaced, and would only happen—if at all—in a genuine randomised experiment. In a 'natural' experiment the assumption that no further controls are needed is erroneous.[4] As Hamermesh (1995, p. 838) argued in his critique of Card and Krueger:

> … without true experiments there are no easy research strategies that might allow us to avoid the modeling necessary to control for changes in other variables that determine the outcomes of interest to us.

In the absence of such controls, the burden falls even more heavily upon the choice of control group. Again, it becomes evident that Leigh's approach is flawed. As Besley and Case (2000, p. F675) argued, the control group for a natural experiment must closely match the treatment group:

> … control groups must be stable, and adequately reflect the effect of changes in other variables that are simultaneously influencing outcomes of the group under study … Good control groups will be those whose fortunes have evolved similarly to those of the group experiencing the policy change *and* who respond similarly to changes in variables that drive policies to change.

There are good grounds for believing that the 'rest of Australia' is a very poor control group: the other Australian states have widely differing industry and employment characteristics, and considerable variation in their wage-fixing systems. Averaging them into a 'rest of Australia' control group does not resolve this problem.

It is particularly important that trends over time do not diverge sharply between treatment and control groups, especially in the period leading up to the intervention being studied. As Card (1992, p. 43) pointed out with respect to one of his early studies: 'If the comparison sample is a legitimate control group, there should be no trend in the pre-1987 gap between California and the comparison sample'. In other words, employment should not already be trending either down or up in ways which diverge significantly between the treatment group and the control group. If there are trends in the gap between these two groups, then the researcher should be controlling for this factor when modelling before-and-after changes. In Leigh's case, there is no attempt to control for this. All that he does is a sensitivity analysis to test whether any *one* of the six time periods has unduly influenced his results. He does not test the sensitivity of his estimates

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against different time periods. A cursory analysis of the gap between employment rates in Western Australia and the rest of Australia during the latter part of Leigh's period of study suggests that this gap was far from stable in the lead-up to the minimum wage 'interventions'.

Considerations of time also bedevil Leigh's assumptions about cause and effect. A preliminary assumption for the natural experiments approach is that one should be able to organise the data in a convincing temporal sequence. The data should provide a clear story about the situation before the intervention, the intervention itself, and then the aftermath. Leigh, however, was looking at six (almost annual) interventions, and this leads to the obvious question: how do we really know what is a *before* and what is an *after*? It is quite possible that the lagged effects of one minimum wage increase may feed into the precursors of the next wage rise. Leigh assumed that a six-month period on either side of a wage increase was sufficient to quarantine it, but he offered no evidence for this. As is well known, the issue of time lags is a critical element in analysing the behaviour of employers in responding to increases in minimum wages (Borland and Woodbridge 1999, p. 95). One cannot just make arbitrary assumptions about questions of time.[5] The very foundation of the natural experiments approach hinges critically on being able to rigorously separate before and after. Leigh fails badly on this score.

Distinguishing cause and effect in a natural experiments framework also requires that problems of endogeneity be properly resolved. In any model which seeks to explore the impact of a policy on an outcome, the right-hand-side variables must include that policy as part of its explanatory framework, while the dependent variable consists of the outcome. The problem is that the policy itself may be partly determined by some of the other right-hand-side variables which are also involved in determining the outcome. In this case, the same economic conditions which partly determine employment levels may also play a role in determining the policy (that is, increases in the minimum wage).

Leigh considered the question of endogeneity, both in terms of the timing of the minimum wage increases, and in terms of their size. He concluded that four out of the six increases may have been endogenous, but dismissed this problem with the argument that 'this would only affect the experiment if the Western Australian economy outperformed the Rest of Australia during that period' (Leigh 2003, p. 367). The rationale for this defence was not presented, nor was any evidence.

