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# Pay in Māori-led firms

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Richard Fabling & David C Maré

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## Document information

### Author contact details

Richard Fabling  
Senior Research Associate, Motu Research  
richard.fabling@xtra.co.nz

David C Maré (corresponding author)  
Senior Fellow, Motu Research  
dave.mare@motu.org.nz

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### Disclaimer

Census data were accessed via Statistics New Zealand's Integrated Data Infrastructure (IDI). These results are not official statistics. They have been created for research purposes from the IDI which is carefully managed by Stats NZ. For more information about the IDI, please visit <https://www.stats.govt.nz/integrated-data/>. The results are based in part on tax data supplied by Inland Revenue to Stats NZ under the Tax Administration Act 1994 for statistical purposes. Any discussion of data limitations or weaknesses is in the context of using the IDI for statistical purposes and is not related to the data's ability to support Inland Revenue's core operational requirements. Access to the data used in this study was provided by Stats NZ under conditions designed to give effect to the security and confidentiality provisions of the Data and Statistics Act 2022. The results presented in this study are the work of the author, not Stats NZ or individual data suppliers.

### Motu Economic and Public Policy Research

PO Box 24390      info@motu.org.nz      +64 4 9394250  
Wellington      www.motu.org.nz  
New Zealand

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## **Abstract**

This study examines whether working in a Māori-led firm contributes to the earnings of Māori employees. It uses administrative data for 2005-2020 to identify Māori-led firms, based on the ethnicity and descent of working proprietors, and using an improved method of measuring descent. Almost 8% of Māori employees work in Māori-led firms. Controlling for firm and worker characteristics, we find that Māori-led firms have slightly lower than average multi-factor productivity and wage levels. The wage effects for Māori of working in a Māori-led firm are small but there is some evidence to suggest that moving between Māori-led firms contributes to wage growth for wāhine Māori, and that in Māori-led firms there is stronger pass-through of firm performance to earnings levels for tāne Māori.

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## **Summary haiku**

Do Māori-led-firms

pay more to Māori workers?

Wage effects are small

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# 1 Introduction

Who you work for matters a lot for what you are paid. This study examines how working in a Māori-led firm affects the pay of Māori employees. Te Puni Kōkiri (2022) reports that there were around 20,500 Māori-owned businesses in 2021, and an additional 9,000 Māori sole traders. Using similar (but not identical) data and methods, we identify around 30,000 firms with a Māori working proprietor (WP). Our study focuses on the subset of those WP-led firms that have employees, and we restrict attention to for-profit firms in the private sector so that we can investigate the relationship between firm performance and wages. We apply a (permanent) definition of “Māori-led” firms based on the ethnicity and descent of working proprietors between 2005 and 2020. In doing so, we develop and apply an improved method of identifying Māori descent from administrative data, which will be of use to other researchers.<sup>1</sup>

The Māori-led firms that we identify employed over 57,000 full-time equivalent workers in 2020, with a higher-than-average share of Māori employees. These firms could thus potentially have a disproportionate impact on the earnings of Māori employees, as well as contributing to Māori economic development. A number of recent studies have examined what is distinctive about Māori-firms, in terms of what they do, how they operate, and how they perform.<sup>2</sup> Although our research approach, which relies on the use of administrative data in the Statistics New Zealand Integrated Data Infrastructure (IDI) and Longitudinal Business Database (LBD) cannot capture the richness of what is distinctive about Māori firms, it does contribute insights into a subset of relevant firm performance and wage-related aspects of Māori firm performance.

A range of Government policies and initiatives support Māori businesses. For instance, the *Pakihi Māori* – Māori Enterprise team within Te Puni Kōkiri aim to “support Māori enterprises to thrive” with a range of business support activities. Across the public sector more broadly, the New Zealand Government in 2020 approved funding of \$7.3m for a progressive procurement policy,<sup>3</sup> initially focused on Māori businesses, that aimed to increase supplier diversity as well as supporting Māori businesses with a “deliberate focus on ensuring a resilient Māori economy going forward” [Cabinet paper CBC-20-0072].

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<sup>1</sup> Access to these data is subject to Stats NZ vetting, which includes following the Ngā Tikanga Paihere framework to ensure that the use of data is respectful, ethical and culturally appropriate.

<sup>2</sup> Eg: Brougham et al (2020); Chen, (2023); Haar, (2020); Mika et al. (2019); and Mika & O’Sullivan (2014).

<sup>3</sup> Te Kupenga Hao Pāuaua: Supporting the Māori Economy through Social Procurement [Cabinet minute CAB-20-MIN-0219.18, CBC-20-MIN-0072].

Our study looks at some of the ways that support for Māori firms could improve the earnings of Māori employees. We consider the overall levels of pay in Māori-led firms, with a particular focus on the consequences for Māori employees, to gauge the extent to which working in a Māori-led business can improve the earnings of Māori workers, avoid the harm from racism and discrimination, and ameliorate long-standing and persistent pay disparities between Māori and non-Māori workers (Cochrane & Pacheco, 2022; Genç, 2017; Genç & Smith, 2008). We also look at the extent to which the productivity performance of Māori-led firms is “passed through” to employees in the form of higher wages. We document some key differences between Māori-led firms and other firms, and control for these when identifying the difference that it makes to work in a Māori-led firm.

Section 2 discusses conceptual and practical approaches to defining “Māori firms”. In section 2.1, we describe the data that we use for this study, and the pragmatic choices we make to identify a set of firms that we refer to as “Māori-led”. We maintain more than one definition of Māori employees, and of Māori-led firms, to reveal how our findings are sensitive to different definitional choices. The definitions are summarised in section 3. Section 4 turns our attention to the sorts of firms in which Māori employees are disproportionately employed (sections 4.1 and 4.2), and whether Māori employees are paid more in Māori-led firms, or in high-paying, high-performing firms (sections 4.3 to 4.5). Section 5 concludes with a discussion of the relevance and interpretation of our findings for the question of whether employment in Māori-led firms raises earnings for Māori employees.

## 2 What is a Māori firm?

Mika et al (2019) summarise the evolution of approaches to defining Māori businesses and the Māori economy, in the context of characterising indigenous enterprises. He cites French (1998), who favoured a definition based on ownership by Māori, combined with other factors to capture further dimensions of “*Māoriness*”. Subsequent studies have elaborated on the range of factors associated with “*Māoriness*”, generally informed by the way that these factors are understood and articulated by Māori entrepreneurs.<sup>4</sup> Mika (2015) reports that having Māori values is seen as a dominant defining feature of a Māori business, in addition to ownership. As a basis for classifying firms as Māori firms, establishing a link to Māori values is not straightforward, even if that criterion is the most salient and meaningful for the firms themselves. Harmsworth (2005, table 4) identifies over 100 “Māori terms, expressions and concepts derived from traditional

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<sup>4</sup> See also Mika (2015), Mill & Millin (2021).

Māori values and commonly used by contemporary Māori organisations”. Durie (2003) delineates six “guiding principles” of Māori-centred firms, which he reports as having “a measure of agreement among such firms”. These are: the *tūhono* principle of alignment; the *pūrotu* principle of transparency; the *whakaritenga* principle of balanced motives; the *paiheretia* principle of integrated goals; the *puāwaitanga* principle of best outcomes; and the *kotahitanga* principle of alliance. Self-identification would appear to be the most tractable way to identify whether firms operate with Māori values.

