OCCASIONAL PAPER

# The impact of wages and the likelihood of employment on the probability of completing an apprenticeship or traineeship

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Australian Government
Department of Education, Employment and Workplace Relations

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# About the research

## *The impact of wages and the likelihood of employment on the probability of completing an apprenticeship or traineeship*

Tom Karmel and Peter Mlotkowski, NCVER

This paper updates an earlier paper by Karmel and Mlotkowski, *The impact of wages on the probability of completing an apprenticeship or traineeship*. The major change is that this new paper looks at whether the probability of getting a job either in alternative employment or at the completion of an apprenticeship or traineeship, in addition to wages, impacts on completion rates. This issue was not considered in the earlier paper because the first Apprentice and Trainee Destinations Survey was run in 2008 when the labour market was particularly buoyant. The situation for the second survey, conducted in 2010, was very different, with unemployment in general and youth unemployment in particular increasing sharply.

## Key messages

- For trade apprentices, the premium attached to becoming a tradesperson is a significant factor to completion, not the training wage. This confirms the earlier finding.
- By contrast, in the non-trades the training wage matters more. For both male and female trainees, completion rates decrease with increases in the difference between wages in alternative employment and training wages.
- Typically, the probability of employment on completion of an apprenticeship or traineeship exceeds that of the apprentice or trainee who drops out. For trades and females in non-trade occupations this difference significantly affects completion rates.
- The economic downturn significantly increased the attractiveness of undertaking an apprenticeship or traineeship. Alternative employment became less attractive compared with being an apprentice or a trainee, and in general the pay-off to completion increased.

Tom Karmel
Managing Director, NCVER

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# Introduction

Low completion rates of apprenticeships and traineeships have been of concern for many years. In 2010 Karmel and Mlotkowski examined the impact of wages on the probability of completion. They found that differences between the training wage, the wage in alternative employment and the wage on completion had a limited effect on completion. For apprentices it was the premium attached to completion that mattered. For male non-trade trainees the difference between the wage in alternative employment and the training wage did have an impact on completion. For females in non-trade traineeships, they found no relationship between wages and the probability of completion.

The previous study did not consider how the likelihood of finding employment after completing or quitting the apprenticeship or traineeship might affect the results. Those not employed after the training contract were excluded from the analysis because, obviously, they did not report a wage. The reason for this emphasis on wages rather than on the probability of gaining employment is that the analysis made use of the 2008 Apprentice and Trainee Destinations Survey, a survey which covered a period of buoyant economic conditions in Australia, with unemployment at historically low levels. By contrast, the 2010 survey looked at apprentices and trainees who either completed or cancelled/withdrew between April and June 2009 and their employment status in March 2010, a period of far less favourable economic conditions. Between survey years, for example, the unemployment rate in Australia peaked at 5.8% in October 2009, from an historical low of 4.0% in February 2008 (ABS 2010).

Hence, this paper follows our earlier approach (Karmel & Mlotkowski 2010) of estimating the impact of wages on the probability of completing an apprenticeship or traineeship, but now we also consider the impact of the likelihood of finding employment. Specifically, we consider the probability of finding employment on completion of the training contract and the probability of finding alternative employment. We hypothesise that the difference between these should have a positive impact on completion rates (noting that we expect the difference itself to be positive).

This paper makes use of both the 2008 Apprentice and Trainee Destinations Survey and the 2010 edition. The models of wages in and out of the training contract are run separately for both cohorts. We do the same for the probability of finding employment. This allows us to determine the impact of deteriorating economic conditions on our explanatory variables. However, when it comes time to estimate the final probability of completing the apprenticeship or traineeship, we combine the datasets. This increases the sample size and makes the models more robust. Further, we decompose the results to determine the impact of changing labour market conditions on the change in the probability of completing between 2008 and 2010.

The next section provides an overview of the apprentices and trainees in the survey in 2008 and 2010. This helps to put the final results into perspective. The methodology is briefly explained in the third section, while the groundwork for the analytical part of the paper is given in the subsequent two sections, the first of which estimates three wages for each group of apprentices and trainees: the wage the apprentices and trainees get at each point in a training contract; the wage the apprentices and trainees would expect to get in alternative employment at each point in the training contract; and, finally, the wage the apprentices and trainees would expect to get on completion of the training contract. The section that follows models the probability of finding employment, first on completion of the training contract, then on cancellation/withdrawal.

The final completion models are then provided. The results are disaggregated into three groups: trades, non-trades (male) and non-trades (female). For trade apprentices, we find that it is still the premium attached to becoming a tradesperson which matters, not the training wage. In addition, the wedge between the likelihood of employment on completion and in alternative employment is significant. In the non-trades, the wedge between expected wages in alternative employment and wages during training is still a significant factor for males, and is now significant for females as well.

This analysis also provides an estimate of the impact of the economic downturn on wages and the probability of finding employment. First, the training wage wedge decreased significantly between 2008 and 2010, more than halving for the trades and non-trade females. By contrast, the wedge between wages on completion and wages in alternative employment increased between 2008 and 2010, particularly for the trades and non-trade males. It seems that during the downturn, a large proportion of the non-completers went into part-time employment, reducing the average wage in alternative employment. The greatest impact of the downturn on the probability of employment was in the trades, where the difference between the probability of completion and in alternative employment increased from 10.8 percentage points to 15.3 percentage points.

In decomposing the final completion models, we find that changing labour market conditions, as reflected in changes to wages and probabilities of employment, explain little of any changes in completion rates. It seems that 'animal spirits'—the attitudes of employers and apprentices or trainees—are more important.

The paper concludes with a brief discussion of these findings.

# Background

This analysis makes use of data from the 2008 and 2010 Apprentice and Trainee Destinations Surveys. These surveys cover the economic cycle in Australia. The 2008 survey looks at apprentices and trainees who completed or cancelled/withdrew in the final quarter of 2007 and their employment status in September 2008. This was a period of buoyant economic conditions in Australia with unemployment reaching a historically low 4.0% in February 2008 (ABS 2010). The 2010 edition looks at apprentices and trainees who completed or cancelled/withdrew between April and June 2009 and their employment status in March 2010. By contrast, this was a period of far less favourable economic conditions. The changing economic backdrop to the surveys is likely to impact on the issues we are interested in: wages, the probability of employment, the likelihood of completing, and the reasons for non-completion. Thus, we initially present some simple cross-tabulations from the surveys, in order to get a handle on the samples of apprentices and trainees we are working with. These tabulations come from NCVER's statistical publication, *Apprentice and trainees destinations 2010*, and give a good indication of the movements we can expect to see.

The impact of the downturn is clear to see from tables 1 and 2, which provide the key findings for completers and non-completers, respectively. The proportion of apprentices and trainees not employed after training increased between 2008 and 2010 for both completers and non-completers. Looking at the trades, the proportion not employed increased from 7.1% to 9.0% for completers, while for the non-completers the proportion increased from 24.0% to 27.4%. Similar increases occurred for the non-trades. The split of employment into full-time and part-time is interesting for the non-completers. For both trade and non-trade non-completers, the proportion employed full-time declined between 2008 and 2010, whereas the proportion employed part-time increased. This result will translate into a decrease in the expected wage in alternative employment in 2010 in our models. All else being equal, this would decrease the training wage wedge and increase the completion premium, possibly impacting the likelihood of completion.

The proportion reporting redundancy as the main reason for non-completion increased dramatically, from 8.9% in 2008 to 26.8% in 2010 for the trades. By contrast, the proportion reporting their pay being too low as their main reason for non-completion declined. However, as argued in the previous study, there are a number of reasons why wages might matter more to non-completion than these elicited responses imply and so we are not discouraged by this result. Indeed, dissatisfaction remains higher with pay than with any other aspect of the apprenticeship or traineeship, with 33.4% of non-completers and 20.2% of completers in 2010 stating they were dissatisfied.

**Table 1 Key findings for completers, 2008 and 2010**

| | Trades | | Non-trades | | All completers | |
|---|---|---|---|---|---|---|
| | 2008 % | 2010 % | 2008 % | 2010 % | 2008 % | 2010 % |
| **Employment and further study outcomes** | | | | | | |
| *Approximately 9 months after training* | | | | | | |
| Employed | 92.9 | 91.0 | 91.7 | 89.8 | 92.0 | 90.1 |
| Full-time | 85.7 | 83.2 | 62.9 | 64.0 | 68.4 | 69.4 |
| Part-time | 7.3 | 7.8 | 28.8 | 25.7 | 23.6 | 20.7 |
| Employed in same occupation as apprenticeship/ traineeship | 77.4 | 79.6 | 70.3 | 67.3 | 72.0 | 70.8 |
| Employed with same employer as apprenticeship/ traineeship | 49.0 | 55.5 | 66.5 | 72.3 | 62.3 | 67.6 |
| Not employed | 7.1 | 9.0 | 8.3 | 10.2 | 8.0 | 9.9 |
| Unemployed | 4.0 | 5.1 | 4.3 | 5.5 | 4.2 | 5.4 |
| Not in labour force | 3.0* | 3.9 | 4.0 | 4.7 | 3.7 | 4.5 |
| **Enrolled in further study** | **32.3** | **20.6** | **30.0** | **24.0** | **30.5** | **23.1** |
| **Salary** | | | | | | |
| Of those employed full-time | | | | | | |
| In last week of apprenticeship/traineeship ($) | 35 700 | 36 600 | 38 600 | 40 700 | 37 700 | 39 300 |
| Approximately 9 months after apprenticeship/traineeship ($) | 49 100 | 52 500 | 44 900 | 45 900 | 46 200 | 48 200 |
| **Dissatisfaction with apprentice or traineeship** | | | | | | |
| **Overall** | **5.0** | **3.8** | **5.7** | **3.7** | **5.5** | **3.7** |
| **Quality of off-the-job training overall** | **7.8** | **5.9** | **7.2** | **6.0** | **7.5** | **6.0** |
| Frequency of training | 8.4 | 7.0 | 9.9 | 7.4 | 9.5 | 7.4 |
| Relevance of skills to workplace | 6.5 | 7.2 | 5.4 | 3.7 | 5.7 | 4.8 |
| Fairness of the assessments of skills and knowledge | 5.7 | 4.2 | 4.3 | 3.1 | 4.7 | 3.4 |
| Relevance of the assessment tasks | 7.2 | 6.5 | 5.2 | 4.3 | 5.7 | 4.9 |
| Quality of the training facilities and equipment | 8.9 | 10.4 | 8.5 | 6.3 | 8.6 | 7.5 |
| **Employment overall** | **6.0** | **4.6** | **5.9** | **4.4** | **5.9** | **4.5** |
| Type of work | 5.3 | 4.5 | 5.3 | 3.3 | 5.2 | 3.7 |
| Working conditions | 8.5 | 6.9 | 7.1 | 5.6 | 7.4 | 6.0 |
| Pay | 29.2 | 23.7 | 20.2 | 18.8 | 22.5 | 20.2 |
| Hours of work | 6.2 | 5.3 | 7.4 | 6.5 | 7.0 | 6.2 |
| Supervision | 7.7 | 7.3 | 8.8 | 5.6 | 8.5 | 6.1 |
| Relationship with co-workers | 4.7* | 2.8 | 4.2 | 3.1 | 4.3 | 3.0 |
| Training provided by employer | 11.3 | 8.2 | 10.4 | 6.7 | 10.5 | 7.1 |
| Skills learnt on the job | 4.7 | 4.2 | 5.7 | 3.2 | 5.4 | 3.5 |

Note: * Estimate has a relative standard error greater than 25% and should be used with caution.

Source: NCVER (2010a).

**Table 2 Key findings for non-completers, 2008 and 2010**

| | Trades | | Non-trades | | All non-completers | |
|---|---|---|---|---|---|---|
| | 2008 % | 2010 % | 2008 % | 2010 % | 2008 % | 2010 % |
| **Employment and further study outcomes** | | | | | | |
| *Approximately 9 months after training* | | | | | | |
| Employed | 76.0 | 72.6 | 76.6 | 73.8 | 76.5 | 73.4 |
| Full-time | 60.4 | 53.9 | 49.4 | 45.6 | 53.3 | 48.1 |
| Part-time | 15.7 | 18.7 | 27.3 | 28.3 | 23.2 | 25.3 |
| Employed in same occupation as apprenticeship/ traineeship | 24.6 | 20.5 | 28.3 | 28.8 | 27.0 | 26.2 |
| Employed with same employer as apprenticeship/ traineeship | 6.6 | 9.5 | 13.6 | 18.9 | 11.0 | 16.0 |
| Not employed | 24.0 | 27.4 | 23.4 | 26.2 | 23.5 | 26.6 |
| Unemployed | 16.0 | 20.0 | 12.8 | 15.9 | 14.0 | 17.2 |
| Not in labour force | 8.0 | 7.4 | 10.5 | 10.3 | 9.6 | 9.4 |
| **Enrolled in further study** | **34.9** | **35.6** | **29.9** | **32.0** | **31.8** | **33.2** |
| **Salary** | | | | | | |
| Of those employed full-time | | | | | | |
| In last week of apprenticeship/ traineeship ($) | 21 900 | 26 500 | 32 300 | 34 700 | 27 200 | 31 300 |
| Approximately 9 months after apprenticeship/traineeship ($) | 38 100 | 39 000 | 41 000 | 41 700 | 39 800 | 40 700 |
| **Dissatisfaction with apprentice or traineeship** | | | | | | |
| **Overall** | **28.1** | **25.3** | **27.0** | **24.6** | **27.6** | **24.7** |
| **Quality of off-the-job training overall** | **15.4** | **10.0** | **22.5** | **14.3** | **19.5** | **12.8** |
| Frequency of training | 20.1 | 13.7 | 29.3 | 22.3 | 25.7 | 19.4 |
| Relevance of skills to workplace | 17.5 | 12.0 | 13.0 | 13.7 | 14.7 | 13.1 |
| Fairness of the assessments of skills and knowledge | 8.8 | 6.6 | 13.1 | 10.0 | 11.4 | 8.8 |
| Relevance of the assessment tasks | 13.6 | 9.1 | 12.8 | 12.2 | 13.1 | 11.1 |
| Quality of the training facilities and equipment | 17.7 | 11.4 | 19.3 | 13.4 | 18.6 | 12.7 |
| **Employment overall** | **26.0** | **20.1** | **20.4** | **19.0** | **22.5** | **19.3** |
| Type of work | 21.4 | 17.8 | 17.1 | 18.1 | 18.6 | 18.0 |
| Working conditions | 26.4 | 18.6 | 24.3 | 19.3 | 25.0 | 19.1 |
| Pay | 52.1 | 38.7 | 40.9 | 30.9 | 45.0 | 33.4 |
| Hours of work | 21.1 | 17.3 | 23.2 | 21.4 | 22.4 | 20.1 |
| Supervision | 26.8 | 23.0 | 25.2 | 23.0 | 25.7 | 22.9 |
| Relationship with co-workers | 24.0 | 16.0 | 15.4 | 10.1 | 18.5 | 11.9 |
| Training provided by employer | 30.6 | 26.9 | 26.4 | 24.3 | 27.9 | 25.2 |
| Skills learnt on the job | 19.5 | 17.7 | 14.2 | 13.8 | 16.1 | 15.0 |
| **Main reason for not completing** | | | | | | |
| Doing something different/better | 23.3 | 20.2 | 36.5 | 41.2 | 31.7 | 34.7 |
| *Got offered a better job* | *3.3** | *2.2* | *10.1* | *7.2* | *7.7* | *5.7* |
| *The pay was too low* | *8.7* | *4.7* | *3.0* | *2.3* | *5.1* | *3.0* |
| Poor working conditions/did not like boss | 19.3 | 13.3 | 7.0 | 5.5 | 11.4 | 7.9 |
| Didn't like the type of work/industry, or transferred to other apprenticeship/ traineeship | 16.8 | 13.7 | 8.2 | 8.7 | 11.4 | 10.3 |
| Wasn't happy with training or study | 8.2 | 5.1 | 7.9 | 3.8 | 8.0 | 4.2 |
| Lost job or made redundant | 8.9 | 26.8 | 7.8 | 15.2 | 8.2 | 18.7 |
| Personal reasons | 10.0 | 15.7 | 16.2 | 18.8 | 13.9 | 17.9 |
| All other reasons | 13.4 | 5.3 | 16.4 | 6.8 | 15.3 | 6.3 |

Note: * Estimate has a relative standard error greater than 25% and should be used with caution.

