MINISTRY OF EDUCATION
Te Tāhuhu o te Mātauranga

Comparing Modern Apprenticeships and industry training

New Zealand Government

Learners in tertiary education

This report forms part of a series called Learners in tertiary education.
Other topics covered by the series are access, pathways, support, participation, retention and qualification completions.

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Acknowledgements
The author gratefully acknowledges comments provided by Nicholas Huntingdon, Sarah Crichton and Kate Andrew.

All views expressed in this report, and any remaining errors or omissions, remain the responsibility of the author.

Published by
Tertiary Sector Performance Analysis and Reporting
Strategy and System Performance
MINISTRY OF EDUCATION

This report is available from the Ministry of Education's Education Counts website:
www.educationcounts.govt.nz

July 2010

ISBN (web) 978-0-478-34286-4

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1.1 Introduction

This analysis builds on previous studies on Modern Apprenticeships and industry training[1] using each programme's administrative dataset to determine if Modern Apprenticeship's additional supports and structures are effective tools to ensure engagement and achievement in formalised industry training programmes for younger people.

Key findings:

1. When other factors are controlled for, there seems to be a premium in the Modern Apprenticeships model over normal industry training, manifested in programme completion rates. On aggregate, learners engaged in Modern Apprenticeships are more likely to complete their programme than equivalent learners in industry training.

2. This is not true in all industries. Modern Apprentices completed their programmes at higher rates than equivalent industry trainees in just over half of the matched ITOs. There may be industry-specific factors and/or programme administration factors that mean that the Modern Apprenticeship model works better to provide a completion premium in some industries than it does in others.

3. There does not appear to be any premium on completion between industry training and Modern Apprenticeships when combined with the ethnicity of the learner. When other factors are adjusted for, each ethnic group performs relatively similarly between the two programmes.

4. When other factors are adjusted for, there appears to be no difference in coordination effects based on the identity of the coordinator (ITO coordinators compared to non-ITO coordinators) in Modern Apprenticeships in respect to likelihood of learners to complete their programmes. Observed higher completion rates for non-ITO coordination services may be a function of differences in brokerage practices, specifically recruitment criteria, between the two.

The Modern Apprenticeships programme was introduced nation-wide in 2001 to address participation problems in workplace industry training by young people. It is aimed at 15 to 21 year olds wishing to participate in formalised workplace-based training, and is intended to lead to national qualifications.[2] It is based on the traditional industry training arrangements, but differs in two important ways.

Modern Apprenticeships involves additional support for both the apprentice and their employer. Modern Apprenticeships coordinators both act as apprenticeships brokers, arranging for job placements for young people, and provide ongoing support and assistance to both employers and apprentices.

Both programmes are administered by the Tertiary Education Commission (TEC), and both are intended to lead to attainment of national qualifications. Modern Apprenticeships qualifications each contain a larger quantum of learning than is usual for non-targeted industry training. An average of 120 credits in total is required across a period of approximately four years for each Modern Apprenticeships learner. Industry training programmes are often smaller, with some programmes consisting of only 40 credits per learner, and they are taken over varying time periods, depending on the requirements of each participant and associated workplace. They do

[1] Mahoney 2009a and 2009b.
[2] There is scope for older people wishing to change their career to participate in Modern Apprenticeships.

not usually involve placement in a new job, as participants are already involved in employment before starting training.

Industry Training Organisations (ITOs) play a standard-setting and an assessment-arranging role for both programmes. ITOs provide sole Modern Apprenticeships coordination services in some industries. In others, non-ITO organisations provide coordination services, while in others, coordination services are provided by both ITO and non-ITO organisations.

There are several possible methods to measure success in industry training and Modern Apprenticeships. Analyses of programme variables have used programme completion as an indicator of the outcome of each training event. Programme completion is used in this analysis as a quality indicator, and the likelihood of a learner completing a least one programme in Modern Apprenticeships and industry training is compared.

Despite the difference in the quantum of learning required of the two programmes, it is possible to compare them by controlling for the differences between them, using a statistical method called logistic regression and using matched cohorts of learners. Using a matched cohort, logistic regression controls for the effects of learner and programme characteristics on outcomes, and allows us to make inferences about how outcomes change as the value of one explanatory variable changes.

In assessing the differences (if any) between the two programmes, we might want to know the answers to the following questions:

1. Do Modern Apprentices complete their programmes at similar rates to industry trainees?
2. Do non-European Modern Apprentices do better or worse than in industry training?
3. Do Modern Apprenticeships learners' chances of success differ according to who provides coordination services?

Apart from the coordination services, there are some fundamental differences between the two programmes that need to be controlled for before a meaningful comparison between the two can be made. For example, previous analyses have identified that duration of learning is positively correlated with completion in Modern Apprenticeship programmes, and negatively correlated with completion in industry training programmes. [3] That is, it seems that the longer a period of training has been at exit in industry training for each individual, the less likely it is to be as a completed programme. But the reverse applies in Modern Apprenticeships – the longer the training period, the more likely the programme is to end in a completion.

The corollary is that after short durations of learning industry training learners complete their programmes at higher rates than Modern Apprentices.[4] This is in part a consequence of the shorter (lower credit quantum) programmes in industry training. Apprentices who leave programmes early are more likely to be non-completers than leavers in the less rigid, variable-duration *industry training*. Modern Apprentices do complete their programmes at higher rates than equivalent industry trainees on aggregate, but over longer periods of time. [5]

Previous analyses explored the probability that learners in industry training and Modern Apprenticeships complete their programme. Mahoney (2009a) found that the predicted and observed probability of a learner competing their programme in industry training is 33 percent. An estimated 35 percent of learners starting industry training for the first time in 2003 completed at least one programme within five years.

[3] Mahoney 2009a and Mahoney 2009b
[4] Mahoney 2009a
[5] Mahoney 2009b

Modern Apprenticeships completion rates improved from 32 percent to 40 percent between 5 and 6 years after commencing study, and 42 percent of 2002 Modern Apprentices starters had completed at least one programme after 7 years.[6] This implies that Modern Apprentices often take a long time to finish their qualifications – longer than the number of years envisaged when the programme was originally devised.

This study controls for the differences in programme credit load between industry training and Modern Apprenticeships, while ignoring specific programme duration, to see if there is a difference between industry training and Modern Apprenticeships in respect to programme completion when both are put on the same footing.

Within Modern Apprenticeships, the observed completion rates seem to indicate some differences between ITO and non-ITO coordination services, as well as differences between ethnic groups. However, both of these studies found that various other variables, such as industry, previous qualification, rate of study and ethnic group (for example) are also strongly associated with completion. Mahoney (2009b) found that in some situations non-ITO coordination seems to result in higher completion rates than ITO coordination services. This analysis tests whether observed differences in completion rates (for example those published on Education Counts) are due to differences in services provided between them, or due to clusters of combinations of other factors associated with success.[7]

Similar issues exist between industry training and Modern Apprenticeships where differences in the performance of some groups over others are observed. For instance, observed cohort completion rates indicate that Pasifika learners do better in industry training than Modern Apprenticeships.[8] Is this a consequence of one programme suiting Pasifika learners more, or a consequence of clustering of variables associated with success?

This study attempts to control for confounding factors to answer our three research questions. It follows the progress of an age and industry-matched group of learners who are identified as starting industry training or Modern Apprenticeships at around the same time, doing programmes with similar credit loads in matched fields of study, and examines the outcome of their learning after a maximum period of time (8 years) have passed. It controls for the varying durations in the two programmes by taking a cohort approach, thereby ignoring varying durations between and within the programmes.