A definition of Māori firms could also be based on what firms do (or how they do what they do), as in Durie’s (2003) characterisation of a Māori-centred business as one that “deliberately revolves around Māori people, Māori assets, and Māori priorities”. He presents a list of actions taken by such businesses, some of which overlap with the criterion of operating with Māori values. In his characterisation, a Māori-centred business:

- Makes a substantial focused contribution to Māori development;
- Is part of a Māori network whether it be with hapū or rōpū or Māori sectoral groups;
- Adopts Māori values in both governance and management;
- Is geared to Māori realities and recognises Māori diversity;
- Creates choice for Māori consumers; and
- Implicitly adopts principles and goals that give shape to a Māori business ethic.

As with definitional criteria based on Māori values, self-identification is likely to be the most reliable and genuine way to determine whether a firm undertakes these actions.

Mika et al (2019) settle on a definition of a Māori business that combines elements of ownership, values, actions, and self-identification. They define a Māori business as one that:

- Self-identifies as a Māori business;
- Has 50 percent or more Māori ownership;
- Applies Māori values implicitly or explicitly; and
- Contributes to collective Māori wellbeing.

The limited business information that is generally available in administrative and survey data is not sufficiently detailed to enable the use of any of the above definitions. Statistics New Zealand has established a Statistical Standard for Māori Business (Statistics New Zealand, 2022a), which incorporates self-identification and ownership. Under this standard, a business is identified as a Māori business if a representative from the business reports that: a) the business identifies as a Māori business; and b) the business is partly or fully owned by a person or persons who have Māori descent. Where Māori ownership is reported, the standard requires that a question on

the proportion of ownership is also asked.<sup>5</sup> This standard has been implemented in the Business Operations Survey (BOS), but only since 2022, when the ownership questions replaced a question about the reasons for considering a business to be a Māori business.<sup>6</sup> The BOS surveys only a sample of firms and only those with 6 or more employees. The survey provides estimates of the number of Māori firms for this subpopulation. In 2023 there were an estimated 2,244 self-identified Māori firms, and 5,412 firms with some owners with Māori descent. The relatively low number of surveyed firms, however, limits the use of BOS data for detailed microdata analysis of Māori firms. Chen (2023) uses BOS data to examine the performance of Māori firms, identifying 879 distinct (self-identified) Māori firms from six years of BOS data. He notes that “The low number of Māori firms in the productivity tables <when linked with BOS> make longitudinal analysis based on the productivity dataset infeasible.”

Statistics New Zealand reports on Māori firms in its *Tatauranga Umanga Māori – Statistics on Māori businesses* (TUM) reports (Statistics New Zealand, 2022b). For this publication Māori firms are identified from a number of sources:<sup>7</sup>

- Self identification: from BOS (since 2015), the Business Register Update Survey (since 2022), Agricultural Census (since 2022), NZ Business Number register (since 2021)<sup>8</sup>
- Māori Authorities and trusts: mainly from tax codes<sup>9</sup>
- Lists of Māori businesses provided by Poutama Trust/ NZ Māori tourism (2015), Te Puni Kokiri (2023)
- Publicly available information on post-treaty settlement entities.

A final approach to identifying Māori businesses, which we follow in the current study, is to use broad coverage microdata (on firms and on their employees, working proprietors, or owners) contained in the Statistics New Zealand Longitudinal Business Database (LBD) and Integrated Data Infrastructure (IDI). Fabling (2018) uses these data to identify Māori working proprietors, linked to firms, as part of his study of owner-operated firms. Working Proprietors

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<sup>5</sup> An alternative but related definition of a Māori businesses has been established for the purposes of progressive procurement. By that definition Māori businesses include (a) Māori authorities, as classified for tax purposes by the Inland Revenue Department; or (b) firms with at least 50% Māori ownership.

<sup>6</sup> For the 2023 BOS survey, the question was again changed, replacing the words “identify as” with “consider itself to be”, and requiring all businesses to respond to the question about Māori ownership.

<sup>7</sup> See <https://datainfoplus.stats.govt.nz/item/nz.govt.stats/d4cc0535-d6f4-4b45-a727-e4c56e993ba9/1>

<sup>8</sup> StatsNZ note that the Statistical Business Register introduced classification for Māori businesses in 2010, but caution that “Due to small numbers, any detailed analysis of Māori enterprise and EC data <in Business Demography statistics> should be done with caution” <https://datainfoplus.stats.govt.nz/item/nz.govt.stats/18188cee-fadc-4b58-8e22-b580cb72240d/7>. Their TUM report (Table 4) notes that the increased identification of Māori firms in the Agricultural census was not matched by comparable increases in identified Māori business in other industries”.

<sup>9</sup> The TUM report states that Māori authorities are businesses involved in the collective management of assets held by Māori. To be included in the count, they must be economically significant enterprises that have been identified as Māori by the Business Register. TUM was first published in 2014, covering only Māori authorities, again in 2016, and annually since 2019.



are identified using the approach documented in Fabling & Maré (2015b), and are classified as Māori based on ethnicity and descent as recorded in the IDI. A similar approach is taken by Te Puni Kōkiri in their *Te Matapaeroa* report series (Te Puni Kōkiri, 2020, 2021, 2022).

## 2.1 Identifying Māori employees, Māori WPs and “Māori-led firms”

Our study is primarily focused on the relationship between the earnings of Māori employees and the performance of Māori-led firms. We therefore restrict attention to firms with employees, and firms for which productivity data are well captured – private-for-profit firms. We define Māori-led firms as private-for-profit businesses that are owned and run by at least one Māori working proprietor (WP). These WPs are identified using ethnicity and descent data in Stats NZ’s Integrated Data Infrastructure (IDI), combined with various tax data sources that identify working proprietors and their firms (Fabling & Maré, 2015b).<sup>10</sup>

This approach is similar to the method applied by Te Puni Kōkiri (2022) (TPK), which we then modify in two ways. We apply additional population and time constraints that relate to our focus on employee outcomes, particularly on the relationship between productivity and wages. We also implement a permanent classification of firms to be Māori/non-Māori – rather than the year-by-year classification used by TPK – which simplifies our longitudinal analyses, reduces the impact of transitory measurement error, and is consistent with our model of owner characteristics having a persistent effect on how businesses operate. In a parallel fashion, we also identify European-,<sup>11</sup> Pasifika-, Asian- and MELAA- led firms, with the only difference in method being the lack of descent data for these (level one) ethnicity groups.

In terms of population constraints, we restrict industry coverage to the market sector (defined by Stats NZ) where revenue-based gross output can be constructed. We also limit the analysis to the 2005-2020 March financial years. The upper limit is constrained by the most recent year of productivity data, while the lower limit is chosen to exclude years where coverage of employee ethnicity is significantly lower, and productivity data may be of lower quality.