Source: NCVER (2010a).

# Methodology

The methodology follows Karmel and Mlotkowski (2010) in calculating the wage differences between the training wage, the wage in alternative employment and the wage on completion. The estimation of the probability of employment is the new element of the analysis.

The method is as follows.

- Repeat the equations to estimate the annual wage during training, the wage on completion and the wage in alternative employment. These involve ordinary least square (OLS) regressions with log(wage) as the dependent variable; 2008 and 2010 data are modelled separately.
- Calculate the difference between wages on completion and wages in alternative employment, and the difference between wages in alternative employment and wages during training. This involves using the wage equations calculated in the previous step. The calculations are performed separately for 2008 and 2010.
- Estimate the probability of finding alternative employment and the probability of finding employment on completion, using the same set of apprentice and trainee characteristics used in the first step. The probabilities are modelled using logistic regression. The dependent variable will be binary: whether employed approximately nine months after completion or cancellation/ withdrawal, or not. Once again 2008 and 2010 data are modelled separately.
- Model the impact on the likelihood of completion of the wage wedges and the probabilities of finding employment. This is a simple logistic regression. However, at this stage the 2008 and 2010 datasets are combined to increase the sample size. In addition, a dummy variable (which equals one for 2010 and zero for 2008) is included to see whether there is a difference in the probability of completion between survey years over and above that due to the changes in wages and the probability of employment.
- Finally, the results are decomposed such that we determine the impact of changing labour market conditions on the change in the probability of completion between 2008 and 2010.

Appendix A provides a graphical representation of the method.

# Modelling wages

This section provides the estimates of wages in and out of the training contract. Later these will be used as inputs into a model which estimates the impact of wages, together with the likelihood of finding employment, on the probability of completion. The models are run on the 2008 and 2010 surveys separately. They are identical in form to the ones in Karmel and Mlotkowski (2010) and are reduced in the same manner, with the occupational dummy variables being retained or dropped as a block, depending on the amount of variation between the values of the coefficients, and all other variables being dropped through normal backward elimination.

For completeness, we define the explanatory variables as follows. Duration is entered into the models as duration for full-time and part-time contracts. Age is entered as the age of the apprentice or trainee at the commencement of their training contract to avoid correlation with duration, noting that trade apprenticeships generally take four years full-time to complete. The remaining variables are entered as binary or dummy variables: male, part-time, existing worker, high-level qualification (certificate IV or above, compared with certificate III or below), completed Year 12 prior to commencement, had certificate III or above post-school qualification prior to commencement, school-based, and private sector (compared with government sector or group training). Finally, dummy variables on the Australian and New Zealand Standard Classification of Occupations (ANZSCO) of the training contract are entered to test whether wages vary by occupation.

## Wages at each point in the training contract

We begin with wages at each point in the training contract. These models are based on the wages the apprentices and trainees received in the last week of their training contract, which for non-completers means the week they cancelled/withdrew, which could have been at any point in time.

Rather than simply present the coefficients, we convert them to show the percentage differences in the wages from a reference category (table 3). (Appendix B shows the coefficients.) For example, we can show how wages change with duration by comparing wages one, two and three years into the training contract with wages at the start. Overall, the results are quite consistent between 2008 and 2010—apart from the occupations, all other variables impact on wages in the same direction and to a similar extent. The fact that more variables are significant in 2010 is down to the increased sample size of the Apprentice and Trainee Destinations Survey.

The variables which have most impact on wages during training are duration, age at commencement, part-time status, and school-based status. In the trades in 2010, wages during training increase by 14.3% after one year (full-time); after two years wages increase by 30.6% and after three years they increase by around 50%. Age at commencement has a significant positive impact across all groups and survey years. By contrast, part-time and school-based apprentices and trainees earn wages commensurate with their part-time status. Once again, this result is consistent between the three groups and between 2008 and 2010.

Interpreting the variation in the occupational blocks between survey years is difficult because some variables may not be individually significant.

**Table 3 Impact of characteristics on annual wage during training, trades and non-trades (male/female), relative to a reference category, 2008 and 2010**

| | Trades | | Non-trades (male) | | Non-trades (female) | |
|---|---|---|---|---|---|---|
| | 2008 % | 2010 % | 2008 % | 2010 % | 2008 % | 2010 % |
| FT duration (1 year compared with at start) | 17.5 | 14.3 | * | 9.6 | * | * |
| FT duration (2 years compared with at start) | 38.1 | 30.6 | * | 20.2 | * | * |
| FT duration (3 years compared with at start) | 62.3 | 49.3 | * | 31.8 | * | * |
| PT duration (1 year compared with at start) | * | 16.3 | * | 24.9 | 12.2 | 12.6 |
| PT duration (2 years compared with at start) | * | 35.1 | * | 55.9 | 26.0 | 26.9 |
| PT duration (3 years compared with at start) | * | 57.1 | * | 94.7 | 41.4 | 42.9 |
| Age at commencement (20 years old compared with 16) | 22.6 | 23.2 | 30.6 | 18.2 | 23.8 | 16.7 |
| Age at commencement (25 years old compared with 16) | 67.9 | 71.8 | 97.0 | 50.6 | 73.1 | 46.3 |
| Age at commencement (30 years old compared with 16) | 142.0 | 154.0 | 213.4 | 98.9 | 155.5 | 90.2 |
| Characteristic dummy variables: | | | | | | |
| Male | * | 18.4 | - | - | - | - |
| Part-time | * | -21.1 | -34.0 | -40.6 | -40.3 | -40.2 |
| Existing worker | 21.6 | 12.3 | * | 16.4 | 22.7 | 18.3 |
| High-level qualification | * | 36.3 | 19.1 | * | * | 13.4 |
| Completed Year 12 | * | * | 7.0 | 9.1 | 16.2 | 16.7 |
| Had cert. III or above post-school qual. | * | 14.9 | 16.5 | 9.8 | 18.2 | 8.0 |
| School-based | -62.8 | -41.6 | -37.6 | -44.5 | -49.2 | -47.7 |
| Private sector | 13.3 | 4.4 | * | 16.0 | * | * |
| Occupational dummy variables: | | | | | | |
| Trades: | | | | | | |
| 31 Engineering, ICT & science technicians | 17.5 | -26.5 | - | - | - | - |
| 32 Automotive and engineering | 23.0 | 0.0 | - | - | - | - |
| 33 Construction trades workers | 18.6 | 2.7 | - | - | - | - |
| 34 Electrotechnology and telecommunications trades workers | 22.8 | 4.9 | - | - | - | - |
| 35 Food trades workers | 14.3 | -3.1 | - | - | - | - |
| 391 Hairdressers | -9.4 | -4.3 | - | - | - | - |
| All other trade occupations | -- | -- | - | - | - | - |
| Non-trades: | | | | | | |
| 1+2 Managers and professionals | - | - | -- | -- | - | -- |
| 4 Community and personal service workers | - | - | -10.9 | -3.0 | - | -3.9 |
| 5 Clerical and administrative workers | - | - | -2.3 | 9.1 | - | -1.2 |
| 6 Sales workers | - | - | -2.4 | -9.3 | - | -17.4 |
| 7 Machinery operators and drivers | - | - | 13.1 | 15.4 | - | 17.7 |
| 8 Labourers | - | - | -3.9 | 7.2 | - | -9.6 |

Notes: Calculations derived according to the following example. If $\ln(w^1)$ is the wage when, say, the school-based dummy variable equals 1, and $\ln(w^2)$ is the reference wage (when the school-based dummy variable equals 0), then the percentage change in wages is given by $\%\Delta w=(\exp(\alpha)-1)*100$, where $\alpha$ is the coefficient on the school-based dummy variable from the reduced models.

* Denotes coefficient not significant at the 10% confidence level.

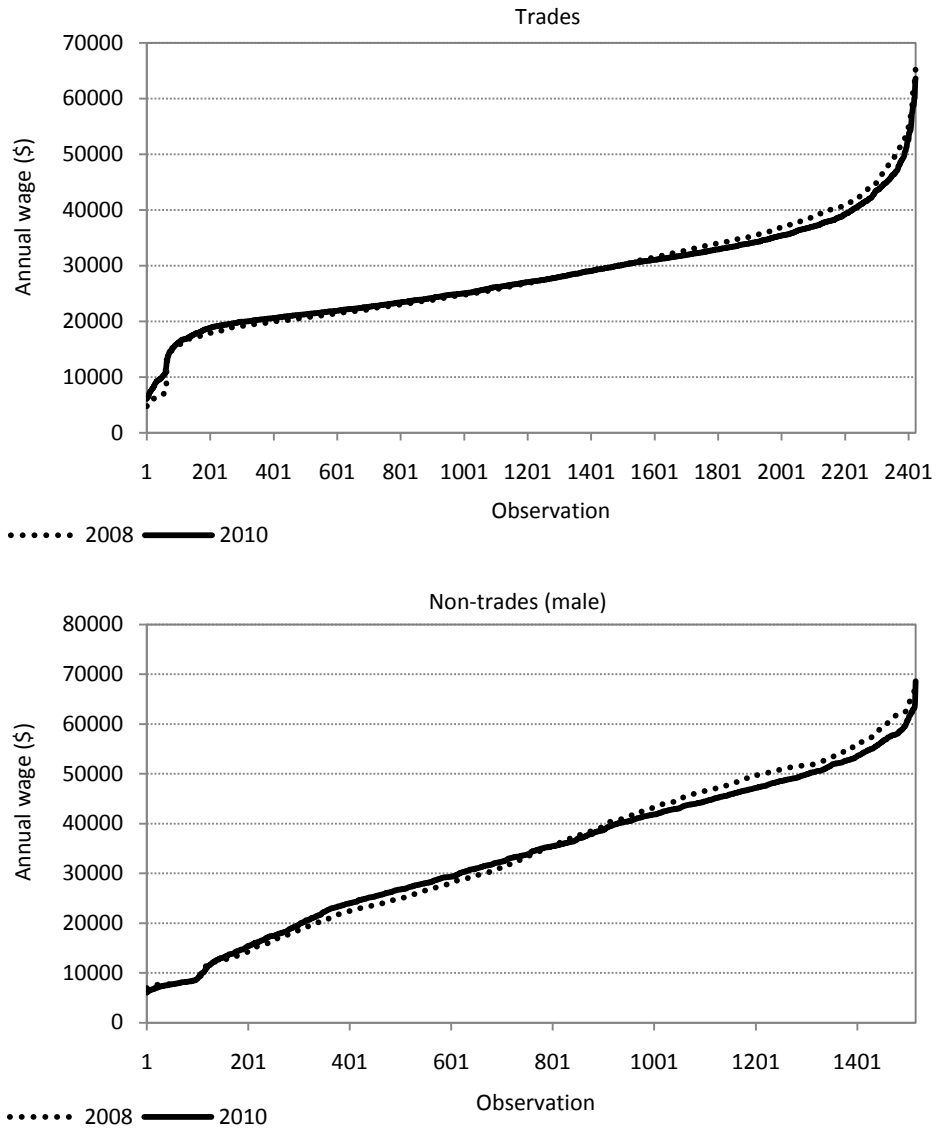
\- Denotes variable not entered into model.

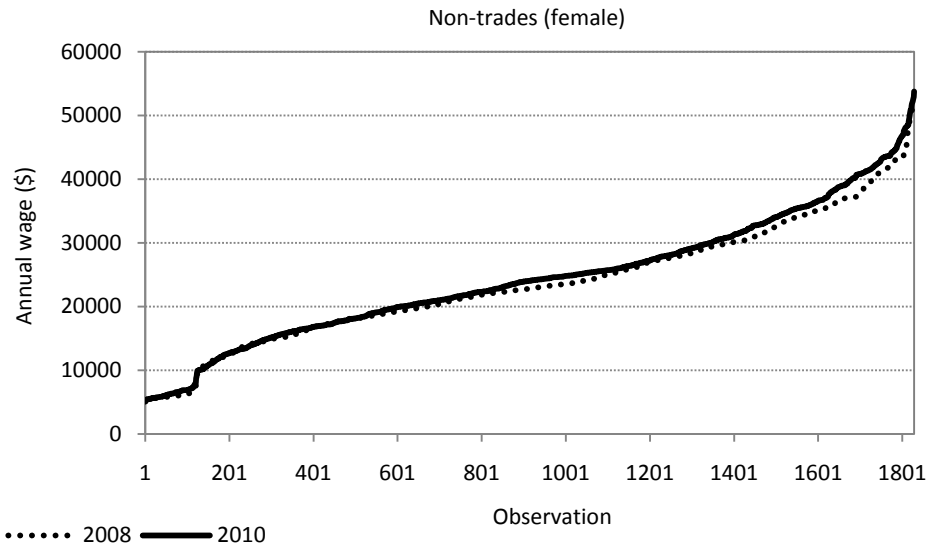
-- Denotes occupational variable used as reference, and hence not entered into model.