Other variables are controlled for using logistic regression, such as:

- the programme credit load
- the rate of study
- the prior qualifications of the learner
- learner age at entry
- learner geographic location
- learner gender and ethnic group
- NQF level of programme
- Start year (2002, 2003, 2004 or 2005)
- the ITO administering their programme (a proxy for the industry they are working in)
- an identifier showing whether learners are in industry training or Modern Apprenticeships, and if Modern Apprenticeships, whether their coordinator is or is not an ITO.

[6] See *Achievement in Workplace Learning* tables in Education Counts: http://www.educationcounts.govt.nz/__data/assets/excel_doc/0007/16297/Achievement-in-workplace-based-learning-230310.xls

[7] For example, we know that there is a difference between ITO and non-ITO coordination between the type of people who are coordinated: non-ITO learners tend to have higher qualifications on entry than those coordinated by ITOs (see appendix 1, table 7). Since we know that previous qualification is associated with completion, this might explain the different completion rates.

[8] Achievement in workplace-based learning tables ITA.6 for Pasifika learners commencing in 2003 in Modern Apprenticeships compared to ITA.5 Pasifika industry training learners starting in the same year.

Two statistical models are used to answer the three main research questions: Model 1 compares matched industry training and Modern Apprenticeships training, to answer questions 1 and 2. Model 2 compares outcomes within Modern Apprenticeships to answer question 3. Both models use the same cohort of learners identified below.

A brief discussion of the meaning of the results of the modelling is included in the conclusion section of this paper.

2.1 Cohort selection

A cohort of industry training learners was selected from the industry training Performance Management System (PMS). Modern Apprenticeships learners were drawn from the coordinator dataset. The cohort was chosen to ensure an adequate population across independent variables. To facilitate this, the industries were limited to those administered by ITOs involved in both the industry training and Modern Apprenticeships programmes between 2002 and 2005.[9]

For the within-Modern Apprenticeships comparison used in Model 2, the industries were further limited to those with learners with both ITO and non-ITO coordination to enable fair comparison.[10]

The basis of cohort selection was as follows:

- The earliest start date in industry training or Modern Apprenticeships is set between 1 January 2002 and 31 December 2005.
- The level of the programme the learner enrolled in is set at Levels 3 or 4 for both industry training and Modern Apprenticeships.
- Industry training programmes were limited to those leading directly to national qualifications on completion. Selected learners were excluded if they were enrolled in a Limited Credit Programme (LCP), Supplementary Credit Programme (SCP), Trade Certificate (TC) or unidentifiable programme type in industry training.
- Learners were involved in one programme only throughout the training, administered by a single ITO, and were active in one fund category only (either in Modern Apprenticeships or industry training).
- Learners enrolled with an ITO that also administered Modern Apprenticeships programmes.
- The age of the learner at their first enrolment was between 15 and 21 years inclusive.
- Prioritised ethnic group of learner limited to one of European, Māori, Pasifika or 'other'. Asian and 'Not stated' learners were excluded from cohort selection due to their a-typicality (patchiness of distribution between sub-categories of other variables is undesirable in logistic regression analyses).

These selection criteria produced a cohort comprising 29,406 learners: 12,910 Modern Apprentices and 16,496 industry training learners.

[9] See appendix table 1 for industries and learner numbers.
[10] See appendix table 2.

3.1 Model 1 specifications

Statistical modelling was used to determine the strength of each variable in predicting the probability that each learner attained at least one programme outcome recorded as a 'completion'. As the dependent variable is binary (completion or non-completion), logistic regression is the most appropriate method to use. Continuous independent variables were grouped into fairly homogenous categories to enable estimates to be calculated for each.

Two models were created: the first contained the *fund* variable, and tested the predictors of learners attaining at least one programme completion between two different types of training: industry training and Modern Apprenticeships, and for differences between ethnic groups between the two funds.

The second model tested for differences within Modern Apprenticeships between ITO delivered coordination services and non-ITO delivered coordination services.

The regression model produces estimates that enable comparison between each categorical independent variable with a reference category value of the variable. The reference category chosen for model 1 is specified below:

- Fund = industry training
- Industry training organisation = Motor Industry Training Organisation
- Prioritised ethnic group = 'European / Pakeha'
- Programme level = level 3
- Gender = Male
- Age at start = 15 to 17 years
- Programme credits = 121 to 160 credits
- STM rate = 0.6
- Previous qualification = NCEA level 1 (or equivalent)
- Territorial local authority region: Auckland

The reference categories were chosen based on the typicality of learner in industry training and Modern Apprenticeships, and the requirements of the main research questions.

We calculated and graphed a set of predicted probabilities of programme completion for the base category. *Predicted probabilities* are the adjusted probabilities of learners completing at least one programme. That is, predicted probabilities of completion are the observed probabilities adjusted for the effects of the other variables within the regression model.

Predicted probability graphs in the following sections show the effects of changing one variable value for the base category of learner: for example, the probability of a reference category learner completing at least one programme if they trained in a programme administered by the Agriculture ITO (for example) instead of the Motor ITO, while keeping all other variable values constant.

3.2 Model 1 Results

The model was a good fit for the data, and it was able to explain 15 percent of the observed variance (adjusted R square 0.1548). This is a good proportion for these types of analyses, signalling good predictive power.

Table 1 shows a summary of the model (see appendix table 3 for regression output). The variables are ranked in the order of the amount of variation in the model each accounts for. The closer the variable is to the top of the list, the more variation in respect to the values of the independent variable.

An interaction effect, *Fund * Ethnic group*, was included in the model, but it did not reach statistical significance. This provides the answer to question 2: there is no interaction between fund and ethnic group, meaning that there does not seem to be a difference between performance of each ethnic group between the two funds.

In order to be able to make estimates for the main effects of these variables, the non-significant interaction effect was removed and the model was subsequently re-run. A summary of results is shown below.

Of main note is that when entered without the interaction effect, the fund variable is of itself significantly associated with completion. *Fund* loses its potency in the presence of the interaction effect *industry training organisation * fund.* Its presence is still required in the model, however, to ensure the hierarchical validity of the model. Gender and NQF level of programme (as well as *fund* in the presence of the interaction*)* are not significant predictors of completion in this model.

Table 1 – Model 1 specifications by variable

Variable	Degrees of Freedom	Chi-Square	Pr > ChiSq
Industry Training Organisation	24	532.89	<.0001
Previous qualification	6	289.22	<.0001
Industry Training Organisation by Fund (interaction)	24	253.72	<.0001
Minimum year learner	3	240.32	<.0001
Ethnic group	4	117.64	<.0001
Programme credits	4	71.04	<.0001
Region	10	69.06	<.0001
Study rate	4	48.29	<.0001
Age at entry	3	15.01	<.0001
NQF level	1	1.88	0.1706
Gender	1	0.02	0.8924
Fund	1	0.01	0.9373

The following sections show results by variables of interest.

3.3 Industry Training Organisation by Fund (interaction)

The largest source of variance in the model is derived from the industry training organisation (ITO) variable. This replicates findings in industry training analyses[11] that when compared to other administrative data collection variables, it is industry-related factors that have the most influence on whether a learner completes at least one programme. These factors are thought to be conventions in and the support for trades training within each industry, perhaps driven by (or may be independent of) the economic imperatives for each industry, as well as the effects of each ITO servicing each industry.