Our definition of Māori-led firms relies on identifying Māori working proprietors, using data on ethnicity and descent. Appendix 1 documents our measurement approach, which extends existing descent data available in the IDI, and which will be of use to other researchers and analysts working on related topics (subject to Stats NZ approval). Our approach also allows us to separately identify three distinct subsets of Māori employees, reflecting different patterns

<sup>10</sup> We use the 202310 IDI instance, except for the latest productivity data which relies on 202110.

<sup>11</sup> We group “other” ethnicities with European, reflecting the fact that this group is relatively small and Census identifies that this category is primarily “New Zealanders”.

of observed ethnicity and descent. Appendix 1 also documents the rationale for various choices we make when classifying each firm as either Māori-led or not Māori-led.

Because our definitions and methods differ somewhat from previously applied approaches, Table 1 reconciles our counts of Māori-led firms with those used by Te Puni Kōkiri (2022). The table summarises key differences and shows how they combine to change the overall firm population and coverage of employees (FTE) in Māori-led firms. The top row of the table shows our approximation of the TPK-defined population – we create our own approximation here so we can identify associated annual average employment, and to be able to perform our decomposition. Figure 1 compares the TPK-estimated proportion of firms to our approximation over time, confirming that we accurately capture the same time variation, but slightly overestimate the number of Māori-led firms.

**Table 1: Reconciling the Te Puni Kōkiri (2022) and our Māori-led firm populations**

	Mean		Coverage	
	N(firms)	FTE	N(firms)	FTE
<b>Approximate TPK population</b>	<b>29,834</b>	<b>47,056</b>	<b>1.000</b>	<b>1.000</b>
Use time-invariant (50%+ years) rule	30,003	43,794	1.006	0.931
Add DIA and HLFS descent data	33,016	47,850	1.107	1.017
Drop non-productivity industries	29,780	45,019	0.998	0.957
Add employee-only years	30,645	47,869	1.027	1.017
<b>Drop firms that never have both WP and employees (our population)</b>	<b>15,851</b>	<b>47,844</b>	<b>0.531</b>	<b>1.017</b>

*Note: Reported numbers are averages for 2005-2020. Counts are randomly rounded to base 3*

The remaining rows of Table 1 sequentially accumulate our rule changes, starting with our decision to define Māori-led firms as a permanent characteristic. This raises the average number of Māori-led firms in a year (by 0.6%), consistent with the findings in Appendix Table 4, but also decreases the average total employment in these firms (by 7%). The latter result is driven by the fact that firms that have no WPs (of any ethnicity) in some years tend to have more employees, on average.

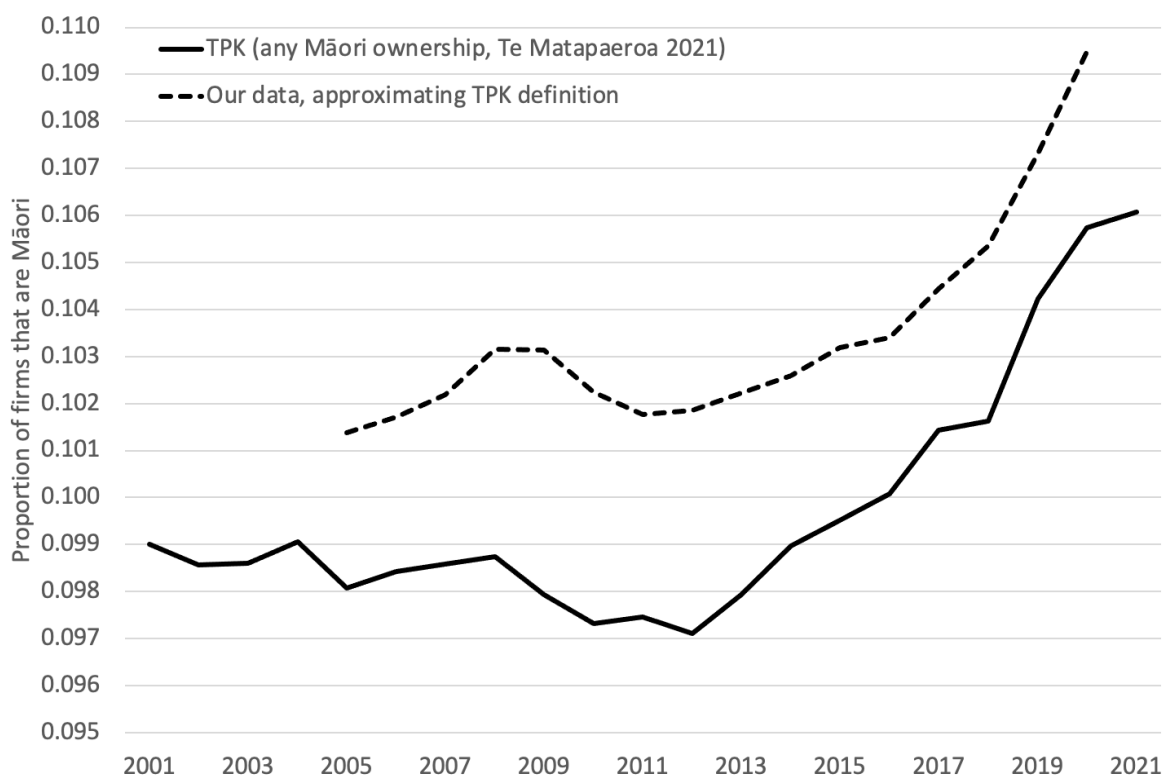
The next row expands our identification of Māori WPs using DIA and HLFS data, which increases the average firm count by around 10 percentage points (pp), with a somewhat smaller increase in the average FTE in Māori-led firms. Dropping productivity industries has a smaller impact than we might expect, since both populations are restricted to the private-for-profit sector (ie, exclude government), but this still reduces the population by around 10pp and employment by 6pp.

Because the TPK population relies on contemporaneous WPs, we also gain observations and employees when we include employee-only years for Māori-led firms. Here the impact on

employment coverage is stronger than that on the firm count, because of the negative relationship between intermittent WP participation and FTE.

The final step has the greatest impact on the population of firms, which is to exclude Māori-led firms that never have employees, which removes almost half of the population. The remaining firms are those where we can study the interplay between business owners and their employees. A key point to note, therefore, is that our coverage of employees is almost unaffected by this restriction,<sup>12</sup> with the final employee population being 1.7% higher than with the TPK population.

**Figure 1: TPK proportion of Māori firms vs our approach based on Māori-led firms**



Note: “Our data” relate to the top row of Table 1, as a proportion of the Te Matapaeroa (Te Puni Kōkiri, 2022) population of all firms that have WPs (including sole traders).

### 3 Data Summary

This section provides an overview of the data we subsequently use in our analysis. In section 3.1, we summarise the definitions of Māori-led firms and of Māori employees, which are used throughout the subsequent analysis. Section 3.2 provides an overview of the number of Māori-

<sup>12</sup> There is a slight decline because we require there to be at least one year where both WP and employees are present in the firm (ie, some temporal overlap).

led firms, the proportion of firms that we classify as Māori-led, and their share of FTE employment.

### 3.1 Māori employees and Māori-led firms: Summary of classifications

This section summarises the data-based classifications of Māori-led firms and of Māori employees that we will use throughout our analysis. The distinctions are made because there are alternative plausible ways of identifying Māori in the data.