There is another way we can present these results, one which allows us to look at the impact of the economic downturn on apprentice and trainee wages. We can take one of the survey years, say 2010, and calculate for each apprentice or trainee in this sample their wage during training, first

based on the 2010 model and then based on the 2008 model. In this way we calculate what the 2010 apprentices and trainees received and what they could have expected to receive in 2008. The difference shows the impact of the economic downturn. Figure 1 presents the results of this exercise. Overall, there is little variation for each group. It seems the downturn had no great impact. This is to be expected since minimum training wages are set by legislation, not the prevailing economic conditions, and many apprentices and trainees would be on the minimum rate. We expect to see more of an impact on wages in alternative employment and wages on completion.

**Figure 1 Impact of downturn on annual wage during training, trades and non-trades (male/female)**






Note: 2008 wages are presented at 2010 prices.

# Wages in alternative employment

The second wage we model is the expected wage in alternative employment. These models are based on the wages the apprentices and trainees received approximately nine months after they cancelled or withdrew from their training contract, in September 2008 or March 2010, respectively. The models are restricted to those in employment—we are concentrating on wages for the time being rather than on the probability of gaining employment.

We again present the results more intuitively by converting the coefficients to show the percentage differences, relative to a reference category, in actual wages in alternative employment. Table 4 shows that wages in alternative employment are around 50% higher for trade apprentices who withdraw after three years—compared with trade apprentices who notionally have their contracts cancelled at the start—in both 2008 and 2010. The table also quantifies the likely outcome of doing a traineeship part-time rather than full-time, with wages in alternative employment declining by roughly around a third for males and females in both years. This no doubt reflects that many of those undertaking a part-time traineeship continue in part-time employment after they leave the training contract. This is also likely to be the outcome for school-based apprentices and trainees.

Again, there is little variation by occupation. In 2010, the only group for which we retain the occupational dummies is non-trade males.

**Table 4 Impact of characteristics on annual wage in alternative employment, trades and non-trades (male/female), relative to a reference category, 2008 and 2010**

| | Trades | | Non-trades (male) | | Non-trades (female) | |
|---|---|---|---|---|---|---|
| | 2008 | 2010 | 2008 | 2010 | 2008 | 2010 |
| | % | % | % | % | % | % |
| FT duration (1 year compared with at start) | 14.3 | 13.7 | * | 14.2 | * | * |
| FT duration (2 years compared with at start) | 30.5 | 29.2 | * | 30.3 | * | * |
| FT duration (3 years compared with at start) | 49.2 | 46.8 | * | 48.8 | * | * |
| PT duration (1 year compared with at start) | * | 57.2 | * | 32.5 | 16.0 | * |
| PT duration (2 years compared with at start) | * | 147.2 | * | 75.5 | 34.5 | * |
| PT duration (3 years compared with at start) | * | 288.8 | * | 132.4 | 56.0 | * |
| Age at commencement (20 years old compared with 16) | 12.3 | 29.4 | 33.0 | 26.4 | 16.9 | 30.2 |
| Age at commencement (25 years old compared with 16) | 34.9 | 98.4 | 108.5 | 81.7 | 47.3 | 99.3 |
| Age at commencement (30 years old compared with 16) | 69.6 | 225.7 | 246.6 | 175.7 | 92.6 | 225.0 |
| Characteristic dummy variables: | | | | | | |
| Male | 25.7 | 41.8 | - | - | - | - |
| Part-time | * | * | -33.5 | -38.5 | -30.1 | -27.8 |
| Existing worker | 42.0 | 13.1 | 17.5 | * | * | * |
| High-level qualification | * | * | * | * | 32.2 | 27.0 |
| Completed Year 12 | * | * | 15.2 | 16.8 | 16.3 | 11.5 |
| Had cert. III or above post-school qual. | * | * | * | * | * | * |
| School-based | * | -50.6 | * | * | -31.1 | -29.9 |
| Private sector | * | * | * | 15.3 | * | * |
| Occupational dummy variables: | | | | | | |
| Trades: | | | | | | |
| 31 Engineering, ICT & science technicians | - | - | - | - | - | - |
| 32 Automotive and engineering | - | - | - | - | - | - |
| 33 Construction trades workers | - | - | - | - | - | - |
| 34 Electrotechnology and telecommunications trades workers | - | - | - | - | - | - |
| 35 Food trades workers | - | - | - | - | - | - |
| 391 Hairdressers | - | - | - | - | - | - |
| All other trade occupations | - | - | - | - | - | - |
| Non-trades: | | | | | | |
| 1+2 Managers and professionals | - | - | - | -- | -- | - |
| 4 Community and personal service workers | - | - | - | -18.4 | 13.2 | - |
| 5 Clerical and administrative workers | - | - | - | -3.6 | 28.2 | - |
| 6 Sales workers | - | - | - | -29.4 | 40.0 | - |
| 7 Machinery operators and drivers | - | - | - | 0.8 | 9.5 | - |
| 8 Labourers | - | - | - | -6.6 | 86.7 | - |

Notes: Calculations derived according to the following example. If $\ln(w^1)$ is the wage when, say, the school-based dummy variable equals 1, and $\ln(w^2)$ is the reference wage (when the school-based dummy variable equals 0) then the percentage change in wages is given by $\%\Delta w=(\exp(\alpha)-1)*100$, where $\alpha$ is the coefficient on the school-based dummy variable from the reduced models.

* Denotes coefficient not significant at the 10% confidence level.

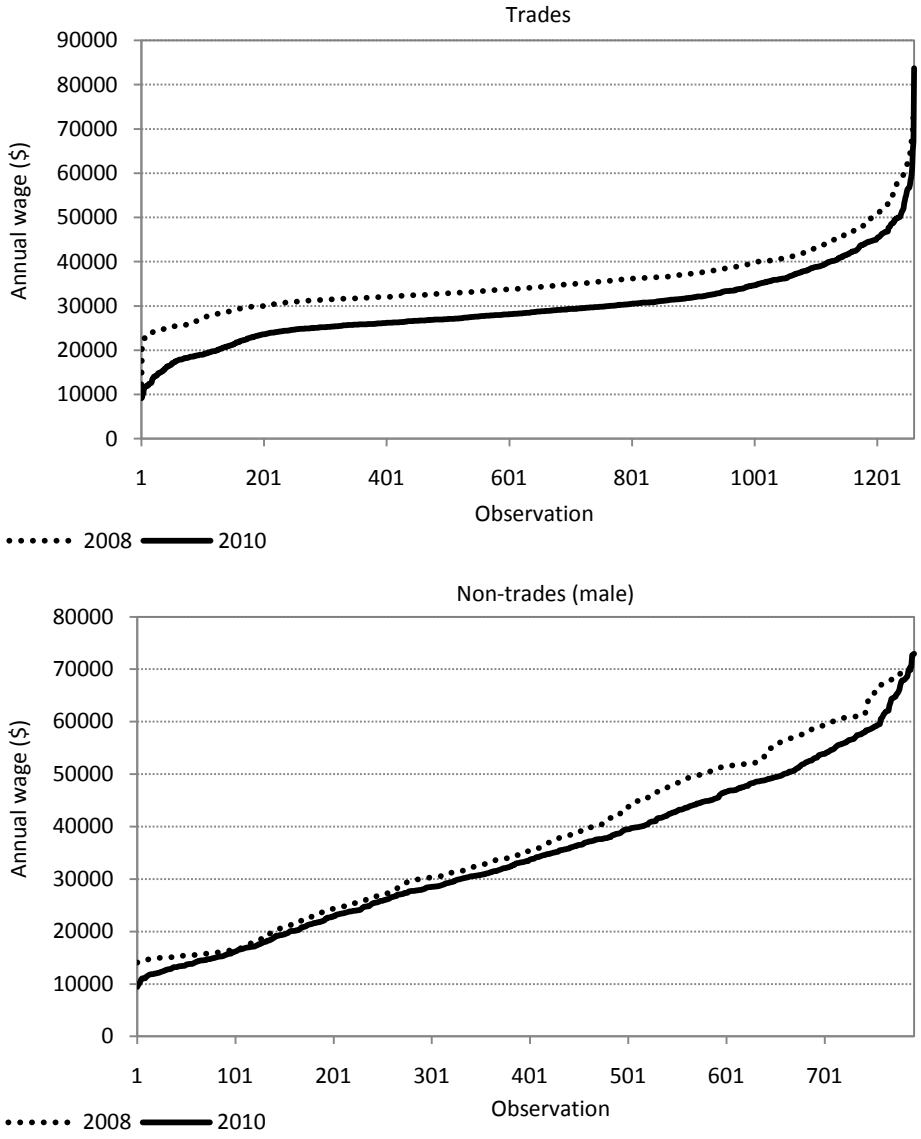
\- Denotes variable not entered into model.

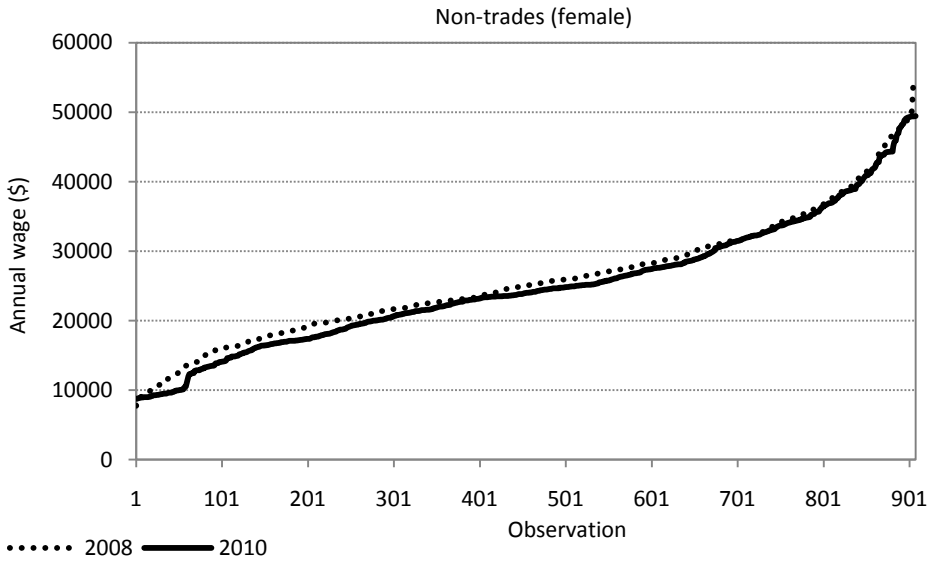
-- Denotes occupational variable used as reference, and hence not entered into model.

Again we can derive for each apprentice or trainee in the 2010 sample a wage in alternative employment based on the 2010 model and a wage based on the 2008 model (figure 2), the difference between the two showing the impact of the downturn. Clearly, the group most affected

was the trades. On average, a trade apprentice could have expected a wage in alternative employment of $29 819 per annum in 2010, compared with $35 907 in 2008 (in 2010 prices). This is a decrease of 17.0%. The impact of the downturn in the non-trades was less pronounced but is still clear to see. For non-trade males, the average wage in alternative employment declined from $38 111 in 2008 to $35 255 in 2010, a decrease of 7.5%. For females, the average wage declined from $26 155 in 2008 to $25 109 in 2010, a decrease of 4.0%.

**Figure 2 Impact of downturn on annual wage in alternative employment, trades and non-trades (male/female)**






Note: 2008 wages are presented at 2010 prices.

# Wages on completion

The final wage we model is the expected wage on completion of the training contract. These models are based on the same wage after training variable but now we restrict the sample to those who completed their apprenticeship or traineeship. As with the previous model, we also restrict the sample to those who are in employment.

Duration is not entered into the models because it does not make intuitive sense for wages on completion to change with the duration of the training contract. For example, whether the training contract is completed in a shorter or longer time frame than the traditional four years in the trades should not matter to wages on completion because the level of the qualification is the same: a certificate III in a particular trade. Any variation in wages on completion across qualification level should be captured by the dummy variable 'high-level qualification', which compares certificate IV or above holders to those with a certificate III or lower qualification.

Table 5 quantifies the impact of apprentice and trainee characteristics in percentage terms, relative to a reference category. By contrast with wages in alternative employment, the variation in wages on completion by occupation is quite substantial and the results are fairly consistent between 2008 and 2010. In the trades, wages on completion are significantly higher for the electrotechnology and construction trades and significantly lower for hairdressers, compared with the reference category of 'all other trade occupations'. In the non-trades, sales workers receive significantly lower wages on completion compared with the reference category of managers and professionals, for both males and females and in both 2008 and 2010.

Finally, it seems many part-time and school-based apprentices and trainees continue in part-time employment on completion of the training contract, with wages on completion significantly lower for these groups in both 2008 and 2010.