Figure 1 shows the predicted probability of a learner completing at least one programme within a maximum of 8 years of first commencement in training, by fund, by the ITO administering their learning. The significant interaction between the fund and the organisation name variables shows that while controlling for the effects of the other variables within the model, there is a difference in the likelihood of success between industry training and Modern Apprentices, and this difference varies quite widely by industry.

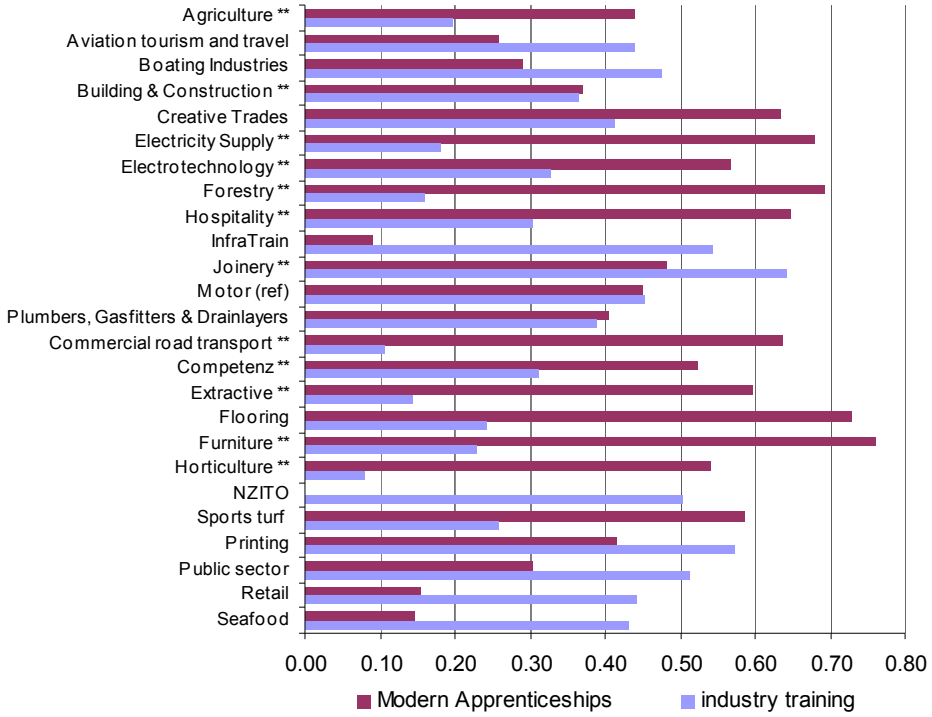
For instance, for learners administered by the Agriculture ITO (and therefore most likely to be training and working in agricultural industries) the probability of completion is 0.45 for Modern Apprentices, and only 0.2 for matched industry training learners. By contrast, learners whose training is administered by infratrain (likely to be working in the infrastructure industries) the probabilities are less than 0.1 for Modern Apprentices but greater than 0.5 for industry training learners.

Modern Apprenticeships learners are more likely to complete at least one programme than equivalent industry training learners participating in training in just over half (14 out of the 25) cohort represented ITOs. However, ITOs where Modern Apprentices are more likely to complete than industry trainees generally contain relatively larger numbers of trainees, which contributes to the finding that Modern Apprentices complete at higher rates overall.

This effect is not wholesale: learners in industries covered by the infratrain, joinery, NZITO, printing, public sector, retail and seafood ITOs show lower adjusted completion rates for equivalent Modern Apprentices than industry trainees. Other industries, such as those covered by the building and construction, and motor ITOs show very little or no difference between them.

[11] Mahoney 2009a and 2009b.

Figure 1 – Predicted probability of programme completion for each industry training organisation



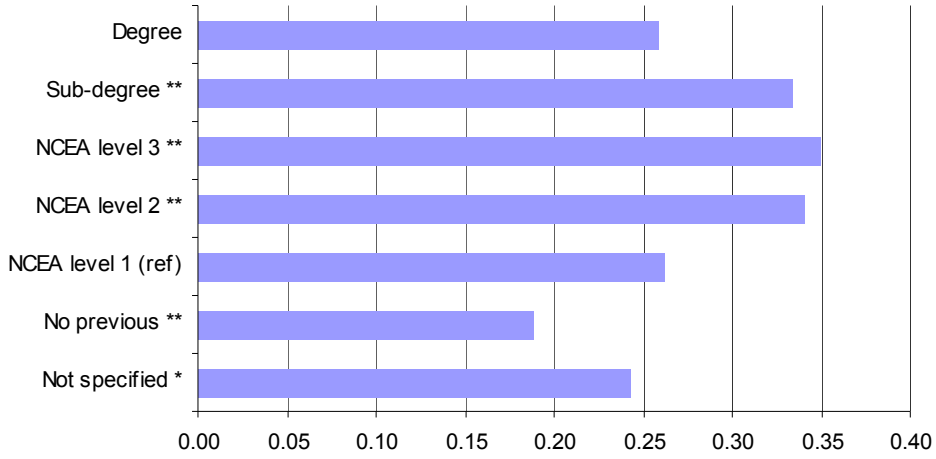
Note: ** shows statistical significance at the 5 % level and * shows significance at the 10 % level

3.4 Previous qualification of learner

The qualification of the learner before entering industry training or Modern Apprenticeships is also a strong predictor of completion. This variable can be used to measure both natural ability of the learner on entry, as well as skills acquired in prior learning, including learning ability. Generally, the odds of programme completion increase with the level of prior educational attainment of the learner on entry.

Learners with no qualifications are less likely to complete their programme than the base category (learners who have attained NCEA level 1 or the equivalent), while learners with NCEA level 2 or its equivalents or NCEA level 3, or a previous sub-degree type qualification (such as a national certificate or diploma) were more likely to complete at least one programme.

Figure 2 – Predicted probability of programme completion by previous qualification of learner



Note: ** shows statistical significance at the 5 % level and * shows significance at the 10 % level

Learners with degree level qualifications (or higher) were no more likely to complete a programme than the base category, but relatively few take industry training following completion of a degree, so the result for that group is not statistically significant. Learners with degrees prior to entry in industry training have less of an incentive to complete their programme, presumably as certification in industry training would not provide them with any additional labour market advantage.[12]

Learners with no previous qualifications before entering training were less likely to complete a programme than the reference category, which may be a reflection of their lower natural ability and lower educational experience.

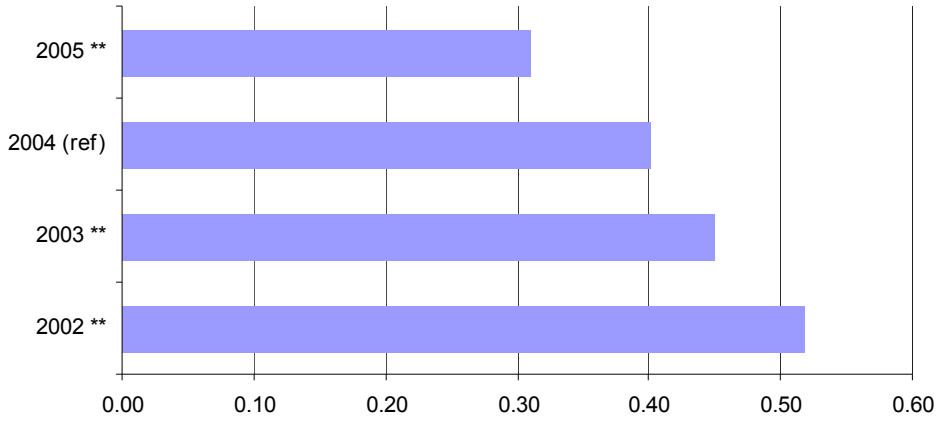
[12] See Mahoney, 2009 a.