**Table 2: Classification of Māori employees**

	Short name	Māori descent	Ethnicity
Māori (strict)	Māori (strict)	Yes	Māori only
Māori (multi-ethnicity)	Māori (MultE)	Yes	Multiple, including Māori
Māori (ethnicity or descent)	Māori (E/D)	Yes	Not Māori
		No	Māori

Employees are classified as Māori if they satisfy any of the three definitions in Table 2, although most of the findings that are reported below separately identify the three distinct groups.

**Table 3: Classification of Māori-led firms**

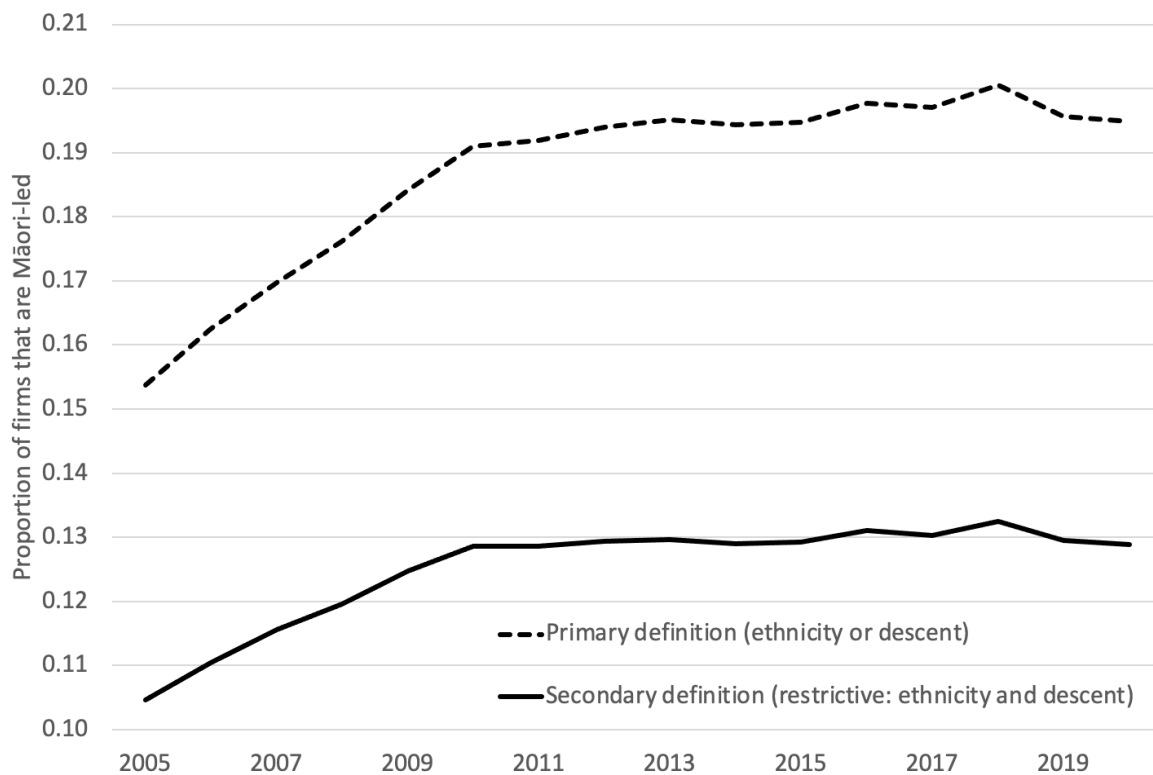
	Annual classification of firm	Permanent classification of firm
Māori-led (primary definition)	Any WP is Māori (any of the three Table 2 groups)	Annual classification is true in at least 50% of years where the firm has employees
Māori-led (secondary – restrictive definition)	Any WP is Māori (strict) or Māori (MultE)	
Wāhine-Māori-led	Any WP is female and Māori (any Table 2 group)	
Tāne-Māori-led	Any WP is male and Māori (any Table 2 group)	

### 3.2 The number and prevalence of Māori-led firms

In our analysis dataset, the average number of employing Māori-led firms over the 2005-2020 period is 15,672. Appendix Table 7 documents the annual number of Māori-led firms, as well as the annual number of firms, of firms with working proprietors, and the annual number of employing WP firms. Māori-led firms account for between 15% and 20% of employing WP-led firms. The variation over time is shown in Figure 2, with the increase over time reflecting a decline in the number of employing WP firms, as well as a modest increase in the number of

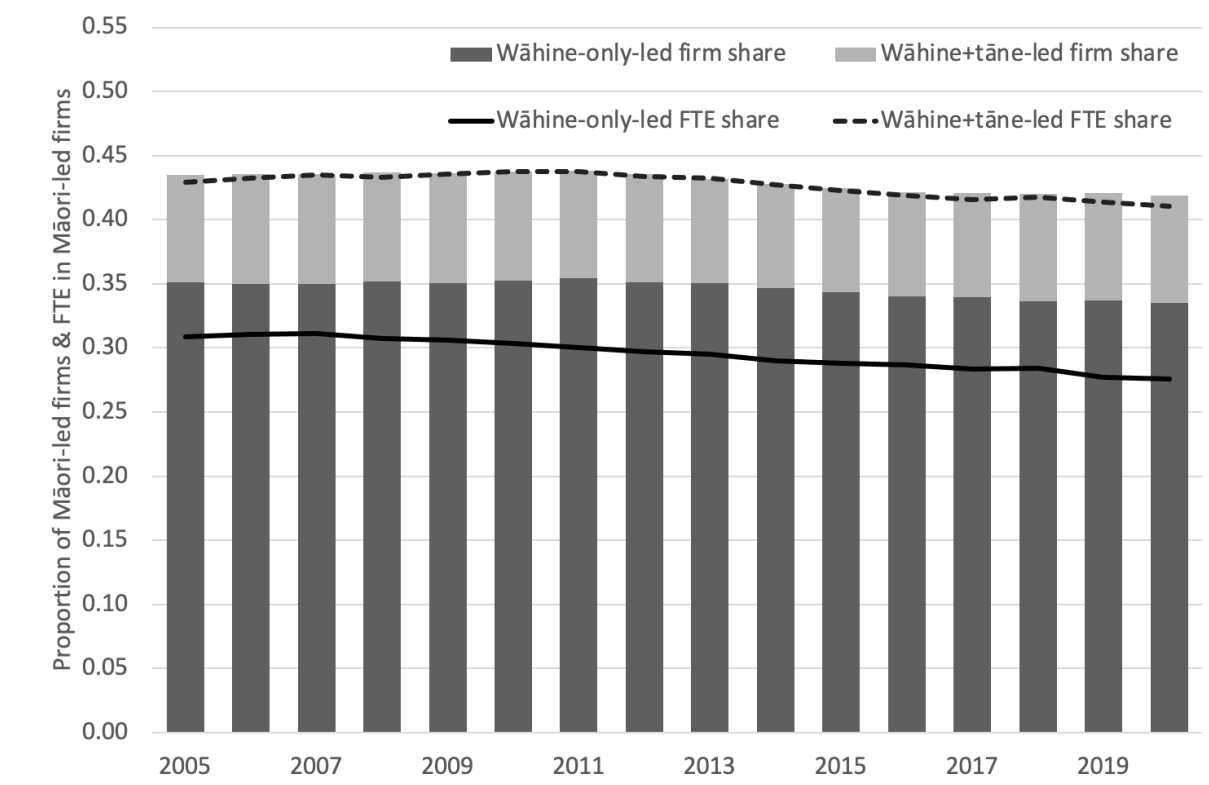
Māori-led firms. Figure 2 also shows the number of Māori-led firms captured by the more restrictive secondary definition shown in Table 3, which requires Māori WPs to have both Māori descent and to identify ethnically as Māori. The proportion is lower – between 10% and 13%, but generally follows the same upward pattern as is evident when using the primary definition.