**Table 5 Impact of characteristics on annual wage on completion, trades and non-trades (male/female), relative to a reference category, 2008 and 2010**

| | Trades | | Non-trades (male) | | Non-trades (female) | |
|---|---|---|---|---|---|---|
| | 2008 % | 2010 % | 2008 % | 2010 % | 2008 % | 2010 % |
| Age at commencement (20 years old compared with 16) | 15.5 | 5.8 | 16.4 | 13.5 | 18.9 | 12.6 |
| Age at commencement (25 years old compared with 16) | 46.0 | 13.6 | 45.0 | 35.5 | 55.7 | 33.4 |
| Age at commencement (30 years old compared with 16) | 94.6 | 22.4 | 86.4 | 65.7 | 114.6 | 62.4 |
| Characteristic dummy variables: | | | | | | |
| Male | * | 24.5 | - | - | - | - |
| Part-time | -38.1 | -31.8 | -21.0 | -33.8 | -24.6 | -27.3 |
| Existing worker | * | * | 9.8 | * | 20.5 | * |
| High-level qualification | * | * | 12.2 | * | * | 18.1 |
| Completed Year 12 | * | * | 7.8 | * | 10.3 | * |
| Had cert. III or above post-school qual. | * | * | 14.7 | 13.3 | 13.8 | 8.4 |
| School-based | -30.5 | -37.6 | -32.1 | -40.0 | -31.1 | -43.4 |
| Private sector | * | -7.1 | -16.0 | * | * | -8.5 |
| Occupational dummy variables: | | | | | | |
| Trades: | | | | | | |
| 31 Engineering, ICT & science technicians | -9.4 | -11.4 | - | - | - | - |
| 32 Automotive and engineering | 22.9 | 13.2 | - | - | - | - |
| 33 Construction trades workers | 31.3 | 22.8 | - | - | - | - |
| 34 Electrotechnology and telecommunications trades workers | 43.6 | 32.6 | - | - | - | - |
| 35 Food trades workers | -4.5 | -6.7 | - | - | - | - |
| 391 Hairdressers | -25.9 | -13.5 | - | - | - | - |
| All other trade occupations | -- | -- | - | - | - | - |
| Non-trades: | | | | | | |
| 1+2 Managers and professionals | - | - | -- | -- | -- | -- |
| 4 Community and personal service workers | - | - | -21.4 | -5.0 | 1.4 | 1.7 |
| 5 Clerical and administrative workers | - | - | -6.5 | -0.9 | 9.8 | 0.1 |
| 6 Sales workers | - | - | -28.1 | -31.4 | -13.7 | -13.7 |
| 7 Machinery operators and drivers | - | - | -8.6 | -2.2 | -5.8 | 12.1 |
| 8 Labourers | - | - | -8.5 | -10.2 | -8.7 | -12.0 |

Notes: Calculations derived according to the following example. If $\ln(w^1)$ is the wage when, say, the school-based dummy variable equals 1, and $\ln(w^2)$ is the reference wage (when the school-based dummy variable equals 0), then the percentage change in wages is given by $\%\Delta w=(\exp(\alpha)-1)*100$, where $\alpha$ is the coefficient on the school-based dummy variable from the reduced models.

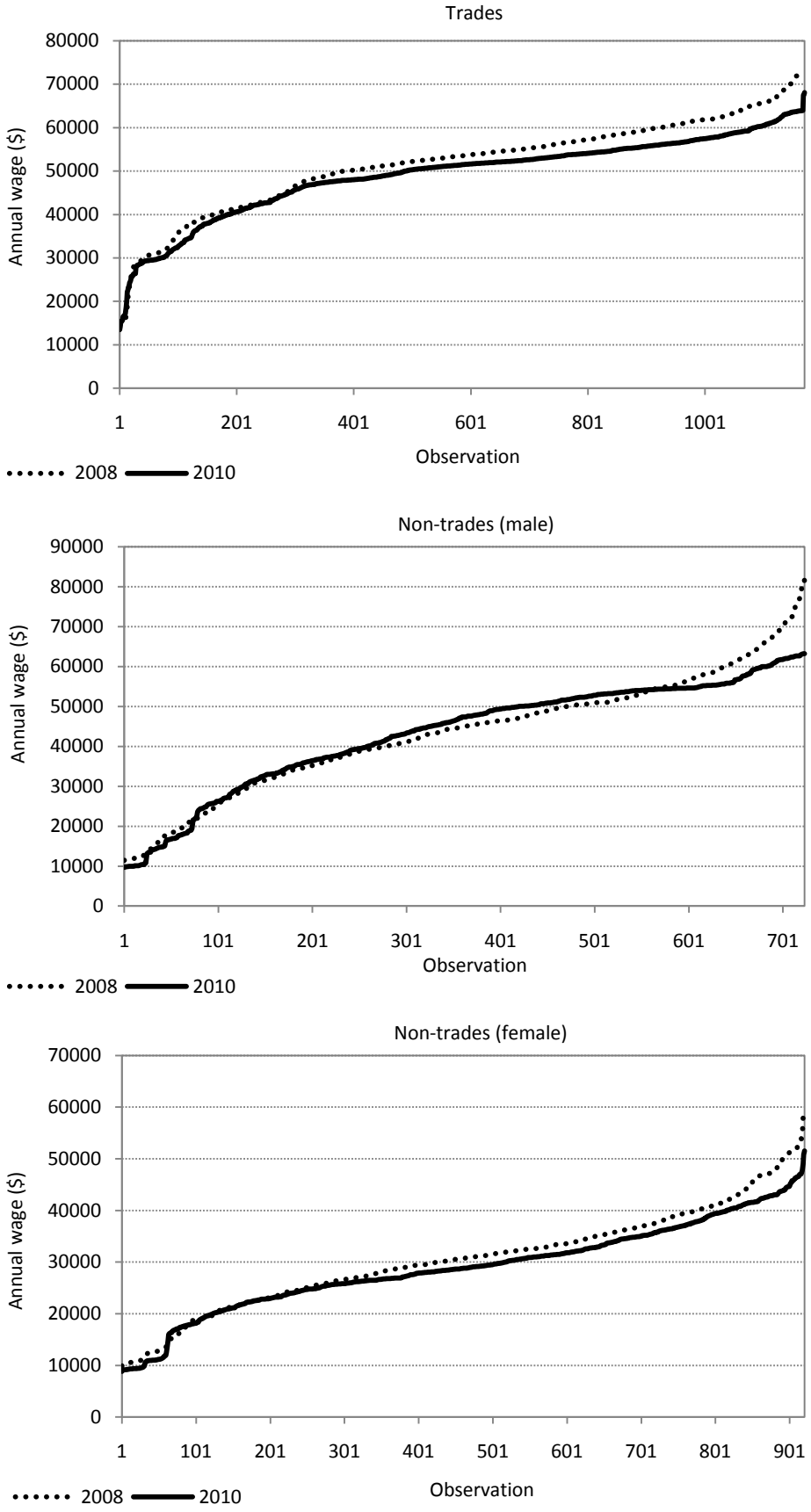
* Denotes coefficient not significant at the 10% confidence level.

\- Denotes variable not entered into model.

-- Denotes occupational variable used as reference, and hence not entered into model.

Finally, we present the impact of the downturn by deriving for each apprentice and trainee in the 2010 sample their wage on completion based on the 2010 model and the 2008 model (figure 3). In the trades, most apprentices could have expected a higher wage on completion in 2008 than in 2010. The average wage declined from $51 664 in 2008 to $49 082 in 2010, a decrease of 5.0%. There was a similar decrease for non-trade females, where the average wage on completion declined by 5.3%, from $31 192 in 2008 to $29 548 in 2010. By contrast, there was hardly any difference for males in the average wage, although some trainees at the top end could have expected a higher wage in 2008.

**Figure 3 Impact of downturn on annual wage on completion, trades and non-trades (male/female)**




Note: 2008 wages are presented at 2010 prices.

# The likelihood of employment

The previous section concerned three wages relevant to apprentices and trainees. Two of these were wages outside the training contract: the wage in alternative employment and the wage on completion. A number of respondents were excluded from these models because they were not employed at around nine months after completing or quitting the apprenticeship or traineeship and so, naturally, did not have a wage. As previously discussed, economic conditions deteriorated between 2008 and 2010 and consequently the number not in employment increased. We now want to consider these apprentices and trainees by modelling the likelihood of finding employment on completion and the likelihood of finding alternative employment. These models will be used in our later models of completion.

## Likelihood of finding employment on completion

The first model estimates the likelihood of finding employment on completion of the training contract. Whereas previously the response variable was a wage variable which could take on any number of values, this time the response variable is binary: whether employed in September 2008 or March 2010, or not. This changes the nature of the model and its interpretation (see table 6). The explanatory variables entered are the same as before (age, part-time status, existing worker status and so on). We also include duration. Our thinking is that, although duration should not affect wages on completion, it might affect the likelihood of finding a job in the first place, since it is a proxy for experience. That is, in having to choose between two applicants with the same qualification, the employer is more likely to go with the one with more job experience.

Table 6 shows the impact of apprentice and trainee characteristics on the probability of finding employment on completion, relative to a reference category, and holding all other variables constant. This time the differences are expressed as percentage points. The table is read in the following manner: in 2010, commencing a traineeship aged 30 years compared with aged 16 years translates to a 4.8 percentage point increase in the probability of being employed for males.

Overall, the results ring true. The greater the duration of the training contract, the greater the probability of employment, meaning that employers do view duration as a proxy for experience. Being older at commencement increases the probability of employment on completion, although the impact is greater in the non-trades, most probably because there were too few older trade apprentices to influence the result. Having completed Year 12 prior to commencement, being an existing worker, or doing a high-level qualification all also increase the probability of employment to varying degrees. Part-time status has only a modest impact and one that is not entirely consistent across all the groups. This probably reflects the fact that part-timers can undertake a number of activities in addition to the training contract, some of which would increase the probability of employment after completion, and some of which might decrease the likelihood nine months on.

**Table 6 Impact of characteristics on probability of finding employment on completion, trades and non-trades (male/female), relative to a reference category, 2008 and 2010**

| | Trades | | Non-trades (male) | | Non-trades (female) | |
|---|---|---|---|---|---|---|
| | 2008 | 2010 | 2008 | 2010 | 2008 | 2010 |
| | *% pt* | *% pt* | *% pt* | *% pt* | *% pt* | *% pt* |
| FT duration (1 year compared with at start) | 0.2 | 0.5 | 4.6 | 5.1 | 4.9 | * |
| FT duration (2 years compared with at start) | 0.4 | 1.0 | 6.6 | 7.7 | 8.0 | * |
| FT duration (3 years compared with at start) | 0.6 | 1.5 | 7.5 | 9.1 | 10.0 | * |
| PT duration (1 year compared with at start) | 0.4 | 8.2 | * | * | 1.4 | 4.4 |
| PT duration (2 years compared with at start) | 0.7 | 9.7 | * | * | 2.7 | 7.2 |
| PT duration (3 years compared with at start) | 0.9 | 10.0 | * | * | 3.8 | 8.9 |
| Age at commencement (20 years old compared with 16) | 0.1 | * | 1.7 | 2.1 | 1.1 | 0.9 |
| Age at commencement (25 years old compared with 16) | 0.1 | * | 2.6 | 3.8 | 2.3 | 1.8 |
| Age at commencement (30 years old compared with 16) | 0.1 | * | 3.0 | 4.8 | 3.2 | 2.7 |
| Characteristic dummy variables: | | | | | | |
| Male | 0.3 | * | - | - | - | - |
| Part-time | * | -0.6 | * | -2.1 | 0.7 | 1.1 |
| Existing worker | 0.4 | 0.5 | 1.9 | 4.0 | 4.9 | 6.0 |
| High-level qualification | 0.3 | * | 1.6 | 3.4 | 1.0 | * |
| Completed Year 12 | 0.4 | 0.8 | 1.4 | 1.6 | 0.6 | 2.5 |
| Had cert. III or above post-school qual. | * | * | 1.6 | * | 0.9 | 4.7 |
| School-based | * | 1.6 | 1.2 | 0.1 | * | 1.6 |
| Private sector | -0.2 | -0.6 | -1.9 | -0.8 | -5.2 | * |
| Occupational dummy variables: | | | | | | |
| Trades: | | | | | | |
| 31 Engineering, ICT & science technicians | 0.2 | 0.0 | - | - | - | - |
| 32 Automotive and engineering | -1.6 | 0.6 | - | - | - | - |
| 33 Construction trades workers | -2.1 | 0.3 | - | - | - | - |
| 34 Electrotechnology and telecommunications trades workers | 1.6 | 0.3 | - | - | - | - |
| 35 Food trades workers | -0.2 | 0.2 | - | - | - | - |
| 391 Hairdressers | 1.5 | 0.8 | - | - | - | - |
| All other trade occupations | -- | -- | - | - | - | - |
| Non-trades: | | | | | | |
| 1+2 Managers and professionals | - | - | -- | -- | -- | -- |
| 4 Community and personal service workers | - | - | 2.3 | -3.8 | -1.1 | -3.3 |
| 5 Clerical and administrative workers | - | - | -2.0 | -7.1 | -3.1 | -3.1 |
| 6 Sales workers | - | - | 2.9 | -4.1 | 0.6 | -4.2 |
| 7 Machinery operators and drivers | - | - | 1.3 | -3.8 | -18.3 | -2.6 |
| 8 Labourers | - | - | 2.2 | -2.4 | -3.5 | -12.0 |

Notes: Calculations derived according to the logistic prediction equation pr(x) = exp(f(x))/(1+exp(f(x))).

* Denotes coefficient not significant at the 10% confidence level. Critical value for a chi-square test for significance at the 10% confidence level is 2.706 (1 degree of freedom).

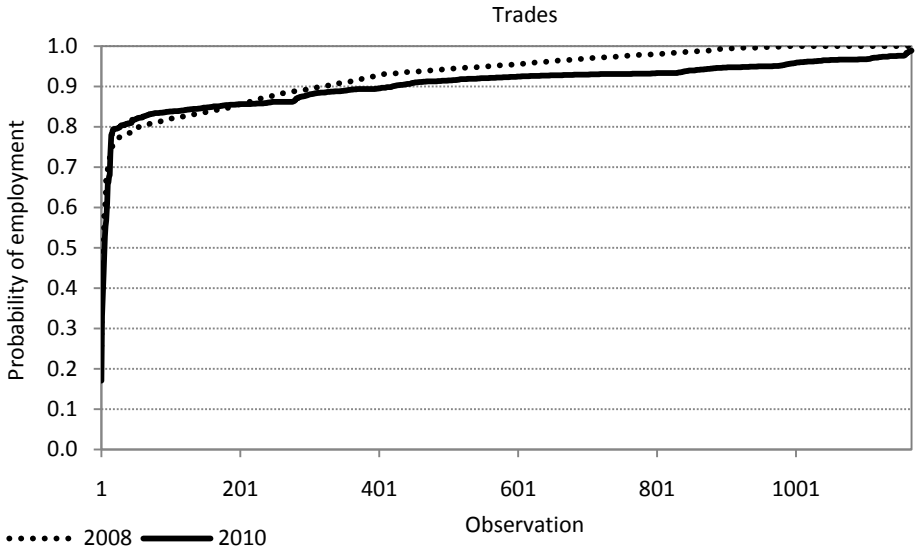
\- Denotes variable not entered into model.