3.5 Start year

There was a significant start year effect, and this is primarily due to the greater availability of data on the progress of training for learners who commenced earlier, than for those who started later. Learners commencing training in 2005 have only had five years in which to complete their programme under this cohort selection, as the latest data available for the programme covers the period to 31 December 2009 (a total of 5 possible calendar years). In contrast, learners who commenced in 2002 can be tracked across a window of 8 possible calendar years.

This does not mean that learners starting in some (earlier) years are more likely to complete their programmes than others (we would need 8 whole years of data at least for each starting year cohort of learners to determine this, which will not be available for analysis until 2013), but is a consequence of the finite data collection. In effect, figure 3 shows that the longer a trainee remains within their programme of study, the more likely they are to attain a completion. Including start year in the model controls for the effects of the limited dataset for the cohort learners starting later (i.e. in 2005 over those who commenced in 2003).

Figure 3 – Predicted probability of programme completion by start year



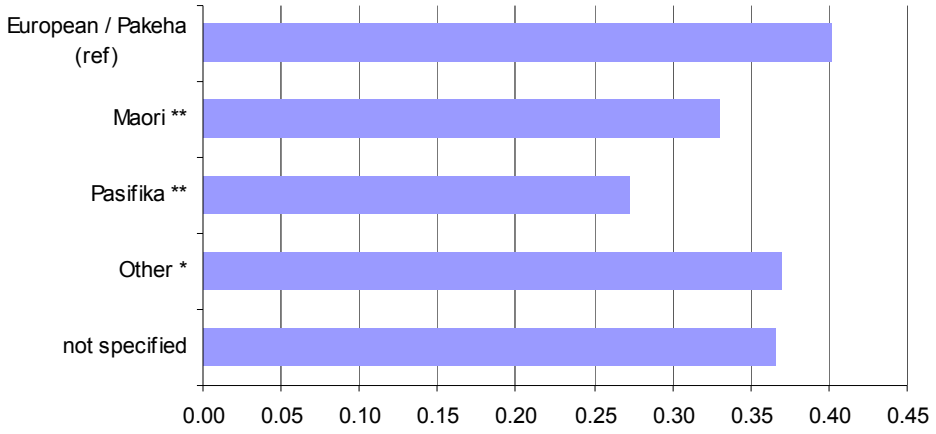
Note: ** shows statistical significance at the 5 % level and * shows significance at the 10 % level

3.6 Ethnicity of learner

Learners' ethnic group identification is a significant predictor of programme completion. The results show that, across both programmes, all learners are more likely than Pasifika learners to complete their programme.

These differences are consistent across the two funds (industry training and Modern Apprenticeships), as shown by the non-significance of the *fund*ethnic group* interaction within the model. This implies that each ethnic group succeeds equally between these two funds.

Figure 4 – Predicted probability of programme completion by ethnic group



Note: ** shows statistical significance at the 5 % level and * shows significance at the 10 % level

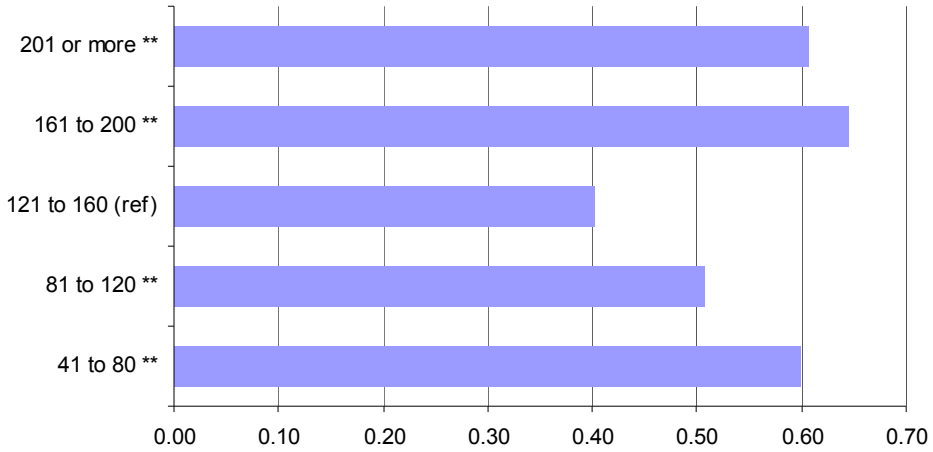
3.7 Programme credits

Each Modern Apprenticeships and industry training programme is assigned a set number of credits consisting the quantum of learning required to attain competence in each field covered by the programme. It is important to control for the effects of differences in programme credits between the two funds to enable a true comparison to be made between them.

Modern Apprenticeships programmes contain a minimum of 100-120 credits, set as the quantity of learning required for young people to attain competence in a vocationally related field as demonstrated by the award of a national certificate. Industry training programmes often consist of fewer numbers of credits, as these learners generally may have more work-related experience and therefore lower learning requirements than Modern Apprentices.

Mahoney (2009a&b) showed that in industry training, programmes with smaller numbers of credits are more likely to result in a completion than programmes with larger credit loads. Figure 4 shows that this pattern is true of both programmes. However, programmes consisting 161 or more credits are also likely to be highly associated with completion.

Figure 5 – Predicted probability of programme completion by credit loading of programme



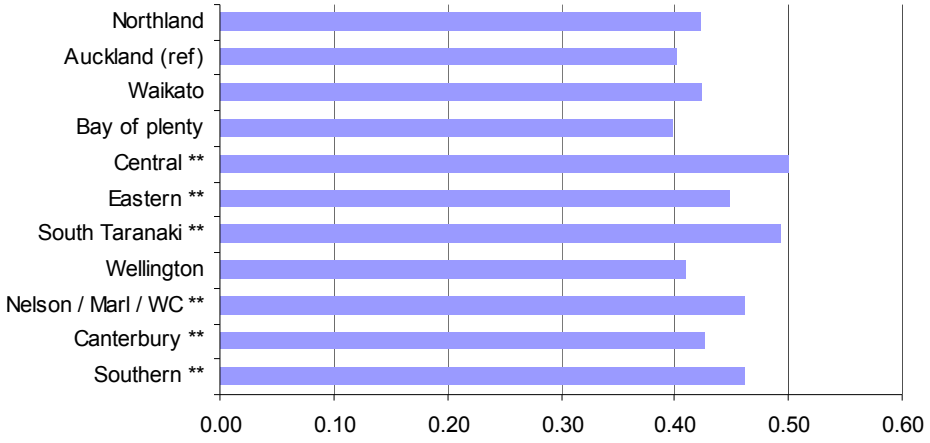
Note: ** shows statistical significance at the 5 % level and * shows significance at the 10 % level

3.8 Location

There are some differences in the likelihood of learners attaining a programme completion depending on the location of their employment. Controlling for all the other effects in the model, learners in the base category's (Auckland region) chances of completion tend to be lower than learners in other geographic regions.