**Figure 2: Proportion of employing WP firms that are Māori-led firms**



*The denominator in this graph is the number of firms with WP and FTE employment - see column (3) of Appendix Table 7.*

Appendix Table 7 also shows the number of wāhine-only Māori-led firms, defined as Māori-led firms with no tāne Māori working proprietors, the number of tāne-only Māori-led firms, and the number of Māori-led firms with both wāhine and tāne Māori WPs. Tāne-only Māori-led firms account for 56% to 58% of Māori-led firms. The remainder are either wāhine-only Māori-led (33% to 35%), or both (8%). These patterns are summarised in Figure 3, together with the proportion of FTE employment in Māori-led firms that is accounted for by the three sex-based groupings of firm. Wāhine-only Māori-led firms are on average slightly smaller than the average Māori-led firm, so they account for a slightly smaller proportion of employment (29% on average) than they do of the number of firms.

**Figure 3: Māori-led firms: share of Wāhine Māori-led in number of firms and employment**

## 4 Findings

Our main focus is on the interaction between Māori employees and Māori firms – particularly whether Māori employees earn more in productive Māori firms. Which firm someone works in is as important a factor in determining earnings as are observable employee characteristics such as qualification, age, or ethnicity. Our starting point is therefore to examine the sort of firms in which Māori employees are disproportionately employed. Initially, we look at whether Māori are disproportionately employed in Māori firms, and whether the pattern remains disproportionate when we adjust for the characteristics of the firm (industry, location, firm size) or of the employees (age, sex, qualifications). We then (section 4.3) look more generally at whether the firms in which Māori employees work are firms that might be expected to pay well, based on the long-run average pay premium paid by the firm (firm fixed effect), and the firm’s productivity (multi-factor productivity, mfp). In sections 4.4 and 4.5, we turn to what Māori employees are actually paid, and how this is related to the firms in which they work – with a particular focus on whether they work in Māori-led firms, and in well-performing Māori-led firms. We also report

whether Māori employees who move between jobs get relatively large earnings increases when they move to or from a Māori-led firm. Finally, we examine the “pass-through” of productivity change to wages – whether the wages of Māori employees are higher when the firms in which they work are more productive.

#### 4.1 What sort of firms do Māori employees work in?

In this section, we document the distinctive distribution of Māori employees across different sorts of firms. We characterise firms according to whether they are Māori-led, as well as according to their (multifactor and labour) productivity, capital intensity, and wage level.

Table 4 summarises some of the key differences between the firms that Māori and non-Māori employees work in (final two columns of the table). Almost 8% of Māori employees work in Māori-led firms, compared with 3.8% of non-Māori workers. The majority of workers work in firms that do not have working proprietors (65% of Māori and 66% for non-Māori). On average, Māori employees work in firms that are slightly larger and less capital intensive than non-Māori employees, and which have lower productivity. Multifactor productivity in firms employing Māori is 2.8% lower than the non-Māori mean mfp but the normalised wage premium paid by those firms is only 0.9% below. Wages paid to Māori employees is, however, 11% lower than the non-Māori average. Some of this wage discrepancy is due to the location and industry of firms employing Māori. Jobs in which Māori are employed are disproportionately located outside Auckland (26% compared with 38%), and more likely to be outside the main metropolitan areas (49% compared with 35% overall). They are also more likely to be in primary, manufacturing and construction industries (43% compared with 33%).

The lower pay in jobs held by Māori may also reflect the younger age structure of Māori employees (average age of 35.3 compared with 38.2 for non-Māori, for workers aged 18-64) and lower qualifications mix (not reported in Table 4). Around 56% of Māori employees have qualifications no higher than school level, compared with 42% for non-Māori. Similarly, 12% of Māori employees have graduate or higher qualifications, compared with 28% for non-Māori.

Table 4 also shows differences in job characteristics across the three employee classifications for Māori workers (first three columns), generally indicating Māori (strict) employees are the least similar to non-Māori employees, and Māori (E/D) are the most similar. For employer mfp, Māori (E/D) employees are, on average, in 1% more productive firms than non-Māori, while Māori (strict) are in 6% lower productivity firms. In the context of our study relating firm characteristics to wages, these statistics suggest that we should maintain these distinct groupings of Māori employees.

**Table 4: Characteristics of jobs in firms where Māori employees work**

	Strict	Māori MultE	E/D	Māori	All Non-Māori
<b>Proportion in firm type</b>					
Māori-led	0.087	0.077	0.069	0.079	0.038
Māori-led (secondary)	0.070	0.057	0.041	0.058	0.025
Wāhine Māori-led	0.042	0.035	0.030	0.037	0.016
Tāne Māori-led	0.063	0.053	0.045	0.055	0.027
Non-Māori-WP-led	0.239	0.276	0.310	0.270	0.298
Employee-only	0.674	0.647	0.622	0.651	0.664
<b>Mean firm performance</b>					
Multifactor productivity	-0.057	-0.015	0.015	-0.023	0.005
Labour productivity	11.01	11.10	11.15	11.08	11.14
Capital-labour ratio	9.33	9.45	9.51	9.42	9.50
Log of firm employment	4.46	4.16	3.99	4.23	4.13
Firm employment*	86.6	64.3	53.9	68.7	62.3
Firm wage premium	-0.003	-0.010	-0.010	-0.007	0.002
<b>Mean worker wage</b>					
Log of monthly wage	8.25	8.28	8.32	8.28	8.39
Monthly wage*	\$3,813	\$3,962	\$4,104	\$3,939	\$4,413
<b>Proportion in location</b>					
Auckland	0.224	0.272	0.283	0.257	0.379
Other metropolitan	0.215	0.269	0.277	0.252	0.300
Regional centres	0.384	0.325	0.315	0.343	0.234
Outside FUA	0.178	0.135	0.125	0.148	0.088
<b>Proportion in broad industry</b>					
Primary	0.122	0.078	0.081	0.094	0.062
Manufacturing & construction	0.378	0.313	0.303	0.333	0.266
Other services	0.500	0.609	0.616	0.573	0.672

Notes: Weighted by job-years, based on main job. For 2005-22. \* indicates geometric mean.