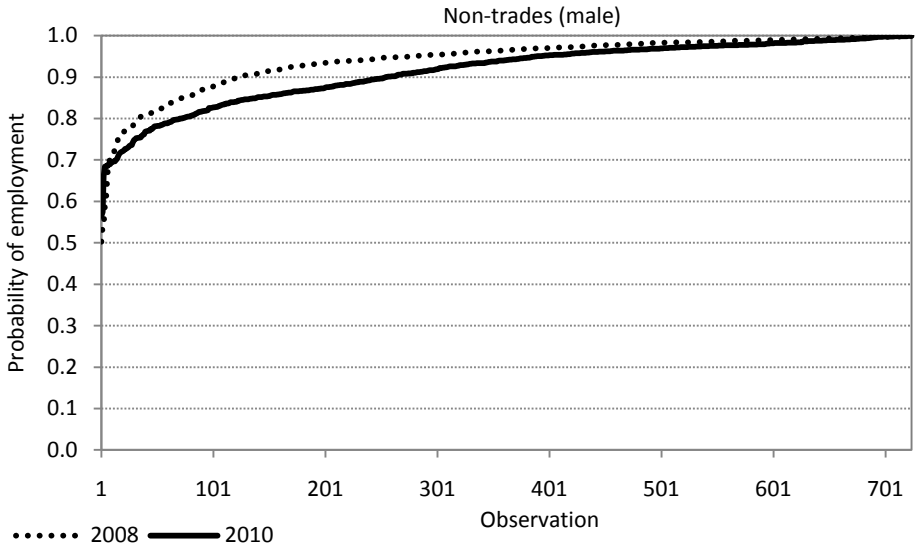
-- Denotes occupational variable used as reference, and hence not entered into model.

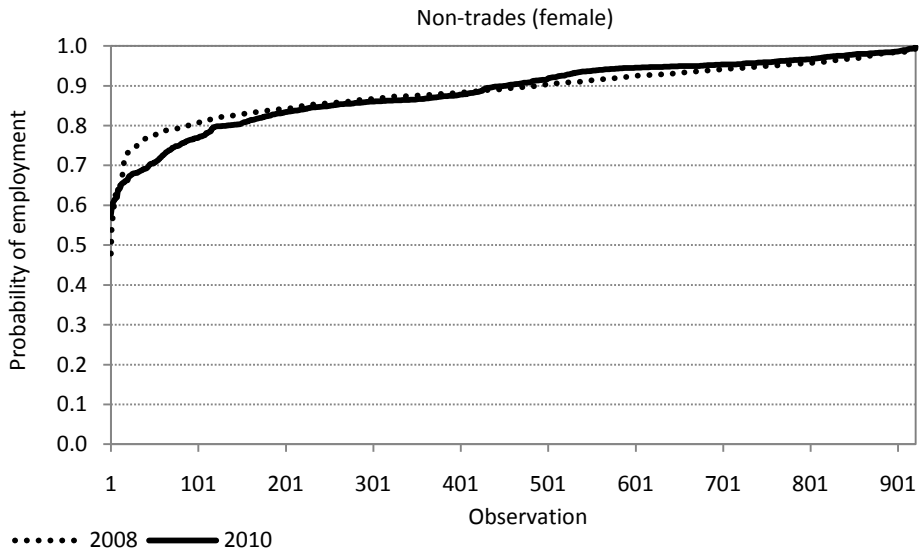
As with apprentice and trainee wages, we are able to show the impact of the downturn by deriving for each individual in the 2010 sample their probability of employment on completion based on the 2010 model and the 2008 model. That is, we can see whether an individual could have expected a

higher likelihood of employment in 2008 than in 2010. Figure 4 presents the results. Indeed, most trade and non-trade male completers could have expected a slightly higher likelihood of finding a job in 2008 than in 2010. For example, the average probability of employment declined from 93.1% in 2008 to 90.6% in 2010 for trade completers. By contrast, there was hardly any difference for most females in non-trade traineeships. Finally, quite a few trade completers have a probability of one based on the 2008 model. This reflects a buoyant economy and the reported skills shortages of that time.

**Figure 4 Impact of downturn on probability of finding employment on completion, trades and non-trades (male/female)**






# Likelihood of finding alternative employment

The second model of employment estimates the probability of being employed approximately nine months after quitting the training contract. Table 7 presents the impact of the apprentice and trainee characteristics on this probability, relative to a reference category. Duration and age at commencement have a positive impact. Both may be viewed as proxies for experience. In the trades, withdrawing after three full-time years (compared with having the contract cancelled at the start) translates to a 16.3 percentage point increase in the probability of finding employment in 2010. Prior education, in the form of a certificate III or above qualification or having completed Year 12, also increases the likelihood of finding alternative employment. Part-time and school-based statuses have a mostly negative impact, but again the results are not entirely consistent.

**Table 7 Impact of characteristics on probability of finding alternative employment, trades and non-trades (male/female), relative to a reference category, 2008 and 2010**

| | Trades | | Non-trades (male) | | Non-trades (female) | |
|---|---|---|---|---|---|---|
| | 2008 | 2010 | 2008 | 2010 | 2008 | 2010 |
| | *% pt* | *% pt* | *% pt* | *% pt* | *% pt* | *% pt* |
| FT duration (1 year compared with at start) | 7.0 | 6.3 | 14.4 | 12.3 | * | 8.7 |
| FT duration (2 years compared with at start) | 12.5 | 11.7 | 21.9 | 20.7 | * | 15.1 |
| FT duration (3 years compared with at start) | 16.7 | 16.3 | 25.2 | 25.8 | * | 19.6 |
| PT duration (1 year compared with at start) | 20.2 | 14.6 | 2.7 | 12.9 | 11.5 | * |
| PT duration (2 years compared with at start) | 25.3 | 23.5 | 5.3 | 21.4 | 18.3 | * |
| PT duration (3 years compared with at start) | 26.3 | 28.1 | 7.6 | 26.4 | 21.9 | * |
| Age at commencement (20 years old compared with 16) | 1.5 | * | 6.8 | 3.6 | 3.9 | * |
| Age at commencement (25 years old compared with 16) | 2.4 | * | 10.8 | 7.2 | 7.5 | * |
| Age at commencement (30 years old compared with 16) | 2.8 | * | 12.4 | 9.7 | 10.0 | * |
| Characteristic dummy variables: | | | | | | |
| Male | 1.9 | 7.4 | - | - | - | - |
| Part-time | 4.8 | * | * | -6.8 | -4.1 | -1.6 |
| Existing worker | 2.7 | 9.9 | 7.7 | * | -2.2 | 8.3 |
| High-level qualification | * | * | 3.5 | * | 8.4 | * |
| Completed Year 12 | * | 1.8 | * | 5.2 | 5.3 | 10.7 |
| Had cert. III or above post-school qual. | 1.8 | 5.9 | * | 3.2 | 9.4 | 7.6 |
| School-based | -16.3 | -8.6 | * | * | 14.8 | -15.0 |
| Private sector | 2.5 | * | -5.2 | 2.2 | 2.3 | 7.9 |
| Occupational dummy variables: | | | | | | |
| Trades: | | | | | | |
| 31 Engineering, ICT & science technicians | 5.0 | -7.4 | - | - | - | - |
| 32 Automotive and engineering | 0.4 | -7.3 | - | - | - | - |
| 33 Construction trades workers | 0.7 | -4.6 | - | - | - | - |
| 34 Electrotechnology and telecommunications trades workers | 2.5 | 3.3 | - | - | - | - |
| 35 Food trades workers | 0.0 | -1.2 | - | - | - | - |
| 391 Hairdressers | -2.2 | -1.2 | - | - | - | - |
| All other trade occupations | -- | -- | - | - | - | - |
| Non-trades: | | | | | | |
| 1+2 Managers and professionals | - | - | -- | -- | -- | -- |
| 4 Community and personal service workers | - | - | -6.4 | 1.1 | 45.2 | -9.1 |
| 5 Clerical and administrative workers | - | - | -8.1 | 3.1 | 34.8 | -6.6 |
| 6 Sales workers | - | - | 3.5 | 3.5 | 36.9 | -5.2 |
| 7 Machinery operators and drivers | - | - | -8.8 | 3.1 | -6.8 | -30.9 |
| 8 Labourers | - | - | 0.1 | -4.6 | 4.1 | -13.6 |

Notes: Calculations derived according to the logistic prediction equation pr(x) = exp(f(x))/(1+exp(f(x))).

* Denotes coefficient not significant at the 10% confidence level. Critical value for a chi-square test for significance at the 10% confidence level is 2.706 (1 degree of freedom).

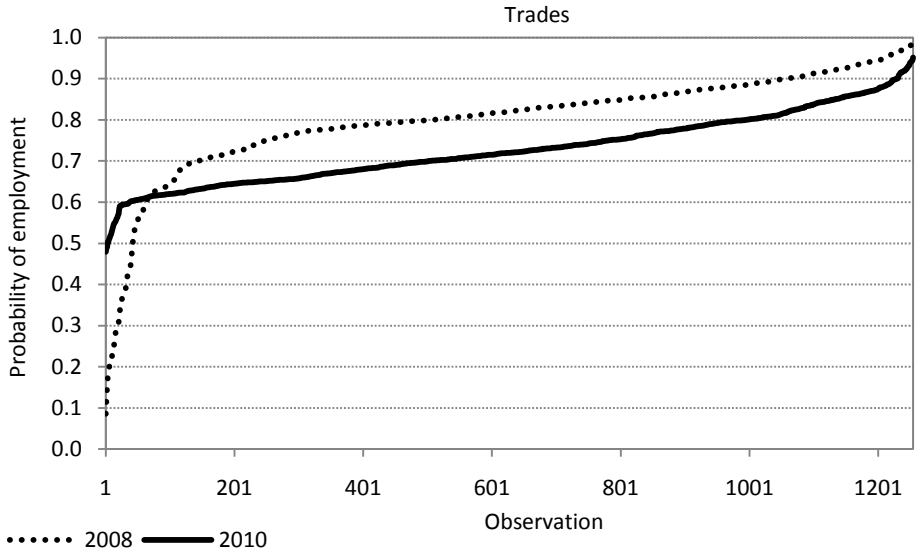
\- Denotes variable not entered into model.

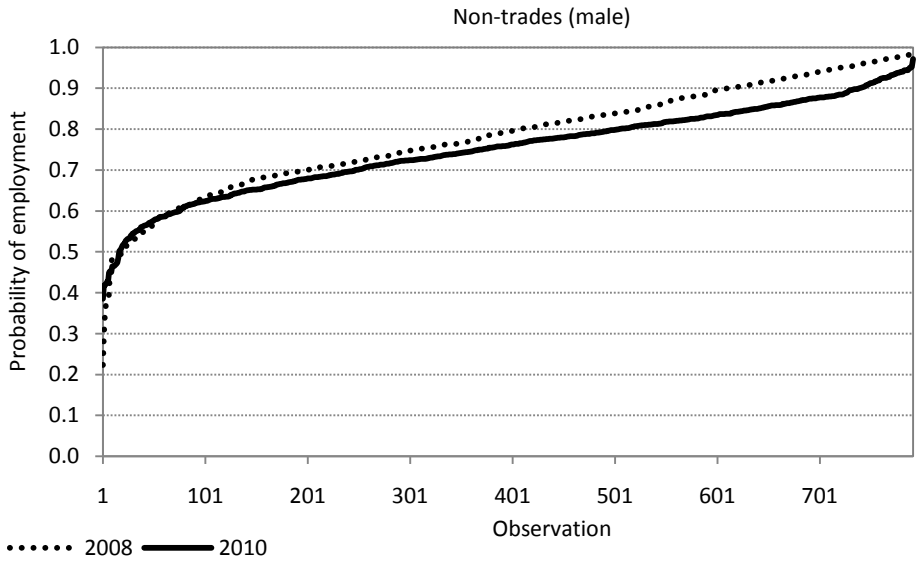
-- Denotes occupational variable used as reference, and hence not entered into model.

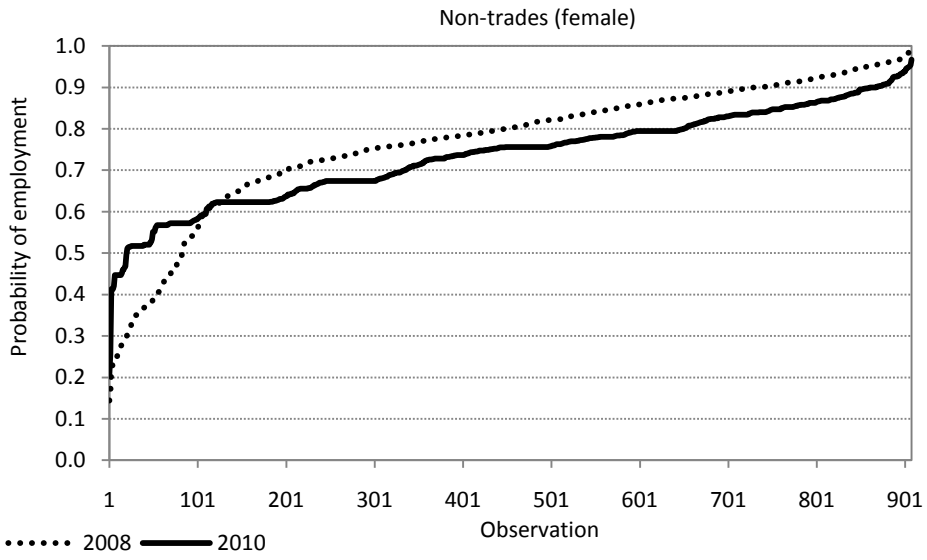
The impact of the economic downturn on the probability of finding alternative employment is clear to see from figure 5. For trade non-completers, the average probability of employment declined

from 80.2% in 2008 to 73.0% in 2010. For non-trade males, the average probability declined from 79.1% in 2008 to 75.3% in 2010, while for non-trade females it declined from 76.6% to 73.6%.