Mahoney (2009a) speculated that this effect may be a population density effect identified in a similar Australian study of apprentice outcomes. Apprentices and industry trainees working in rural areas may be more likely to complete their programme in part because of a relative lack of alternative work and study options available to them. There may also be a stronger trades training tradition in less densely populated areas, in part due to industry demographics located within them.

Figure 6 – Predicted probability of programme completion by location of employment



Note: ** shows statistical significance at the 5 % level and * shows significance at the 10 % level

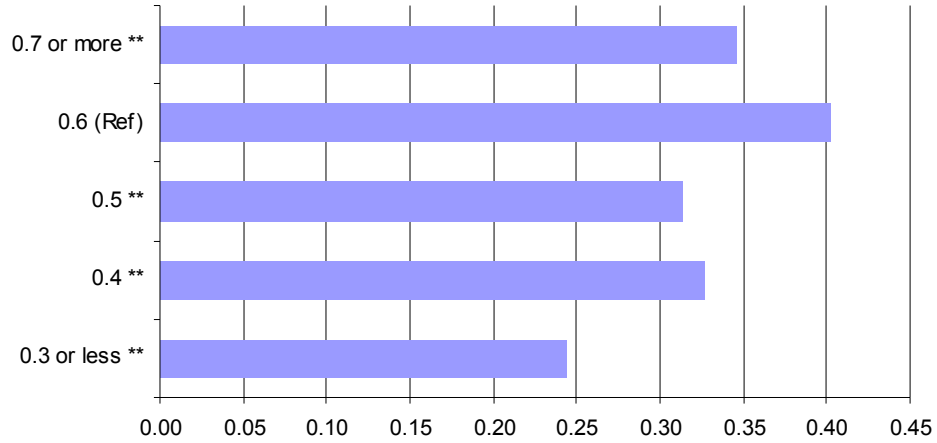
3.9 Study rate

The study rate of the programme was associated with programme completion. This variable measures the volume of learning, representing a fraction of the study load required to complete 120 credits in each year. Most industry trainees study at a rate of 0.4 STMs or below (Mahoney 2009a) while most Modern Apprentices (73 percent) study at 0.6 STMs or below.

Inclusion of this variable in the model controls for any differences between the two modes of learning, in effect stripping away difference between them so that a fair comparison can be made between Modern Apprenticeships and industry training.

Figure 7 shows that learners engaged in training at a rate of 0.6 for both types of training are the most likely to complete their programme.

Figure 7 – Predicted probability of programme completion by rate of study



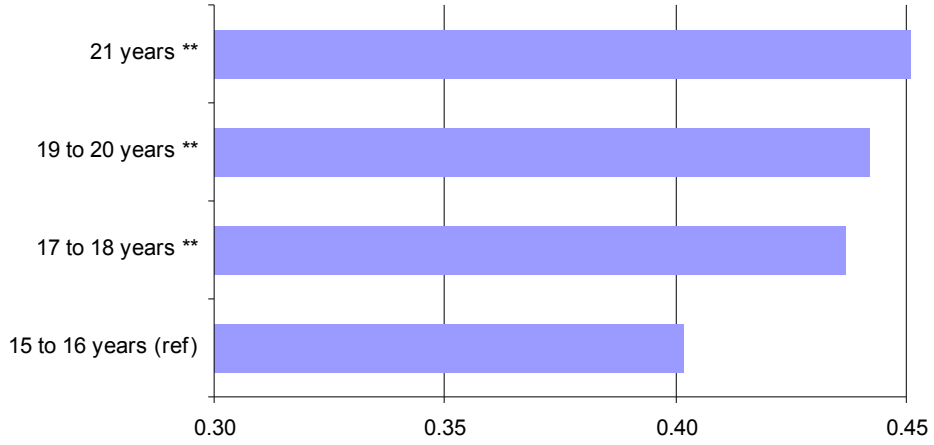
Note: ** shows statistical significance at the 5 % level and * shows significance at the 10 % level

3.10 Learner's age at programme entry

The age of the learner at first entry is associated with programme completion. Controlling for the effects of all the other variables in the model, older learners are more likely than younger learners to complete their programme.

This finding replicates those of the previous studies. Older learners are more likely to have had prior work (and other) experience that may contribute to their ability to complete programmes. Older people may also be more likely to have chosen a career path, and will be likely to stick to it.

Figure 8 – Predicted probability of programme completion by age group



Note: ** shows statistical significance at the 5 % level and * shows significance at the 10 % level

4.1 Model 2 specifications

The second model was used to test for differences between ITO coordination and non-ITO coordination within Modern Apprenticeships.

The same regression model was used as before, with only one major difference: the *fund category* variable was limited to Modern Apprenticeships. A new variable, *coordinator type* denotes whether the coordination services were delivered by an ITO or by a non-ITO organisation.

An additional industry variable is available for use within the Modern Apprenticeship coordinator data collection, and replaces the industry training organisation variable used in model 1 (this variable is not collected for industry training so could not be used for the comparison between it and Modern Apprenticeships).

The reference category chosen for the model is specified below:

- Coordinator type = ITO as coordinator
- Industry = Motor engineering
- Prioritised ethnic group = 'European / Pakeha'
- Programme level = level 3
- Gender = Male
- Age at start = 15 to 17 years

- Programme credits = 121 to 160 credits
- STM rate = 0.6
- Previous qualification = NCEA level 1 (or equivalent)
- Territorial local authority region: Auckland

The predicted probability of each variable value, that is the likelihood of completion adjusted for the other variables within the regression model, is shown in the following graphs. Predicted probabilities estimates produced by the second model are shown only where they differ considerably from those attained in model 1.

4.2 Model 2 Results

Table 2 shows the hierarchy of significant factors in the model. There are some small changes in the model strength and the order of the strength of the variables. The R Square statistic was 0.19 (0.15 for model 1). See appendix for the regression output.

Controlling for the other variables within the model, the type of coordinator (ITO or non-ITO coordinator) **was not** a significant predictor of whether a learner attained at least one programme completion in Modern Apprenticeships. It could be argued that the selection of learners between provider types is a consequence of who offers coordination in each industry – so this might represent an additional industry-provider effect. This study attempted to control for this by limiting observations to only those industries where both types of coordination were on offer.

The observed effect that non-ITO coordination is associated with better outcomes could be a consequence of the brokerage function of non-ITO coordinators: we know that there is a difference between the type of people who are selected to participate between ITO and non-ITO coordination (see appendix tables 5-7). Non-ITO coordinators may have different selection criteria for who they choose to put forward for each apprenticeship. This could explain the difference in prior qualifications between non-ITO and ITO coordinated apprentices at entry. When the effects of industry, age and previous qualification of the learner, and programme factors also included within the model are taken into account, any difference between non-ITO and ITO coordination disappears.

Table 2 – Model 2 specifications by variable

Variable	Degrees of Freedom	Chi-Square	Pr > ChiSq
Industry	10	439.25	<.0001
Ethnic group	4	55.08	<.0001
Previous qualification	6	46.74	<.0001
Minimum year learner	3	41.15	<.0001
Region	10	34.92	<.0001
Study rate	4	32.87	<.0001
Programme credits	4	14.57	0.01
NQF level	1	7.62	0.01
Age at entry	1	4.21	0.04
Coordinator type	3	2.92	0.40

The relationships between the reference category and the other variables were similar to those shown for model 1, but the predicted probabilities for the unique industry variable are shown below.