## 4.2 Do Māori employees work in Māori-led firms?

One consequence of the over-representation of Māori employees in Māori-led firms (Table 4) is that almost a third of jobs in Māori-led firms are held by Māori, compared with only 19% of all jobs being held by Māori. As reported in Table 5, the proportion of jobs held by Māori is even higher in Māori-led firms with wāhine Māori working proprietors (34.5%) and in firms identified as Māori-led using our secondary, restrictive, definition that requires a working proprietor with both Māori ethnicity and Māori descent (34.9%). The over-representation of Māori is particularly strong for Māori (strict) employees in firms identified as Māori-led using the secondary definition. 14.6% of jobs in such firms are held by Māori (strict), though Māori (strict) employees account for only 6.5% of all jobs.



**Table 5: Proportion of jobs held by Māori, by firm type**

Firm type	Proportion of jobs held by Māori in firm type				Proportion of jobs across all firms	
	Strict	MultE	E/D	All	Māori	Non-Māori
Māori-led	0.124	0.139	0.059	0.322	0.079	0.038
Māori-led (secondary)	0.146	0.151	0.051	0.349	0.058	0.025
Wāhine Māori-led	0.139	0.146	0.060	0.345	0.037	0.016
Tāne Māori-led	0.128	0.137	0.057	0.322	0.055	0.027
Non-Māori-WP-led	0.053	0.078	0.042	0.174	0.270	0.298
Employee-only	0.067	0.081	0.038	0.185	0.651	0.664
All firms	0.065	0.083	0.040	0.188	1.000	1.000
Share of Māori employees	0.347	0.442	0.212	1.000	1.000	0.000

In turn, the overrepresentation of Māori employees in Māori-led firms is related to the mean differences in employer performance reported in Table 4. This can be seen in Table 6, which shows the distribution of firm-level productivity across different firm types (left panel), and the distribution of Māori employment across low and high productivity firms within firm type (right panel).<sup>13</sup> Mean mfp of Māori-led firms is identical to that of non-Māori-WP-led firms (0.156) and above the average for all firms (0.136). It is likely that some of the difference between WP-led and employee-only firms is due to difficulties in measuring labour input in firms with working proprietors (see Fabling & Maré (2015a); Fabling & Sanderson (2014)). The interquartile range for Māori-led firms is 2pp smaller than for non-Māori-led firms, and substantially smaller than it is for employee-only firms, whose mfp dispersion is wider both above and below the median.

The right-hand panel of Table 6 focuses on sorting of Māori employees into high vs low productivity firms within a firm type. The mfp groups are determined so that 25% of FTE is employed in each of “low” and “high” mfp firms, with the remaining 50% of FTE in “middle” productivity firms. For a given firm type, deviations from this benchmark result from that firm type being relatively low or high mfp (on average, as shown in the left panel), and of workers sorting into low or high mfp firms. The main takeaway from the disaggregation by MFP is that Māori employment is skewed towards higher productivity firms with WPs, and toward lower productivity firms that are employee-only. Sorting of Māori employment into low productivity employee-only firms helps explain the lower average mfp of firms employing Māori workers, relative to non-Māori workers (seen in Table 4).

<sup>13</sup> Appendix Table 8, Appendix Table 9 and Appendix Table 10 provide further information on the characteristics of different firm types, including separate measures for wāhine Māori-led and tāne Māori-led firms. Appendix Table 8 shows employment by year. Appendix Table 9 shows unweighted mean labour productivity, capital labour ratio, firm size, and firm wage premium. Appendix Table 10 shows FTE shares by industry and shares of employees.

**Table 6: Firm-level distribution of productivity and Māori employment**

	multifactor productivity				mfp groups: share of Māori FTE		
	Mean	25th	50th	75th	Low	Middle	High
Māori-led	0.156	-0.023	0.149	0.343	0.131	0.571	0.298
Māori-led (secondary)	0.151	-0.028	0.145	0.342	0.129	0.554	0.317
Wāhine Māori-led	0.129	-0.046	0.128	0.322	0.144	0.562	0.294
Tāne Māori-led	0.173	-0.008	0.161	0.356	0.127	0.569	0.304
Non-Māori-WP-led	0.156	-0.040	0.139	0.346	0.148	0.597	0.255
Employee-only	0.106	-0.080	0.139	0.403	0.324	0.491	0.185
All firms	0.136	-0.053	0.140	0.366	0.265	0.524	0.211

Notes: Left panel summary statistics are calculated at the firm-year level, which results in a non-zero mean for mfp (mean zero at the job-year level). Right panel groups are based on FTE-weighted quartiles of the mfp distribution within each year ("Low"/"High"=1<sup>st</sup>/4<sup>th</sup> quartile).

The numbers in Table 5 are raw proportions. The probability of working in a Māori-led firm may, however, reflect the prevalence of Māori-led firms within locations and industries in which Māori work, or may reflect that the age and qualification mix of jobs in those firms better matches the characteristics of Māori workers. Table 7 reports estimates of the likelihood that Māori employees work in Māori-led firms, with different columns showing estimates that control for different sets of observable characteristics. The estimates in Table 7 are selected coefficients ( $\gamma_{eth}$ ) from a linear probability regression of the following form:

$$P(\text{Māori} - \text{led firm}_{it}) = \alpha + \sum_{eth} \gamma_{eth} + \tilde{X}_{it}\beta + e_{it} \quad (1)$$

where each observation is for an employee's ( $i$ ) main job in a year ( $t$ ) from 2005 to 2020. The coefficients  $\gamma_{eth}$  capture the relative probability of working in a Māori-led firm, for employees of different ethnicities, including the three distinct groups of Māori employees – Māori (strict); Māori (MultE); Māori (E/D) – described in section 3.<sup>14</sup> Each column includes a different set of  $\tilde{X}_{it}$  variables: (1) year indicators only (also included in all subsequent sets); (2) indicators for each of 39 distinct industry groups; (3) 20 location indicators based on functional urban areas;<sup>15</sup> (4) firm size (the log of total employment); (5) indicators for five levels of highest qualification;<sup>16</sup> (6) sex-specific indicators for each of 25 2-year age groups from 18-19 to 62-63 and for 64 year olds; and

<sup>14</sup> Non-Māori employees are classified as one of 5 distinct ethnic groups: four single-ethnicity groups (European/other, Pacific, Asian, MELAA) and one group for all non-Māori employees identifying with more than one ethnicity. The European/other group is chosen as the base (omitted) category for statistical, and not normative, reasons. Coefficients for non-Māori groups are not reported.

<sup>15</sup> FUA indicators include one for each of 17 metropolitan areas and large regional centres, one for medium regional centres (pooled), one for small regional centres (pooled), and one for all non-FUA areas (pooled) [classification FUA2023\_V1\_00].

<sup>16</sup> Qualifications are classified as none; school level; post-school; degree; and post-graduate.

(7) all covariates in (1) to (6) combined.<sup>17</sup> We refer to the final combined set of covariates as our “main controls”.