**Figure 5 Impact of downturn on probability of finding alternative employment, trades and non-trades (male/female)**




Non-trades (female)
Probability of employment
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
101
201
301
401
501
601
701
801
901
Observation
2008
2010

# Impact of wages and employment likelihood on completion

The models we have estimated in the previous sections will now be used as inputs into a model which estimates the final probability of completing the apprenticeship or traineeship. The basic hypothesis is still the same: the higher the wage during training compared with the alternative, and the higher the wage at completion compared with the alternative, then the higher should be the completion rate. In addition, we now have these employment probabilities and we hypothesise that the higher the probability of finding employment on completion relative to the probability of alternative employment, then the higher should be the completion rate. Importantly, we now estimate wage differences and employment probabilities for every apprentice or trainee in the sample. That is, every apprentice or trainee receives an expected wage on completion and an expected probability of employment on completion, regardless of whether they are a completer or not.[1] The expected wages and probabilities for the 2008 sample are based on the 2008 models and similarly for 2010. The 2010 price levels are used in both calculations.

The calculation of the wage differences is complicated by the fact that wages vary across the duration of the training contract. To make the modelling tractable we assume that it is the average wage wedge for the remainder of the contract which matters (see appendix C). The probability of employment, whether on completion or the alternative, also changes with duration. For example, the probability of finding alternative employment is greater for an apprentice or trainee who is near the end of their training contract compared with someone at the start. The simplest way to deal with this is to model the standard duration of a completed contract and a cancelled/withdrawn contract, using our set of characteristic variables. We can then use these estimates in the employment probability models in place of the observed durations.

Table 8 provides a useful summary of the calculated wage differences for each group for each survey year. A few observations come immediately to mind. The difference between wages in alternative employment and wages during training decreased significantly between 2008 and 2010. (For the trades and non-trade females the average difference more than halved.) By contrast, the wedge between wages on completion and wages in alternative employment increased between 2008 and 2010, significantly for the trades and non-trade males. Clearly, the economic downturn between survey years was at play here. During the downturn, more of the non-completers went into part-time employment, reducing the average wage in alternative employment.

Table 8 also shows the impact of the economic downturn on the probability of employment. Overall, the wedge between the probability of completion and in alternative employment increased for every group between 2008 and 2010. In the trades, the wedge increased from 10.8 percentage points to 15.3 percentage points, primarily driven by decreases in the probability of finding alternative employment.

[1] This is distinct from figures 2 to 5, where we merely presented estimates of wage on completion and probability of employment on completion for the completers, and the analogous set for the non-completers.

**Table 8 Mean wage wedges and employment probabilities, trades and non-trades (male/female), 2008 and 2010**

| | Trades | | Non-trades (male) | | Non-trades (female) | |
|---|---|---|---|---|---|---|
| | 2008 | 2010 | 2008 | 2010 | 2008 | 2010 |
| Wedge between expected wages in alternative employment and wages during training ($) | 12 673 | 6 159 | 6 086 | 4 357 | 3 667 | 1 310 |
| Wedge between expected wages on completion and expected wages in alternative employment ($) | 9 970 | 15 042 | -55 | 3 662 | 2 459 | 2 611 |
| Wedge between probability of employment on completion and probability of alternative employment (% pt) | 10.8 | 15.3 | 13.4 | 13.5 | 12.0 | 15.0 |

Note: 2008 dollar amounts have been presented in 2010 prices.

Up until now, we have modelled everything separately for 2008 and 2010. Many of the models were consistent between the years, but as table 8 shows the final calculated differences are very different, with the economic downturn clearly playing its part. We now want to use these results to model the probability of completing an apprenticeship or traineeship. In the previous study, Karmel and Mlotkowski (2010) found that the wage differences only had a limited impact on the probability of completion for the 2008 cohort. In the trades, it was the premium associated with becoming a tradesperson which mattered, not training wages. For females in non-trade traineeships there was no relationship between wages and completion rates. It was only for males in non-trade traineeships for which increasing training wages would make a difference to completion rates.

This limited impact of wages on completion rates may well be down to the smaller sample size of the 2008 survey. To improve the robustness of the models, we now combine the 2008 and 2010 datasets and model the probability of completing the apprenticeship or traineeship using the wage wedges—with 2008 wages calculated in 2010 prices—and the difference between the probability of employment after completion and the probability of alternative employment (that is, probability of employment if the apprenticeship is not completed). Our prior is that completion rates will increase with the difference between the employment rate on completion and the probability of alternative employment. In addition, a dummy variable (which equals one for 2010 and zero for 2008) is included to see whether there is a difference in the probability of completion between survey years over and above differences in wages and employment probabilities. Karmel and Misko (2009) and NCVER (2010b) argue that completion rates increase as economic conditions deteriorate but this could be driven by changes in the wage variables of probabilities of employment. Hence, we have no prior on the sign of the 2010 dummy.

Table 9 provides a summary of the final results. In the trades, the difference between wages on completion and wages in alternative employment is significant to completion. That is, it is still the premium associated with becoming a tradesperson which matters, not training wages. In addition, the difference between the probability of employment on completion and the probability of alternative employment is significant. In the non-trades, the difference between wages in alternative employment and wages during training is still a significant factor for males. For non-trade females, this difference has now become significant. For females in non-trades the difference between the probability of employment on completion and the probability of alternative employment is also significant.

**Table 9 Summary of regression of probability of completing an apprenticeship or traineeship, trades and non-trades (male/female), 2008 and 2010 combined**

| | | Trades | | Non-trades (male) | | Non-trades (female) | |
|---|---|---|---|---|---|---|---|
| | Expected sign | Estimate | Chi-square | Estimate | Chi-square | Estimate | Chi-square |
| Intercept | | -0.7134 | 208.944 | 0.8800 | 936.107 | 0.8260 | 896.946 |
| Wedge between expected wages in alternative employment and wages during training | - | $3.2*10^{-5}$ | 126.827 | **$-1.0*10^{-5}$** | 14.567 | **$-5.0*10^{-5}$** | 183.523 |
| Wedge between expected wages on completion and expected wages in alternative employment | + | **$2.1*10^{-5}$** | 201.346 | $3.9*10^{-7}$ | 0.032 | $-2.0*10^{-5}$ | 36.914 |
| Wedge between probability of employment on completion and probability of alternative employment | + | **0.8496** | 58.213 | -0.4565 | 14.881 | **1.3760** | 242.639 |
| Difference between surveys (2010 survey = 1; 2008 survey = 0) | | 0.5875 | 406.212 | -0.2356 | 107.994 | -0.2802 | 160.699 |

Notes: Critical value for a chi-square test for significance at the 10% confidence level is 2.706 (1 degree of freedom). Bold figures are significant based on a one-tail test.
2008 wages were entered into the model in 2010 prices.

From this model, we can decompose the difference between the probability of completion for the 2010 cohort and for the 2008 cohort. We decompose the difference into two components: the component which may be explained by changes in the opportunity cost occasioned by the change in labour market conditions; and an unexplained component, employing a variant of the standard Oaxaca (1973) decomposition. Before doing this, we re-run the models, omitting the differences that were not significant. Appendix D provides the details of the decomposition. Here we provide the summary (table 10).

**Table 10 Decomposition of completion models**

| | Trades | Non-trades (male) | Non-trades (females) |
|---|---|---|---|
| | % pt | % pt | % pt |
| Difference between completion rate in 2010 compared with 2008 | 12.4 | -4.8 | -3.0 |
| Component explained by changes in labour market | 2.2 | 0.5 | 2.4 |
| Unexplained component | 10.2 | -5.3 | -5.4 |

Note: Decomposition based on reduced forms of models in table 9.
Appendix table B8 provides the details of the reduced form models.
2008 wages were entered into the model in 2010 prices.

The values presented in table 10 are averages obtained by undertaking the decomposition for each respondent and taking the overall average of the implied probabilities. The table shows that the component explained by changes in labour market conditions was positive for all of the groups. That is, movements in wages and employment probabilities in the downturn acted to increase completion rates. However, relative to the unexplained component, these movements accounted for little of the final change in completion rates. For example, in the trades, completion rates increased by 12.4 percentage points from 2008 to 2010, on average. The component explained by changes in labour market conditions was 2.2 percentage points. The contribution of the changes in labour market conditions to the change in the non-trades (females) rate was of the same order.

The interpretation is that changes in completion rates between the two periods are dependent on more than just the objective changes in wages and probabilities of employment. We know that redundancies in the downturn are a factor, but it seems that individuals in the trades become more

risk-averse and stay in their apprenticeship. The negative sign of the unexplained component of the change in the probability of completion for the non-trades is more difficult to explain, although the difference in completion rates between 2008 and 2010 is at variance with other estimates; NCVER (2010b) estimates that completion rates for all apprentices and trainees went up from 50.8% (2007 commencing cohort) to 56.2% (2009 commencing cohort), with the increase being larger for the non-trades relative to the trades.

# Discussion

The starting point for this paper was the analysis in Karmel and Mlotkowski (2010), which found only a limited impact for wages on completion rates for apprentices and trainees in 2008. We wanted to conduct a similar analysis for the 2010 cohort of the Apprentice and Trainee Destinations Survey. However, it was clear also that the analysis needed to be expanded. The economic downturn between survey years did impact on apprentices and trainees by reducing the likelihood of employment after non-completion and completion alike. Focusing on wages alone would have overlooked the increased number of apprentices and trainees not in employment after training.

The methodology used was to model the 2008 and 2010 separately throughout. However, when it came time to run the final completion models, we merged the cohorts to increase the sample size and improve the robustness of the models.

Overall, we find that wages matter somewhat more to completion than previously found. In the trades, the completion wage premium is still the significant factor. By contrast, in the non-trades it is the training wage wedge which matters. For both male and female trainees, completion rates decrease with increases in the difference between wages in alternative employment and training wages. Looking at the probability of employment, the higher the difference between the likelihood of finding employment on completion and the likelihood of alternative employment, then the higher the completion rates for the trades and non-trade females.

We also find that the downturn had a significant impact on apprentice and trainee wage differences. The average difference between the wage in alternative employment and the training wage more than halved for the trades and non-trade females. By contrast, the difference between wages on completion and wages in alternative employment increased significantly for the trades and non-trade males. It seems that, as economic conditions deteriorated, more of the non-completers went into part-time employment and fewer went into full-time work. This reduced the average wage in alternative employment and increased the relative completion wage and training wage. The likelihood of apprentice and trainee non-completers finding a job also decreased significantly in the downturn, particularly in the trades.

Overall we find that the changes in labour market conditions between 2008 and 2010, as reflected in the impact on wages and probabilities of employment, appear to explain relatively little of the change in completion rates.

# References

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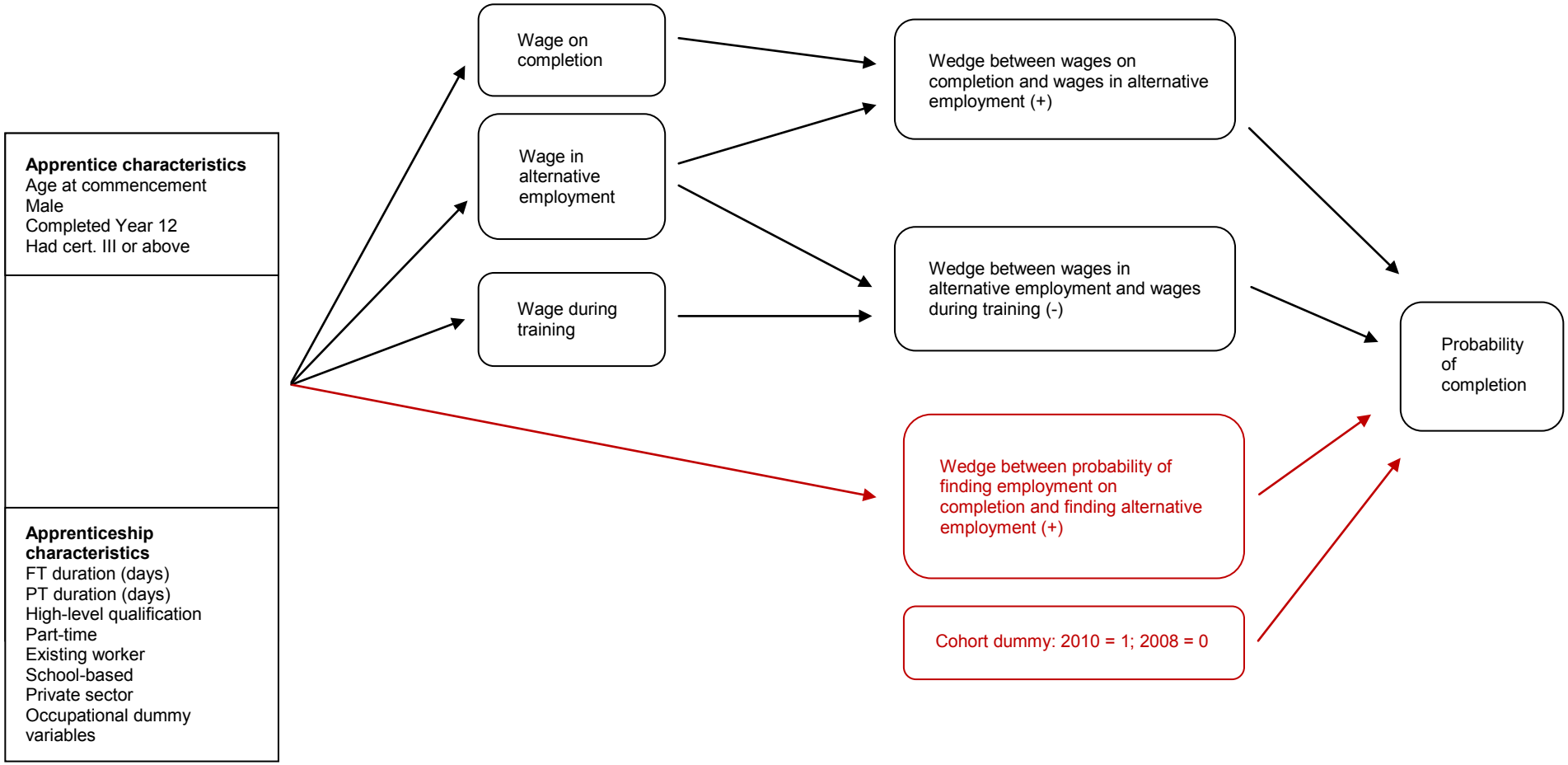
# Appendix A: The model

Figure A1 provides a graphical representation of the model used to derive the impact of wages and the probability of employment on apprentice and trainee completion rates.