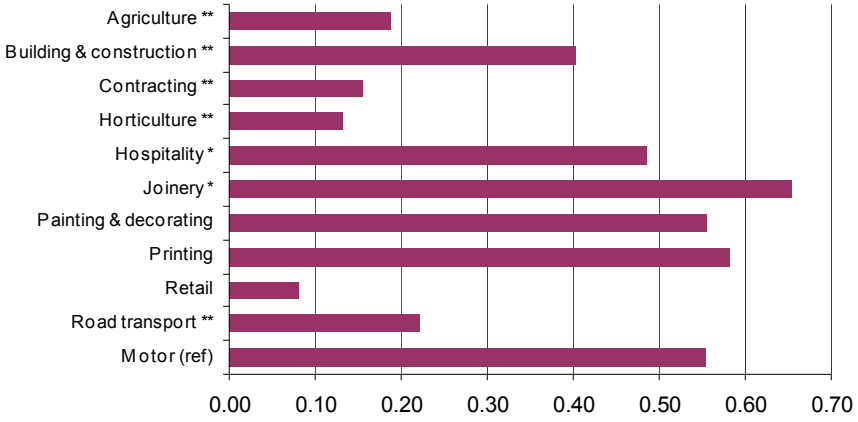
4.3 Industry

Figure 10 shows that the predicted probability of attaining a programme completion within Modern Apprenticeships differed by industry within the cohort.

The results for each industry are fairly similar to the results shown in figure 1 for each industry training organisation, with some exceptions. Differences occur due to the ITO variable capturing a number of industries in some instances, while the industry variable available for use in Modern Apprenticeships is in effect a disaggregation of it and hence is more precise.

Other differences may be due to the absence of industry training learners from the second regression model, and the change of reference group from 'industry training' in model 1 to 'non-ITO coordinator' in model 2.

Figure 10 – Predicted probability of programme completion by cohort Modern Apprenticeships industry



Note: ** shows statistical significance at the 5 % level and * shows significance at the 10 % level

5.1 Conclusions

This study controls for differences between (and within) Modern Apprenticeships and industry training to answer the following questions:

1. Do Modern Apprentices complete their programmes at similar rates to industry trainees?
2. Do non-European Modern Apprentices do better or worse than in industry training?
3. Do learners chances of success differ according to who provides coordination services?

In summary, this study found:

1 When other factors are controlled for, there seems to be a premium in the Modern Apprenticeships model over normal industry training, manifested in overall programme completion rates. On aggregate, learners engaged in Modern Apprenticeships are more likely to complete their programme than equivalent learners in industry training.

2 This is not true in all industries. Modern Apprentices completed their programmes at higher rates than equivalent industry trainees in just over half of the matched ITOs. There may be industry-specific factors and/or programme administration factors that mean that the Modern Apprenticeship model works better to provide a completion premium in some industries over others.

3 There does not appear to be any premium on completion between industry training and Modern Apprenticeships when combined with the ethnicity of the learner. When other factors are adjusted for, each ethnic group performs relatively similarly between the two programmes.

4 When other factors are adjusted for, there appears to be no difference in coordination effects based on the identity of the coordinator (ITO coordinators compared to non-ITO coordinators) in Modern Apprenticeships in respect to likelihood of learners to complete their programmes. Observed higher completion rates for non-ITO coordination services may be a function of differences in brokerage practices, specifically recruitment criteria, between the two.

There is both an observed and adjusted difference between the two funds with respect to the probability of programme completion. Learners engaged in Modern Apprenticeships are more likely to complete their programme than learners in industry training, and this is not due to demographic and provider effects controlled for in this study.

This effect does not apply equally to all industries involved in training in both funds, but due to the bulk of learners successfully completing in Modern Apprenticeships at higher rates than industry trainees, it applies in aggregate. The Modern Apprenticeships model does not provide a premium for completion wholesale, with a little under half of all matched ITOs showing a lower adjusted completion rate for Modern Apprenticeships learners than for normal industry training learners.

It is not clear what this effect represents, but it could be something to do with the differences in the way the two programmes are administered in some industries, as well as the industry specific variables, such as how participants are recruited into workplace-based training, and how workplaces manage it, that have not been quantified. There may be uneven application of the programme between industries, or it may be that the model simply does not suit in some.

The in-aggregate completion premium for Modern Apprenticeships could also be a reflection of the more rigid structure of the programme, rather than the additional supports provided by the

coordinator. The greater stipulations for a training plan, the wider transparency required with the additional (sometimes non-ITO) third party as coordinator acting as a go-between, and the higher brand awareness of Modern Apprenticeships, all may contribute to situations where it is hard for any party to not be aware of the requirements of the apprenticeship. Hence the training is applied in practice as it is intended in theory. These may be issues for learners engaged in industry training where it is not always clear that the requirements for training plans are consistently applied.

Each ethnic group seems to performs equally between both funds, despite the observations that there are differences between them and the fund (the fund variable denotes whether the training is under the industry training or Modern Apprenticeship programme). No performance advantage or disadvantage appears to be present between each ethnic group when the value of *fund* is changed. This finding is counterintuitive, since it is imagined that the more supportive approach under Modern Apprenticeships might have resonated more with non-European learners, such as Māori and Pasifika, leading higher proportions of them to complete compared to other ethnic groups. This appears to not be the case, and implies that any premium towards completion appears to be equally felt between ethnic groups.

There also does not seem to be a premium on services offered by one type of coordinator (ITOs) over other types (non-ITO coordinators). Mahoney (2009b) found that that in some situations non-ITO coordination seems to result in higher completion rates than ITO coordination. However, this study suggests that these differences may be more due to the differing selection criteria adopted by non-ITO coordinators over ITO coordinators (differing brokerage practices), and a concentration of provision-related variables associated with success between the different fund categories, since any difference between them disappears when these are controlled for.

It could be that all coordinators are applying the same types of services, at roughly the same level. It is odd that no difference is ascribable to coordinator types, given that market theory states that competition in markets for provision of services is always a good thing. If competition always inspires innovation in services to occur, then these innovations have been applied evenly across all coordinator groups. This is unlikely to be the case, and it is more likely that the coordinators are all equally applying the minimum of services required under their contracts with the TEC. This implies that there is, or has been to date, little incentive for coordinators to innovate which is a situation which would be worsened if coordination were to be restricted to one type of provider only, for instance.

This report suggests that there may be a case for review of mentoring and peer/support services on offer in Modern Apprenticeships, and the operational policy settings that provide incentives for providers to innovate.