Only four of Leigh's six difference-in-difference estimates were statistically significant. It might be argued that statistical significance is not the be-all and end-all of research (see, for example, McCloskey and Ziliak 1996), and that substantive significance in the findings is more important. Even so, there is still the need to run 'reality checks' against economic modelling, and on this score Leigh's findings stretch credibility. Consulting the ABS data which form the basis for Leigh's analysis shows that the employment numbers which change from month to month are numbered in the hundreds, and six-month changes are at most in the low thousands. Yet examining the tables of standard errors for Western Australia shows that figures of about 1000 persons are subject to standard errors of around 450 persons. If we want confidence levels of 95 per cent (which equates to two standard errors), then we are dealing with the situation where the margin of error around the estimate is almost comparable to the estimate itself. It is hard to believe that the kind of employment changes which Leigh was expecting to find in the data could actually be discerned among the noise. This becomes evident if we convert Leigh's regression findings into real world figures. Leigh suggested that about 4.4 per cent of employees would be likely to be affected by minimum wage increases. This amounts to between 30000 to 40000 persons in Western Australia. If one then assumes an elasticity of labour demand of –0.5 (since the elasticity would be higher for minimum wage workers compared to the workforce as a whole), one should expect to find that a 10 per cent wage increase should lead to employment losses in the order of about 5 per cent, or 1500 to 2000 persons. A 5 per

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cent wage increase should lead to losses of about 750 to 1000 persons. The six minimum wage increases in Western Australia which Leigh examined never went above 10 per cent, and averaged about 6.3 per cent over the whole period. In other words, we are looking for employment losses of around 1300 persons. Given the normal variability in employment, is it conceivable that one could actually discern such an impact? As Kennan (1995, p. 1955) points out, with regard to studies of the elasticity of labour demand for teenagers:

> … we are looking for employment rate changes of about one percentage point, and such changes happen all the time, even from one month to the next. In short, [when looking for the impact of minimum wage increases] we are looking for a needle in a haystack.

4. Conclusion

During the last 15 years wage inequality in Australia has increased considerably. While much of this increased dispersion has been the result of high-wage individuals earning much higher wages—the top of the labour market 'taking off'—it has also been due to low-wage individuals falling behind (Watson et al. 2003). Over the last seven years, wage increases handed down by the Australian Industrial Relations Commission as part of its Safety Net Review (the Living Wage case) have prevented award-dependent workers falling even further behind, and have ensured that the floor of the labour market has been sustained. As overseas research has shown, increasing the minimum wage has beneficial effects on wage dispersion, helping to curtail the growth of wage inequality (Card and Krueger 1995; Borland and Woodbridge 1999; Machin and Manning 1994).

It remains the case, however, that the employment aspects of minimum wages still dominate the public debate. Some commentators invoke the supposed adverse employment impact of these Living Wage increases as part of their criticism of wage regulation at the bottom of the labour market.

Clearly, the relationship between employment and minimum wages is of great policy importance. Unfortunately, Leigh's article does not advance our understanding of this relationship. Despite his efforts, we remain largely ignorant about the real relationship between minimum wages and employment in Australia. Much research remains to be done, preferably using research designs which properly isolate before-and-after effects, which incorporate legitimate control groups, and which adequately control for confounding influences and compositional effects. Proper natural experiments along these lines still remain to be done in Australia.

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Endnotes

1. These include a study which explicitly made use of a quasi-experimental design and used difference-in-difference estimation (Stewart 2001). It concluded that the introduction of the UK minimum wage in April 1999 had no adverse impact on employment.

2. Leigh made some mistakes with the data in his original article and these have since been corrected in an erratum, see Leigh (2004).

3. It has been known for a long time (see, for example, Robinson 1950) that 'ecological correlations'—that is, correlations at the level of grouped data—are invariably much stronger than correlations at the level of individuals.

4. It might be argued that there is sufficient stability in most of the likely control variables that they can be ignored when using difference-in-difference estimators. Unless changes in these variables were correlated with the changes in minimum wages, then the impact of these controls would be negligible. Nevertheless, this is an empirical issue, and without such controls, we do not know if something else was driving the results.

5. In his critique of Leigh's article, Junankar (2004, p. 66) argued that increases in minimum wages were 'most likely to affect *new hires only*', not the existing workforce. This could

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mean that the impact of increases in minimum wages on employment 'could be spread over two or more years'.

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