**Figure A1 Model of probability of completing an apprenticeship or traineeship**




Note: Red boxes, arrows or text indicate analysis not included in original *Impact of wages on completion.*

# Appendix B: Regression models

**Table B1 Regression of (log) annual wage during training, trades and non-trades (male/female): reduced models, 2010**

| | Trades | | Non-trades (male) | | Non-trades (female) | |
|---|---|---|---|---|---|---|
| | Estimate | Pr > \|t\| | Estimate | Pr > \|t\| | Estimate | Pr > \|t\| |
| Intercept | 8.6044 | <.0001 | 8.9895 | <.0001 | 9.1400 | <.0001 |
| Full-time duration (days) | 0.0004 | <.0001 | 0.0003 | 0.0005 | * | * |
| Part-time duration (days) | 0.0004 | 0.0355 | 0.0006 | <.0001 | 0.0003 | <.0001 |
| Age at commencement | 0.0793 | <.0001 | 0.0610 | <.0001 | 0.0585 | <.0001 |
| Age at commencement (squared) | -0.0011 | <.0001 | -0.0007 | <.0001 | -0.0007 | <.0001 |
| Characteristic dummy variables: | | | | | | |
| Male | 0.1691 | <.0001 | - | - | - | - |
| Part-time | -0.2365 | 0.0056 | -0.5208 | <.0001 | -0.5142 | <.0001 |
| Existing worker | 0.1162 | 0.0003 | 0.1515 | <.0001 | 0.1683 | <.0001 |
| High-level qualification | 0.3095 | <.0001 | * | * | 0.1259 | 0.0002 |
| Completed Year 12 | * | * | 0.0872 | 0.0051 | 0.1549 | <.0001 |
| Had cert. III or above post-school qual. | 0.1387 | <.0001 | 0.0937 | 0.0136 | 0.0769 | 0.0169 |
| School-based | -0.5376 | <.0001 | -0.5880 | <.0001 | -0.6487 | <.0001 |
| Private sector | 0.0427 | 0.0633 | 0.1489 | 0.0008 | * | * |
| Occupational dummy variables: | | | | | | |
| Trades: | | | | | | |
| 31 Engineering, ICT & science technicians | -0.3077 | <.0001 | - | - | - | - |
| 32 Automotive and engineering | 0.0002 | 0.9946 | - | - | - | - |
| 33 Construction trades workers | 0.0266 | 0.4050 | - | - | - | - |
| 34 Electrotechnology and telecommunications trades workers | 0.0479 | 0.1947 | - | - | - | - |
| 35 Food trades workers | -0.0310 | 0.4160 | - | - | - | - |
| 391 Hairdressers | -0.0442 | 0.4227 | - | - | - | - |
| All other trade occupations | -- | -- | - | - | - | - |
| Non-trades: | | | | | | |
| 1+2 Managers and professionals | - | - | -- | -- | -- | -- |
| 4 Community and personal service workers | - | - | -0.0304 | 0.6317 | -0.0395 | 0.3946 |
| 5 Clerical and administrative workers | - | - | 0.0867 | 0.1354 | -0.0119 | 0.7880 |
| 6 Sales workers | - | - | -0.0971 | 0.1218 | -0.1914 | 0.0001 |
| 7 Machinery operators and drivers | - | - | 0.1432 | 0.0110 | 0.1634 | 0.0330 |
| 8 Labourers | - | - | 0.0691 | 0.2560 | -0.1012 | 0.1105 |
| R-square | 0.3931 | | 0.4961 | | 0.5072 | |

Notes: * Denotes coefficient not significant at the 10% confidence level.
- Denotes variable not entered into model.
-- Denotes occupational variable used as reference, and hence not entered into model.

**Table B2 Regression of (log) annual wage in alternative employment, trades and non-trades (male/female), reduced models, 2010**

| | Trades | | Non-trades (male) | | Non-trades (female) | |
|---|---|---|---|---|---|---|
| | Estimate | Pr > \|t\| | Estimate | Pr > \|t\| | Estimate | Pr > \|t\| |
| Intercept | 8.4846 | <.0001 | 8.9026 | <.0001 | 8.6139 | <.0001 |
| Full-time duration (days) | 0.0004 | <.0001 | 0.0004 | 0.0114 | * | * |
| Part-time duration (days) | 0.0012 | 0.0004 | 0.0008 | 0.0001 | * | * |
| Age at commencement | 0.0960 | <.0001 | 0.0838 | <.0001 | 0.0953 | <.0001 |
| Age at commencement (squared) | -0.0013 | <.0001 | -0.0010 | <.0001 | -0.0012 | <.0001 |
| Characteristic dummy variables: | | | | | | |
| Male | 0.3489 | <.0001 | - | - | - | - |
| Part-time | * | * | -0.4862 | <.0001 | -0.3254 | <.0001 |
| Existing worker | 0.1234 | 0.0921 | * | * | * | * |
| High-level qualification | * | * | * | * | 0.2389 | <.0001 |
| Completed Year 12 | * | * | 0.1549 | 0.0042 | 0.1089 | 0.0376 |
| Had cert. III or above post-school qual. | * | * | * | * | * | * |
| School-based | -0.7047 | <.0001 | * | * | -0.3559 | 0.0048 |
| Private sector | * | * | 0.1428 | 0.0814 | * | * |
| Occupational dummy variables: | | | | | | |
| Trades: | | | | | | |
| 31 Engineering, ICT & science technicians | - | - | - | - | - | - |
| 32 Automotive and engineering | - | - | - | - | - | - |
| 33 Construction trades workers | - | - | - | - | - | - |
| 34 Electrotechnology and telecommunications trades workers | - | - | - | - | - | - |
| 35 Food trades workers | - | - | - | - | - | - |
| 391 Hairdressers | - | - | - | - | - | - |
| All other trade occupations | - | - | - | - | - | - |
| Non-trades: | | | | | | |
| 1+2 Managers and professionals | - | - | -- | -- | - | - |
| 4 Community and personal service workers | - | - | -0.2032 | 0.0639 | - | - |
| 5 Clerical and administrative workers | - | - | -0.0365 | 0.7170 | - | - |
| 6 Sales workers | - | - | -0.3486 | 0.0007 | - | - |
| 7 Machinery operators and drivers | - | - | 0.0079 | 0.9389 | - | - |
| 8 Labourers | - | - | -0.0685 | 0.5077 | - | - |
| R-square | 0.1812 | | 0.3792 | | 0.2849 | |

Notes: * Denotes coefficient not significant at the 10% confidence level.
- Denotes variable not entered into model.
-- Denotes occupational variable used as reference, and hence not entered into model.

**Table B3 Regression of (log) annual wage on completion, trades and non-trades (male/female), reduced models, 2010**

| | Trades | | Non-trades (male) | | Non-trades (female) | |
|---|---|---|---|---|---|---|
| | Estimate | Pr > \|t\| | Estimate | Pr > \|t\| | Estimate | Pr > \|t\| |
| Intercept | 10.1665 | <.0001 | 9.8947 | <.0001 | 9.6653 | <.0001 |
| Full-time duration (days) | - | - | - | - | - | - |
| Part-time duration (days) | - | - | - | - | - | - |
| Age at commencement | 0.0246 | 0.0105 | 0.0480 | <.0001 | 0.0478 | <.0001 |
| Age at commencement (squared) | -0.0003 | 0.0434 | -0.0006 | <.0001 | -0.0006 | <.0001 |
| Characteristic dummy variables: | | | | | | |
| Male | 0.2192 | 0.0001 | - | - | - | - |
| Part-time | -0.3823 | <.0001 | -0.4131 | <.0001 | -0.3184 | <.0001 |
| Existing worker | * | * | * | * | * | * |
| High-level qualification | * | * | * | * | 0.1664 | 0.0008 |
| Completed Year 12 | * | * | * | * | * | * |
| Had cert. III or above post-school qual. | * | * | 0.1245 | 0.0158 | 0.0810 | 0.0891 |
| School-based | -0.4719 | 0.0105 | -0.5112 | <.0001 | -0.5697 | <.0001 |
| Private sector | -0.0733 | 0.0149 | * | * | -0.0888 | 0.0775 |
| Occupational dummy variables: | | | | | | |
| Trades: | | | | | | |
| 31 Engineering, ICT & science technicians | -0.1209 | 0.1133 | - | - | - | - |
| 32 Automotive and engineering | 0.1241 | 0.0044 | - | - | - | - |
| 33 Construction trades workers | 0.2057 | <.0001 | - | - | - | - |
| 34 Electrotechnology and telecommunications trades workers | 0.2825 | <.0001 | - | - | - | - |
| 35 Food trades workers | -0.0690 | 0.2200 | - | - | - | - |
| 391 Hairdressers | -0.1453 | 0.0622 | - | - | - | - |
| All other trade occupations | -- | -- | - | - | - | - |
| Non-trades: | | | | | | |
| 1+2 Managers and professionals | - | - | -- | -- | -- | -- |
| 4 Community and personal service workers | - | - | -0.0518 | 0.5464 | 0.0168 | 0.8178 |
| 5 Clerical and administrative workers | - | - | -0.0085 | 0.9119 | 0.0006 | 0.9928 |
| 6 Sales workers | - | - | -0.3772 | <.0001 | -0.1474 | 0.0687 |
| 7 Machinery operators and drivers | - | - | -0.0221 | 0.7605 | 0.1141 | 0.3016 |
| 8 Labourers | - | - | -0.1079 | 0.2009 | -0.1283 | 0.2065 |
| R-square | 0.2596 | | 0.4146 | | 0.3051 | |

Notes: * Denotes coefficient not significant at the 10% confidence level.
- Denotes variable not entered into model.
-- Denotes occupational variable used as reference, and hence not entered into model.

**Table B4 Regression of probability of finding employment on completion, trades and non-trades (male/female), reduced models, 2008**

| | Trades | | Non-trades (male) | | Non-trades (female) | |
|---|---|---|---|---|---|---|
| | Estimate | Chi-square | Estimate | Chi-square | Estimate | Chi-square |
| Intercept | -2.2775 | 10.8428 | -1.7290 | 21.7046 | 1.6318 | 29.5337 |
| Full-time duration (days) | 0.0006 | 18.7839 | 0.0025 | 156.4834 | 0.0014 | 43.8119 |
| Part-time duration (days) | 0.0011 | 7.6859 | * | * | 0.0004 | 4.8277 |
| Age at commencement | 0.3119 | 44.1911 | 0.1998 | 106.1122 | 0.0490 | 13.4536 |
| Age at commencement (squared) | -0.0053 | 43.4358 | -0.0025 | 91.8132 | -0.0006 | 9.5018 |
| Characteristic dummy variables: | | | | | | |
| Male | 0.6611 | 11.1052 | - | - | - | - |
| Part-time | * | * | * | * | 0.5419 | 20.3045 |
| Existing worker | 2.3760 | 38.7238 | 0.8328 | 44.6281 | 0.9145 | 121.0077 |
| High-level qualification | 1.2657 | 6.6008 | 0.7695 | 19.5395 | 0.1677 | 2.8356 |
| Completed Year 12 | 1.1195 | 84.2464 | 0.5589 | 36.5011 | 0.0979 | 3.0546 |
| Had cert. III or above post-school qual. | * | * | 0.8005 | 38.5765 | 0.1617 | 4.0324 |
| School-based | * | * | 1.7148 | 150.5655 | * | * |
| Private sector | -0.5680 | 15.5505 | -0.9638 | 55.3040 | -1.1025 | 163.1300 |
| Occupational dummy variables: | | | | | | |
| Trades: | | | | | | |
| 31 Engineering, ICT & science technicians | 0.1583 | 0.2959 | - | - | - | - |
| 32 Automotive and engineering | -0.7119 | 15.7842 | - | - | - | - |
| 33 Construction trades workers | -0.8624 | 25.9261 | - | - | - | - |
| 34 Electrotechnology and telecommunications trades workers | 15.3164 | 0.0022 | - | - | - | - |
| 35 Food trades workers | -0.1220 | 0.3923 | - | - | - | - |
| 391 Hairdressers | 2.4719 | 33.6947 | - | - | - | - |
| All other trade occupations | -- | -- | - | - | - | - |
| Non-trades: | | | | | | |
| 1+2 Managers and professionals | - | - | -- | -- | -- | -- |
| 4 Community and personal service workers | - | - | 0.8694 | 12.7380 | -0.2226 | 1.0594 |
| 5 Clerical and administrative workers | - | - | -0.4272 | 3.3600 | -0.5214 | 5.9316 |
| 6 Sales workers | - | - | 1.3714 | 31.0963 | 0.1413 | 0.4107 |
| 7 Machinery operators and drivers | - | - | 0.4215 | 2.9181 | -1.7767 | 48.9776 |
| 8 Labourers | - | - | 0.8396 | 11.8372 | -0.5839 | 6.4279 |

Notes: * Denotes coefficient not significant at the 10% confidence level. Critical value for a chi-square test for significance at the 10% confidence level is 2.706 (1 degree of freedom).

- Denotes variable not entered into model.

-- Denotes occupational variable used as reference, and hence not entered into model.