APPENDIX

Appendix Table 1 – Model 1 cohort selection - industry training and Modern Apprenticeships comparison

Cohort selection – Model 1	Industry training learners	Modern Apprentices
Agriculture Industry Training Organisation Incorporated	2,525	991
Aviation, Tourism and Travel Training Organisation Incorporated	377	209
Boating Industries Association of New Zealand Incorporated	9	529
Building & Construction Industry Training Organisation Incorporated	2,978	1,990
Creative Trades Industry Training Organisations Inc	352	222
Electricity Supply Industry Training Organisation Incorporated	76	452
Electrotechnology Industry Training Organisation Incorporated	2,204	808
Forest Industry Training and Education Council of New Zealand Incorporated	653	825
Hospitality Standards Institute	1,234	505
InfraTrain New Zealand Limited	46	288
Joinery Industry Training Organisation Incorporated	370	271
Master Plumbers, Gasfitters & Drainlayers New Zealand Incorporated	587	164
NZ Commercial Road Transport Industry Training Organisation Incorporated	646	144
NZ Motor Industry Training Organisation Incorporated	2,145	1,506
New Zealand Engineering, Food and Manufacturing Industry Training Organisation	1,062	2,133
New Zealand Extractive Industries Training Organisation Incorporated	155	30
New Zealand Flooring Industry Training Organisation Incorporated	10	318
New Zealand Furniture Industry Training Organisation Incorporated	73	132
New Zealand Horticulture Industry Training Organisation Incorporated	68	683
New Zealand Industry Training Organisation Incorporated	561	11
New Zealand Sports Turf Industry Training Organisation Incorporated	15	131
Printing and Allied Industries Training Council Incorporated	57	200
Public Sector Training Organisation	130	200
Retail Training New Zealand Incorporated	163	168
Total	16,496	12,910

Appendix Table 2 – Model 2 cohort selection - Modern Apprentices by coordinator type

Modern Apprenticeships industry	ITO coordinated learners	Non-ITO coordinated learners
Agriculture	819	160
Building & construction	1,104	883
Contracting	280	8
Horticulture	653	28
Hospitality	371	133
Joinery	30	246
Motor engineering	900	606
Painting & decorating	8	204
Printing	184	16
Retail	99	69
Road transport	98	46
Total	4,546	2,399

Appendix Table 3 – Model 1 cohort regression output

Parameter		DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept		1	-0.1894	0.1136	2.7789	0.0955
Study rate	0.3 or less	1	-0.00275	0.0854	0.0010	0.9743
	0.4	1	-0.0987	0.0729	1.8333	0.1757
	0.5	1	-0.1619	0.0569	8.0936	0.0044
	0.7 or more	1	-0.2970	0.0457	42.2252	<.0001
Previous qualification	NCEA level 2	1	0.3356	0.0410	66.8733	<.0001
	NCEA level 3	1	0.4170	0.0537	60.2479	<.0001
	Below degree level post-school quals	1	0.3666	0.0555	43.5825	<.0001
	Degree level quals	1	-0.0292	0.1579	0.0343	0.8531
	No previous qualifications	1	-0.3250	0.0486	44.6617	<.0001
	not specified	1	-0.1221	0.0445	7.5346	0.0061
NQF level	4	1	-0.0797	0.0581	1.8776	0.1706

Appendix Table 3 – Model 1 cohort regression output (cont.)

Parameter		DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Gender	F	1	0.00708	0.0524	0.0183	0.8924
Ethnic group	Māori	1	-0.3994	0.0438	82.9997	<.0001
	Not Stated	1	-0.0847	0.0716	1.4008	0.2366
	Other	1	-0.0372	0.0845	0.1938	0.6598
	Pasifika	1	-0.6129	0.0939	42.6172	<.0001
Programme credits	161 to 200	1	0.5105	0.0842	36.7877	<.0001
	201 or more	1	0.5542	0.0817	45.9733	<.0001
	41 to 80	1	0.4022	0.0929	18.7612	<.0001
	81 to 120	1	0.0557	0.0764	0.5317	0.4659
Region	Bay of Plenty	1	-0.0184	0.0562	0.1072	0.7434
	Canterbury	1	-0.0707	0.0506	1.9507	0.1625
	Central	1	0.2636	0.0567	21.5955	<.0001
	Eastern Coast	1	0.1563	0.0677	5.3329	0.0209
	Nelson / Marlborough / West Coast	1	0.2393	0.0671	12.7102	0.0004
	Northland	1	0.1094	0.0713	2.3588	0.1246
	South Taranaki District	1	0.1938	0.1425	1.8492	0.1739
	Southern	1	0.2094	0.0520	16.2008	<.0001
	Waikato	1	0.0531	0.0531	0.9985	0.3177
	Wellington	1	-0.0893	0.0570	2.4535	0.1173
Organisation	Agriculture	1	-1.2098	0.1035	136.6798	<.0001
	Aviation, Tourism and Travel	1	-0.0517	0.1527	0.1147	0.7348
	Boating Industries	1	0.0923	0.7442	0.0154	0.9013
	Building & Construction	1	-0.3612	0.0709	25.9664	<.0001
	Creative Trades	1	-0.1603	0.1482	1.1708	0.2792
	Electricity Supply	1	-1.3146	0.2883	20.7971	<.0001
	Electrotechnology	1	-0.5335	0.0772	47.7544	<.0001
	Forest Industry Training	1	-1.4658	0.1623	81.5177	<.0001
	Hospitality	1	-0.6395	0.1340	22.7778	<.0001
	InfraTrain	1	0.3652	0.3768	0.9392	0.3325
	Joinery	1	0.7745	0.1523	25.8550	<.0001
	Master Plumbers, Gasfitters & Drainlayers	1	-0.2599	0.1235	4.4292	0.0353
	NZ Commercial Road Transport	1	-1.9331	0.1515	162.7864	<.0001
	New Zealand Engineering, Food and Manufacturing	1	-0.5975	0.1019	34.3790	<.0001
	Extractive Industries	1	-1.6005	0.2422	43.6787	<.0001
	Flooring	1	-0.9415	0.8779	1.1501	0.2835
	Furniture	1	-1.0204	0.5252	3.7747	0.0520

Appendix Table 3 – Model 1 cohort regression output (cont.)

Parameter			DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
	Horticulture		1	-2.2420	0.4470	25.1587	<.0001
	New Zealand Industry Training Organisation		1	0.2013	0.2198	0.8384	0.3598
	Sports Turf		1	-0.8619	0.6895	1.5624	0.2113
	Printing and Allied Industries		1	0.4842	0.3040	2.5374	0.1112
	Public Sector		1	0.2359	0.2117	1.2412	0.2652
	Retail		1	-0.0416	0.1889	0.0484	0.8258
	Seafood Industry Council		1	-0.0890	0.2870	0.0961	0.7566
Age at entry	17 and 18 years		1	0.1170	0.0404	8.3935	0.0038
	19 and 20 years		1	0.1384	0.0440	9.8715	0.0017
	21 years		1	0.2027	0.0572	12.5568	0.0004
Minimum year learner	2002		1	0.2362	0.0508	21.5880	<.0001
	2003		1	0.1857	0.0372	24.9730	<.0001
	2005		1	-0.3278	0.0356	84.6616	<.0001
Fund	Modern Apprenticeships		1	-0.00595	0.0757	0.0062	0.9373
Organisation * Fund	Agriculture	MA	1	-0.0409	0.1433	0.0815	0.7753
	Aviation, Tourism and Travel	MA	1	-0.8560	0.2291	13.9624	0.0002
	Boating Industries	MA	1	-0.6955	0.7516	0.8564	0.3547
	Building & Construction	MA	1	-0.3317	0.0984	11.3708	0.0007
	Creative Trades	MA	1	0.7419	0.2106	12.4140	0.0004
	Electricity Supply	MA	1	0.9542	0.3085	9.5702	0.0020
	Electrotechnology	MA	1	0.4669	0.1193	15.3254	<.0001
	Forest Industry Training	MA	1	1.0066	0.1832	30.1896	<.0001
	Hospitality	MA	1	0.8086	0.1802	20.1305	<.0001
	InfraTrain	MA	1	-2.1201	0.4123	26.4452	<.0001
	Joinery	MA	1	0.1272	0.2077	0.3752	0.5402
	Master Plumbers, Gasfitters & Drainlayers	MA	1	-0.1825	0.2137	0.7295	0.3930
	NZ Commercial Road Transport	MA	1	0.7600	0.2824	7.2416	0.0071
	New Zealand Engineering, Food and Manufacturing	MA	1	0.2907	0.1228	5.6058	0.0179
	Extractive Industries	MA	1	0.5856	0.4910	1.4223	0.2330
	Flooring	MA	1	1.1780	0.8878	1.7606	0.1846
	Furniture	MA	1	1.3499	0.5682	5.6432	0.0175
	Horticulture	MA	1	0.3615	0.4613	0.6141	0.4333
	New Zealand Industry Training Organisation	MA	1	-11.6147	121.5	0.0091	0.9239
	Sports Turf	MA	1	0.5463	0.7158	0.5825	0.4453

Appendix Table 3 – Model 1 cohort regression output (cont.)