The first row of Table 4 reports that 6.9-8.7% of Māori employees work in Māori-led firms. This is, on average, 4.1 percentage points higher than for non-Māori. The coefficients in Table 7 report the difference in likelihood compared with that of the largest ethnic group (single-ethnicity European or “Other”), which is close to the overall average likelihood. We will refer to this largest group as “European” when presenting findings. All three subgroups of Māori that we consider are more likely to work in Māori-led firms than are European employees, with an average of around 3.3% (0.033) more likely.<sup>18</sup>

**Table 7: Relative likelihood of Māori employees working in a Māori-led firm**

	None (1)	Industry (2)	Location (3)	Firm size (4)	High qual (5)	AgeXsex (6)	All (7)
Māori (strict)	0.0445** [0.0005]	0.0433** [0.0005]	0.0374** [0.0005]	0.0490** [0.0005]	0.0441** [0.0005]	0.0438** [0.0005]	0.0402** [0.0005]
Māori (MultE)	0.0339** [0.0005]	0.0337** [0.0005]	0.0310** [0.0005]	0.0351** [0.0005]	0.0339** [0.0005]	0.0310** [0.0005]	0.0299** [0.0005]
Māori (E/D)	0.0256** [0.0006]	0.0246** [0.0006]	0.0238** [0.0006]	0.0249** [0.0006]	0.0255** [0.0006]	0.0226** [0.0006]	0.0208** [0.0006]
Adj. R <sup>2</sup>	0.007	0.034	0.010	0.023	0.007	0.008	0.043
Year controls	Y	Y	Y	Y	Y	Y	Y

*Note: Number of primary job-year observations is 21,021,549. Likelihood is measured relative to the largest ethnic group (European), which is close to the overall likelihood. Column header notes inclusion of one or more control variables. Standard errors are clustered by job (employer-employee pair). Significance: \*\* 1% \* 5%.*

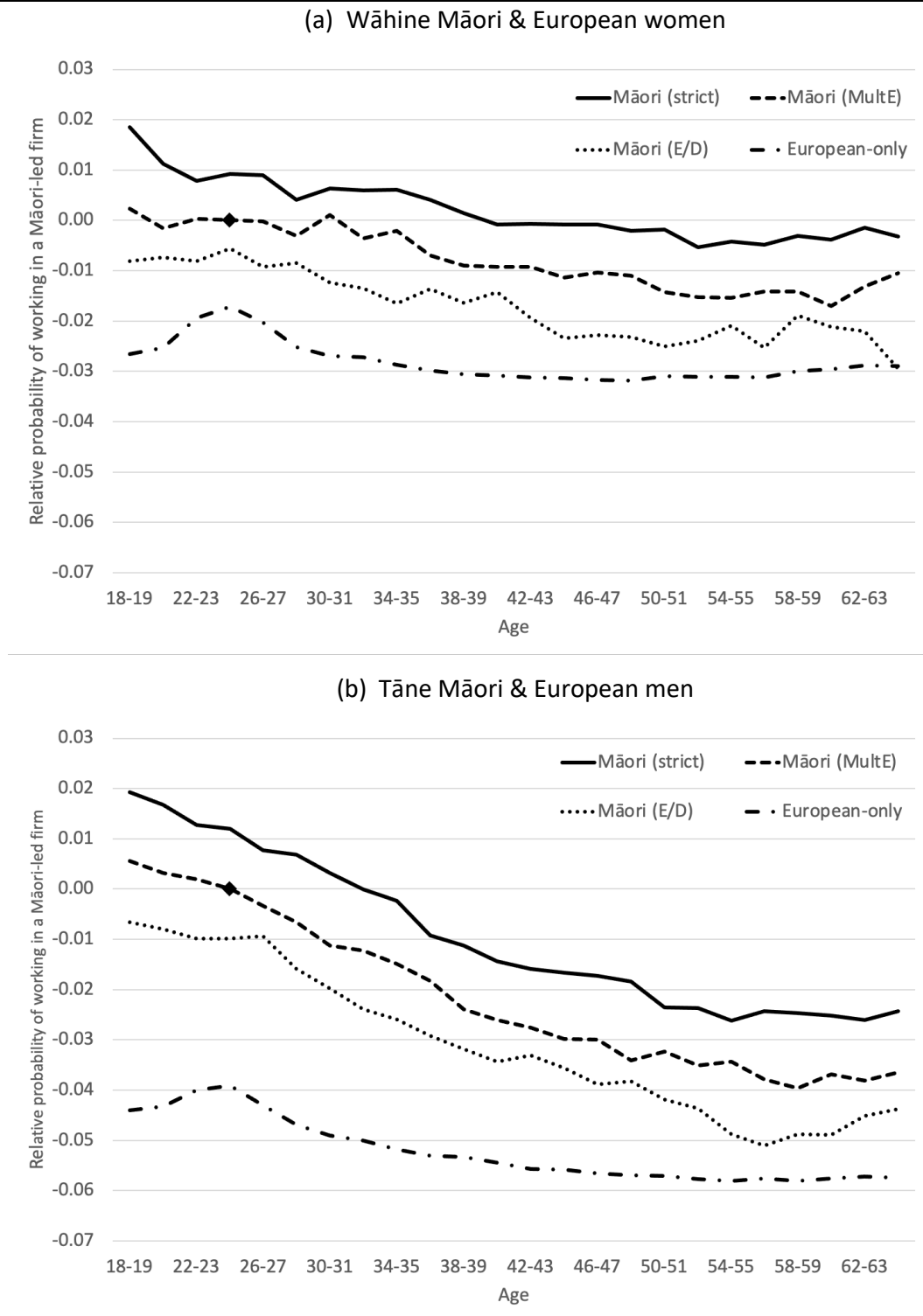
The first column of Table 7 controls only for year-to-year variation and, consistent with Table 4, shows that the proportion of Māori (strict) working in Māori-led firms is higher than the proportion of Māori (MultE), which in turn is higher than the proportion of Māori (E/D). Comparing the coefficients from the first column with coefficients from columns 2 to 6 shows that geographic location differences have the strongest influence on the relative likelihood of working in a Māori-led firm. Māori employees are more likely to live in areas where the proportion of overall employment that is in Māori-led firms is high. However, even controlling for these differences, Māori (strict) have a 3.7pp higher (than European employees) likelihood of working in a Māori-led firm (column 3). Only when controlling for firm-size differences does the estimated relative likelihood increase (for Māori (strict) and Māori (MultE)). Māori are over-

<sup>17</sup> All regressions include year indicators. The omitted categories in regression estimation are: year=2015; European; professional services industries; Auckland FUA; post-graduate qualifications; 18-19 year old males.

<sup>18</sup> The 3.3% is calculated as an FTE-weighted average of the estimated coefficients in column (1).

represented in larger firms, though Māori firms are on average relatively small. The relative proportion of Māori employees in Māori-led firms is shown to be particularly high once we control for the fact that they are disproportionately in large (and less likely to be Māori-owned) firms. As shown in column 7, even controlling for all of the factors in columns 1 to 6, Māori still have a higher likelihood of working in Māori-led firms, 2-4pp higher than European employees.

**Figure 4: Relative probability of working in a Māori-led firm (by age and sex)**



Note: relative to 24-25 year old Māori (MultE)

In Figure 4, we examine the age-profile of the probability of being employed in a Māori-led firm, using estimates from a regression that includes interactions between age and ethnicity, while including all other main controls (see equation (2)). The age profiles are normalised so that all are measured relative to the probability that a 24-25 year old Māori (MultiE) employee works in a Māori-led firm (indicated by a solid diamond in the figures).