**Table B5 Regression of probability of finding alternative employment, trades and non-trades (male/female), reduced models, 2008**

| | Trades | | Non-trades (male) | | Non-trades (female) | |
|---|---|---|---|---|---|---|
| | Estimate | Chi-square | Estimate | Chi-square | Estimate | Chi-square |
| Intercept | -1.5720 | 20.8711 | -1.6121 | 23.2026 | -2.0513 | 45.4464 |
| Full-time duration (days) | 0.0011 | 89.7870 | 0.0025 | 96.8472 | * | * |
| Part-time duration (days) | 0.0046 | 82.2190 | 0.0004 | 4.5088 | 0.0020 | 102.4132 |
| Age at commencement | 0.1623 | 52.7231 | 0.1990 | 140.2953 | 0.0859 | 27.9307 |
| Age at commencement (squared) | -0.0029 | 67.2020 | -0.0027 | 132.6884 | -0.0012 | 27.8979 |
| Characteristic dummy variables: | | | | | | |
| Male | 0.3310 | 10.1889 | - | - | - | - |
| Part-time | -0.7315 | 11.6811 | * | * | -0.7694 | 92.1493 |
| Existing worker | 0.6378 | 14.4207 | 0.6733 | 35.6680 | -0.1534 | 3.0827 |
| High-level qualification | * | * | 0.2919 | 4.3023 | 0.7055 | 30.5372 |
| Completed Year 12 | * | * | * | * | 0.3814 | 35.5396 |
| Had cert. III or above post-school qual. | 0.3917 | 7.0151 | * | * | 0.8165 | 66.4523 |
| School-based | -1.9296 | 56.1433 | * | * | 0.4716 | 21.4648 |
| Private sector | 0.4220 | 30.7560 | -0.4377 | 24.7382 | 0.1587 | 2.8896 |
| Occupational dummy variables: | | | | | | |
| Trades: | | | | | | |
| 31 Engineering, ICT & science technicians | 1.6125 | 34.1192 | - | - | - | - |
| 32 Automotive and engineering | 0.0648 | 0.3918 | - | - | - | - |
| 33 Construction trades workers | 0.1340 | 1.7605 | - | - | - | - |
| 34 Electrotechnology and telecommunications trades workers | 0.5410 | 14.5682 | - | - | - | - |
| 35 Food trades workers | -0.0019 | 0.0003 | - | - | - | - |
| 391 Hairdressers | -0.3289 | 5.4688 | - | - | - | - |
| All other trade occupations | -- | -- | - | - | - | - |
| Non-trades: | | | | | | |
| 1+2 Managers and professionals | - | - | -- | -- | -- | -- |
| 4 Community and personal service workers | - | - | -0.4792 | 4.0160 | 2.5947 | 167.5731 |
| 5 Clerical and administrative workers | - | - | -0.5837 | 6.2236 | 1.6262 | 73.0361 |
| 6 Sales workers | - | - | 0.3543 | 2.2040 | 1.7714 | 85.6843 |
| 7 Machinery operators and drivers | - | - | -0.6243 | 6.8022 | -0.2766 | 1.3966 |
| 8 Labourers | - | - | 0.0070 | 0.0009 | 0.1654 | 0.5520 |

Notes: * Denotes coefficient not significant at the 10% confidence level. Critical value for a chi-square test for significance at the 10% confidence level is 2.706 (1 degree of freedom).

\- Denotes variable not entered into model.

-- Denotes occupational variable used as reference, and hence not entered into model.

**Table B6 Regression of probability of finding employment on completion, trades and non-trades (male/female), reduced models, 2010**

| | Trades | | Non-trades (male) | | Non-trades (female) | |
|---|---|---|---|---|---|---|
| | Estimate | Chi-square | Estimate | Chi-square | Estimate | Chi-square |
| Intercept | 2.0561 | 135.3456 | 0.6662 | 2.3818 | 1.6253 | 32.7133 |
| Full-time duration (days) | 0.0002 | 3.3731 | 0.0020 | 60.3267 | * | * |
| Part-time duration (days) | 0.0049 | 25.0734 | * | * | 0.0015 | 47.4923 |
| Age at commencement | * | * | 0.1161 | 35.4671 | 0.0341 | 4.9437 |
| Age at commencement (squared) | * | * | -0.0013 | 24.1832 | -0.0003 | 2.4607 |
| Characteristic dummy variables: | | | | | | |
| Male | * | * | - | - | - | - |
| Part-time | -2.2414 | 29.7407 | 0.5733 | 15.9239 | -0.4913 | 20.9055 |
| Existing worker | 0.6985 | 24.7354 | 0.9740 | 82.3700 | 1.1592 | 181.4093 |
| High-level qualification | * | * | 1.0781 | 44.4724 | * | * |
| Completed Year 12 | 0.8103 | 105.0664 | 0.3938 | 23.9820 | 0.4242 | 42.9102 |
| Had cert. III or above post-school qual. | * | * | * | * | 0.9840 | 84.8958 |
| School-based | -1.9411 | 21.9422 | 0.9830 | 36.1829 | -0.4507 | 14.7643 |
| Private sector | -0.7643 | 40.6107 | -0.2022 | 2.9894 | * | * |
| Occupational dummy variables: | | | | | | |
| Trades: | | | | | | |
| 31 Engineering, ICT & science technicians | 0.0155 | 0.0041 | - | - | - | - |
| 32 Automotive and engineering | 0.5932 | 21.2681 | - | - | - | - |
| 33 Construction trades workers | 0.2953 | 6.0935 | - | - | - | - |
| 34 Electrotechnology and telecommunications trades workers | 0.2508 | 3.0377 | - | - | - | - |
| 35 Food trades workers | 0.2038 | 1.6654 | - | - | - | - |
| 391 Hairdressers | 1.0135 | 23.0409 | - | - | - | - |
| All other trade occupations | -- | -- | - | - | - | - |
| Non-trades: | | | | | | |
| 1+2 Managers and professionals | - | - | -- | -- | -- | -- |
| 4 Community and personal service workers | - | - | -1.7037 | 29.5614 | -0.7629 | 22.2160 |
| 5 Clerical and administrative workers | - | - | -2.2638 | 54.2213 | -0.7314 | 20.4715 |
| 6 Sales workers | - | - | -1.7555 | 31.8972 | -0.9120 | 30.8739 |
| 7 Machinery operators and drivers | - | - | -1.6940 | 29.9688 | -0.6331 | 7.7785 |
| 8 Labourers | - | - | -1.3390 | 18.4239 | -1.7183 | 95.8765 |

Notes: * Denotes coefficient not significant at the 10% confidence level. Critical value for a chi-square test for significance at the 10% confidence level is 2.706 (1 degree of freedom).

- Denotes variable not entered into model.

-- Denotes occupational variable used as reference, and hence not entered into model.

**Table B7 Regression of probability of finding alternative employment, trades and non-trades (male/female), reduced models, 2010**

| | Trades | | Non-trades (male) | | Non-trades (female) | |
|---|---|---|---|---|---|---|
| | Estimate | Chi-square | Estimate | Chi-square | Estimate | Chi-square |
| Intercept | 0.4458 | 10.5537 | -0.7491 | 8.5816 | 0.4398 | 8.6002 |
| Full-time duration (days) | 0.0008 | 51.9318 | 0.0018 | 61.6816 | 0.0013 | 27.3073 |
| Part-time duration (days) | 0.0022 | 12.3516 | 0.0019 | 46.9868 | * | * |
| Age at commencement | * | * | 0.0773 | 26.9503 | * | * |
| Age at commencement (squared) | * | * | -0.0011 | 26.5686 | * | * |
| Characteristic dummy variables: | | | | | | |
| Male | 0.4405 | 15.5459 | - | - | - | - |
| Part-time | * | * | -0.3646 | 13.0191 | 0.2229 | 7.7140 |
| Existing worker | 0.8004 | 32.9603 | * | * | 0.5282 | 49.2317 |
| High-level qualification | * | * | * | * | * | * |
| Completed Year 12 | 0.1183 | 3.0385 | 0.3849 | 35.3998 | 0.6270 | 112.3888 |
| Had cert. III or above post-school qual. | 0.4330 | 12.2187 | 0.2483 | 7.7290 | 0.4836 | 34.7613 |
| School-based | -0.5647 | 9.0505 | * | * | -0.4339 | 16.7073 |
| Private sector | * | * | 0.1527 | 2.7194 | 0.4217 | 21.5529 |
| Occupational dummy variables: | | | | | | |
| Trades: | | | | | | |
| 31 Engineering, ICT & science technicians | -0.4747 | 6.2943 | - | - | - | - |
| 32 Automotive and engineering | -0.4711 | 17.2389 | - | - | - | - |
| 33 Construction trades workers | -0.3127 | 7.5081 | - | - | - | - |
| 34 Electrotechnology and telecommunications trades workers | 0.2743 | 3.3612 | - | - | - | - |
| 35 Food trades workers | -0.0838 | 0.4700 | - | - | - | - |
| 391 Hairdressers | -0.0846 | 0.2636 | - | - | - | - |
| All other trade occupations | -- | -- | - | - | - | - |
| Non-trades: | | | | | | |
| 1+2 Managers and professionals | - | - | -- | -- | -- | -- |
| 4 Community and personal service workers | - | - | 0.0801 | 0.4030 | -0.5818 | 24.0477 |
| 5 Clerical and administrative workers | - | - | 0.2318 | 3.4714 | -0.4418 | 13.3299 |
| 6 Sales workers | - | - | 0.2603 | 4.4815 | -0.3592 | 8.8744 |
| 7 Machinery operators and drivers | - | - | 0.2273 | 3.2156 | -1.5599 | 46.3277 |
| 8 Labourers | - | - | -0.2910 | 6.3693 | -0.8118 | 27.9694 |

Notes: * Denotes coefficient not significant at the 10% confidence level. Critical value for a chi-square test for significance at the 10% confidence level is 2.706 (1 degree of freedom).

- Denotes variable not entered into model.

-- Denotes occupational variable used as reference, and hence not entered into model.

**Table B8 Regression of probability of completing an apprenticeship or traineeship, trades and non-trades (male/female), reduced models, 2008 and 2010 combined**

| | | Trades | | Non-trades (male) | | Non-trades (female) | |
|---|---|---|---|---|---|---|---|
| | **Expected sign** | Estimate | Chi-square | Estimate | Chi-square | Estimate | Chi-square |
| Intercept | | -0.2374 | 90.951 | 0.8128 | 1620.588 | 0.6989 | 1529.579 |
| Wedge between expected wages in alternative employment and wages during training | - | -- | -- | $-9.6*10^{-6}$ | 19.688 | $-3.0*10^{-5}$ | 208.332 |
| Wedge between expected wages on completion and expected wages in alternative employment | + | $1.3*10^{-5}$ | 105.822 | -- | -- | -- | -- |
| Wedge between probability of employment on completion and probability of alternative employment | + | 0.8442 | 58.118 | -- | -- | 1.463 | 283.011 |
| Difference between surveys (2010 survey = 1; 2008 survey = 0) | | 0.4158 | 282.812 | -0.2326 | 111.334 | -0.2435 | 131.124 |

Note: -- Indicates variable not entered into model.
2008 wages were entered into the model in 2010 prices.

# Appendix C: Estimating average wages

Denote $w^A(t)$ as the wage the apprentice or trainee gets at point $t$ in the training contract. At the beginning of the contract $t = 0$, at the end $t = D$ where $D$ is the duration of a completed contract.

Then $\ln(w_i^A(t)) = X_i^1 \beta^A + \alpha^A t$, where $i$ refers to the $i^{th}$ apprentice, $X_i^1$ is a vector of characteristics, $\beta^A$ is a vector of coefficients and $\alpha^A$ is the coefficient on $t$.

So,

$$w_i^A(t) = \exp(X_i^1 \beta^A + \alpha^A t)$$
$$= \exp(X_i^1 \beta^A)\exp(\alpha^A t)$$

Assume $t_1$ of the contract of training has elapsed.

Then the average wage for the remainder of the contract is given by the integral.

$$\overline{w_i^A}(t_1) = \frac{1}{D - t_1}\int_{t_1}^{D} \exp(X_i^1 \beta^A)\exp(\alpha^A t)dt$$
$$= \frac{\exp(X_i^1 \beta^A)}{D - t_1}\left[\frac{\exp(\alpha^A t)}{\alpha^A}\right]_{t_1}^{D}$$
$$= \frac{\exp(X_i^1 \beta^A)}{(D - t_1)\alpha^A}\left[\exp(\alpha^A D) - \exp(\alpha^A t_1)\right]$$

Similarly,

$$\overline{w_i^O}(t_1) = \frac{\exp(X_i^1 \beta^O)}{(D - t_1)\alpha^O}\left[\exp(\alpha^O D) - \exp(\alpha^O t_1)\right]$$

where $w_i^O(t)$ refers to the wage in alternative employment. Hence the wedge between wages in alternative employment and wages during training is given by the following.

$$wage\_wedge_i = \overline{w_i^O} - \overline{w_i^A}$$

This formulation assumes we know the duration of the contract ($D$). However, there is no standard duration and so we estimate it, using the same characteristics ($X_i$). Thus when modelling the overall probability of completing we use the average wages implied by $t_1 = 0$.

# Appendix D: Decomposition of completion model

We can decompose the difference between the probability of completion for the 2010 cohort and for the 2008 cohort. We decompose the difference into two components: the component which may be explained by changes in the opportunity cost occasioned by the change in labour market conditions; and an unexplained component. For each individual in the sample we estimate:

- the training wage wedge given 2010 conditions
- the completion wage wedge given 2010 conditions
- the probability of employment on completion given 2010 conditions
- the probability of alternative employment given 2010 conditions.

We estimate an analogous set of predictions given 2008 conditions, again for everyone in the sample. Denote by the vector $Z_{10}$ the predictions based on 2010 conditions and $Z_{08}$ the predictions based on 2008 conditions. In addition, denote by $P_{10}(Z)$ the probability of completion in 2010, given predictions of wage wedges and probabilities of employment Z, and $P_{08}(Z)$ the probability of completion in 2008, given Z (the difference between $P_{10}$ and $P_{08}$ comes from the 'difference between surveys' variable in table 8).

Then, $P_{10}(Z_{10})$ gives our prediction of the probability of completion in 2010 and $P_{08}(Z_{08})$ gives the analogous prediction for 2008. Then in the spirit of an Oaxaca decomposition we write:

$$P_{10}(Z_{10}) - P_{08}(Z_{08}) = (P_{10}(Z_{10}) - P_{10}(Z_{08})) + (P_{10}(Z_{08}) - P_{08}(Z_{08})) \quad (1)$$

The first term represents the difference that can be explained by changes in the opportunity cost occasioned by the change in labour market conditions, while the second term is the unexplained component. These calculations are made for each individual and then averaged over the relevant samples (see table 10).

We could also calculate $P_{10}(Z_{10}) - P_{08}(Z_{08}) = (P_{10}(Z_{10}) - P_{08}(Z_{10})) + (P_{08}(Z_{10}) - P_{08}(Z_{08}))$ (2)

Thus a symmetrical approach would be:

$$P_{10}(Z_{10}) - P_{08}(Z_{08}) = \tfrac{1}{2}[(P_{10}(Z_{10}) - P_{10}(Z_{08})) + (P_{08}(Z_{10}) - P_{08}(Z_{08}))] + \tfrac{1}{2}[(P_{10}(Z_{08}) - P_{08}(Z_{08})) + (P_{10}(Z_{10}) - P_{08}(Z_{10}))] \quad (3)$$

However, the results in table 10 are based on (1).

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