Parameter			DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
	Printing and Allied Industries	MA	1	-0.1425	0.3468	0.1688	0.6812
	Public Sector	MA	1	-0.6324	0.2626	5.8004	0.0160
	Retail	MA	1	-1.5130	0.2985	25.6929	<.0001
	Seafood Industry Council	MA	1	-1.5646	0.6289	6.1885	0.0129

Appendix Table 4 – Model 2 cohort regression output

Parameter		DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept		1	0.2179	0.2418	0.8116	0.3677
Study rate (STM)	0.3 or less	1	0.5020	0.1500	11.1964	0.0008
	0.4	1	0.2711	0.1293	4.3953	0.0360
	0.5	1	0.3305	0.1111	8.8520	0.0029
	0.7 or more	1	-0.2523	0.0773	10.6661	0.0011
Previous qualification	6th Form or equiv	1	0.3005	0.0815	13.6072	0.0002
	7th Form or equiv	1	0.4963	0.1168	18.0605	<.0001
	Below degree level post-school quals	1	0.3099	0.1135	7.4549	0.0063
	Degree level quals	1	-0.2160	0.4825	0.2004	0.6544
	No previous qualifications	1	-0.1231	0.0892	1.9039	0.1676
	not specified	1	-0.0580	0.0877	0.4379	0.5081
NQF level	4	1	-0.3492	0.1702	4.2090	0.0402
Gender	F	1	0.2948	0.1068	7.6175	0.0058
Ethnic group	Māori	1	-0.5264	0.0858	37.6341	<.0001
	Not Stated	1	0.1021	0.1467	0.4847	0.4863
	Other	1	0.1417	0.2153	0.4332	0.5104
	Pasifika	1	-0.8944	0.2150	17.3075	<.0001
Programme credits	161 to 200	1	0.1123	0.1374	0.6679	0.4138
	201 or more	1	0.1924	0.1462	1.7327	0.1881
	41 to 80	1	-0.2116	0.7530	0.0790	0.7787
	81 to 120	1	-0.6126	0.1916	10.2222	0.0014
Region	Bay of Plenty	1	0.3688	0.1011	13.3226	0.0003

Appendix Table 4 – Model 2 cohort regression output (continued)

Parameter		DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
	Canterbury	1	-0.0165	0.1165	0.0202	0.8871
	Central	1	0.2235	0.1216	3.3790	0.0660
	Eastern Coast	1	0.3829	0.1164	10.8193	0.0010
	Nelson / Marlborough / West Coast	1	0.3333	0.1209	7.6019	0.0058
	Northland	1	0.4001	0.1255	10.1690	0.0014
	South Taranaki District	1	-0.1009	0.3606	0.0783	0.7796
	Southern	1	0.3191	0.1122	8.0934	0.0044
	Waikato	1	0.3101	0.1079	8.2622	0.0040
	Wellington	1	0.00245	0.1289	0.0004	0.9848
Industry name	Agriculture	1	-1.6828	0.1289	170.3261	<.0001
	Building & construction	1	-0.6092	0.0875	48.5159	<.0001
	Contracting	1	-1.9083	0.2145	79.1707	<.0001
	Horticulture	1	-2.0929	0.1417	218.2705	<.0001
	Hospitality	1	-0.2744	0.1577	3.0264	0.0819
	Joinery	1	0.4131	0.1771	5.4406	0.0197
	Painting & decorating	1	0.00180	0.1982	0.0001	0.9927
	Printing	1	0.1077	0.1941	0.3080	0.5789
	Retail	1	-2.6260	0.2951	79.1681	<.0001
	Road transport	1	-1.4799	0.2826	27.4141	<.0001
Age at entry	17 and 18 years	1	0.0876	0.0746	1.3785	0.2404
	19 and 20 years	1	0.1131	0.0839	1.8178	0.1776
	21 years	1	0.1886	0.1257	2.2516	0.1335
Minimum year learner	2002	1	0.1544	0.0817	3.5734	0.0587
	2003	1	0.1110	0.0780	2.0234	0.1549
	2005	1	-0.2963	0.0778	14.5039	0.0001

Appendix Table 5 – Modern Apprenticeships cohort by industry and by coordinator provider type

Industry	ITO as MAC	Non-ITO MAC	Total	ITO as MAC (%)	Non-ITO MAC (%)
Agriculture	819	160	979	22.5	8.9
Building & construction	1104	883	1987	30.3	49.2
Contracting	280	8	288	7.7	0.4
Horticulture	653	28	681	17.9	1.6
Hospitality	371	133	504	10.2	7.4
Joinery	30	246	276	0.8	13.7
Painting & decorating	8	204	212	0.2	11.4
Printing	184	16	200	5.0	0.9
Retail	99	69	168	2.7	3.8
Road transport	98	46	144	2.7	2.6
Grand Total	3646	1793	5439	100.0	100.0

Appendix Table 6 – Modern Apprenticeships cohort by previous qualifications and by coordinator provider type

Previous qualification	ITO as MAC	Non-ITO MAC	Total	ITO as MAC (%)	Non-ITO MAC (%)
not specified	1027	604	1631	28.2	33.7
No previous qualifications	604	265	869	16.6	14.8
NCEA level 1	833	429	1262	22.8	23.9
NCEA level 2	692	254	946	19.0	14.2
NCEA level 3	273	92	365	7.5	5.1
Below degree level post-school quals	205	141	346	5.6	7.9
Degree level quals	12	8	20	0.3	0.4

Appendix Table 7 – All Modern Apprenticeships starters 2002 - 2005 by previous qualifications and by coordinator provider type

Previous qualification	ITO as MAC	Non-ITO MAC	Total	ITO as MAC (%)	Non-ITO MAC (%)
not specified	2035	1137	3172	28.7	19.5
No previous qualifications	995	726	1721	14.0	12.4
NCEA level 1	1693	1650	3343	23.8	28.3
NCEA level 2	1275	1299	2574	18.0	22.2
NCEA level 3	534	571	1105	7.5	9.8
Below degree level post-school quals	539	441	980	7.6	7.6
Degree level quals	29	16	45	0.4	0.3

Appendix Table 8 – Modern Apprenticeships cohort by ethnic group and by coordinator provider type

Previous qualification	ITO as MAC	Non-ITO MAC	Total	ITO as MAC (%)	Non-ITO MAC (%)
European / Pakeha	2888	1257	4145	79.2	70.1
Māori	440	331	771	12.1	18.5
Pasifika	112	37	149	3.1	2.1
Other	57	16	73	1.6	0.9
Not stated	149	152	301	4.1	8.5
Grand Total	3646	1793	5439	100.0	100.0

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