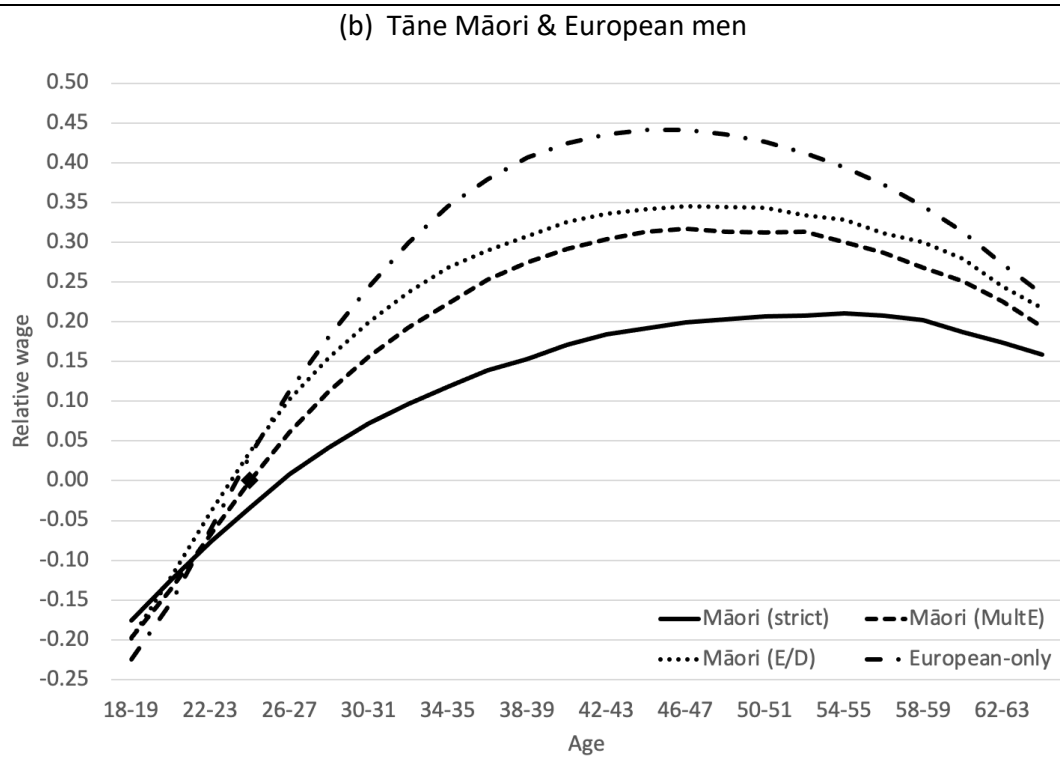
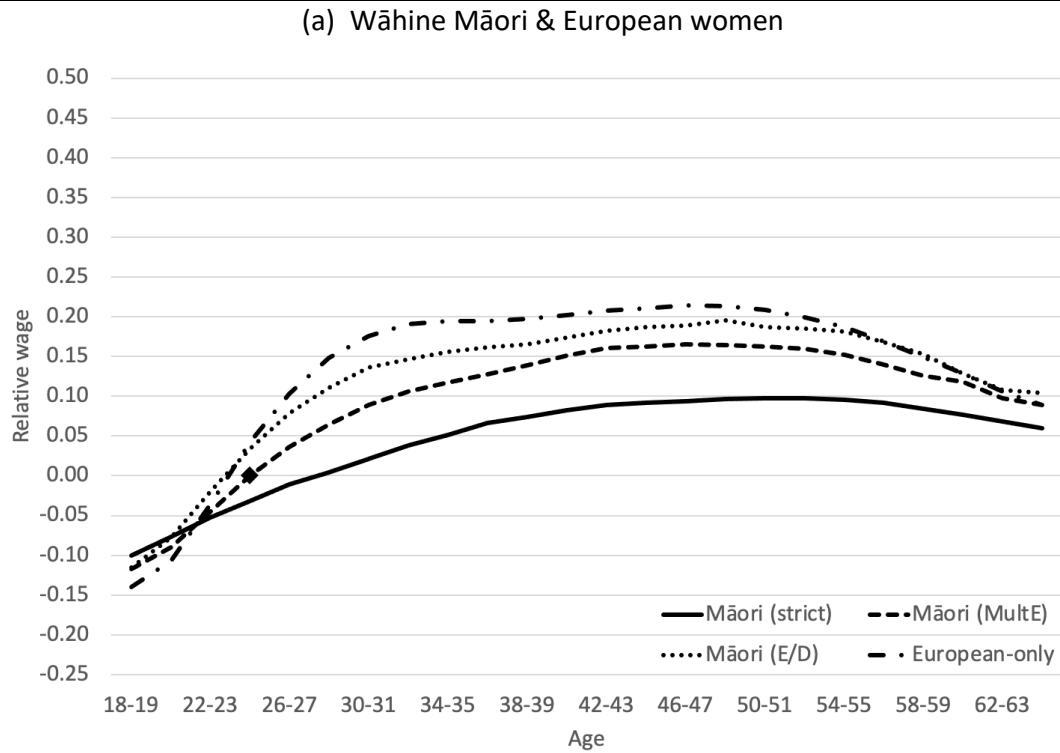
$$P(\text{Māori-led firm}_{it}) = \alpha + \sum_{age} \sum_{eth} \gamma_{eth,age} + X_{it}\beta + e_{it} \quad (2)$$

Figure 4 shows that there is a clear age profile in the probability of working in a Māori-led firm, especially for tāne Māori. Young Māori workers are more likely to work in Māori-led firms than are older Māori workers. Given that young workers generally earn less than prime-aged workers, this pattern probably lowers the average earnings paid in Māori-led firms. As in the raw statistics presented in Table 4, there is also variation across subgroups of Māori employees in the probability of working in a Māori-led firm. Māori (strict) employees are more likely to work in a Māori-led firm, whereas Māori (E/D) employees have a relatively low probability of working in a Māori-led firm. The figure also shows the relatively low likelihood of the largest ethnic group (European) working in a Māori-led firm.

#### 4.3 Do Māori employees work in high-paying and high-performing firms?

Figure 5 shows the relative monthly earnings, by age, of the three subgroups of Māori employees. The estimates are based on a regression analogous to equation (2), but with the dependent variable being the logarithm of FTE-adjusted earnings instead of the probability of working in a Māori-led firm. As in Figure 4, the age profiles are estimated from a regression that includes our main controls and are plotted relative to the monthly earnings of 24-25 year old Māori (MultiE) employees. For tāne Māori, there is earnings growth of 20% (for Māori (strict)) to 35% (for Māori (MultiE)) between age 25 and mid-to late 40s. For wāhine Māori, the growth is smaller (between 10% and 20%) between their mid-20s and late 40s. The figure also shows the growth for the largest ethnic group (European employees). At young ages, there is a minimal difference between ethnic groups. For European men, there is growth of around 45% by their late 40s, which is considerably stronger than for tāne Māori. European women experience relatively strong earnings growth (20%) through until their early 30s, but limited growth in average earnings subsequently.

**Figure 5: Relative wage of Māori employees (by age and sex)**

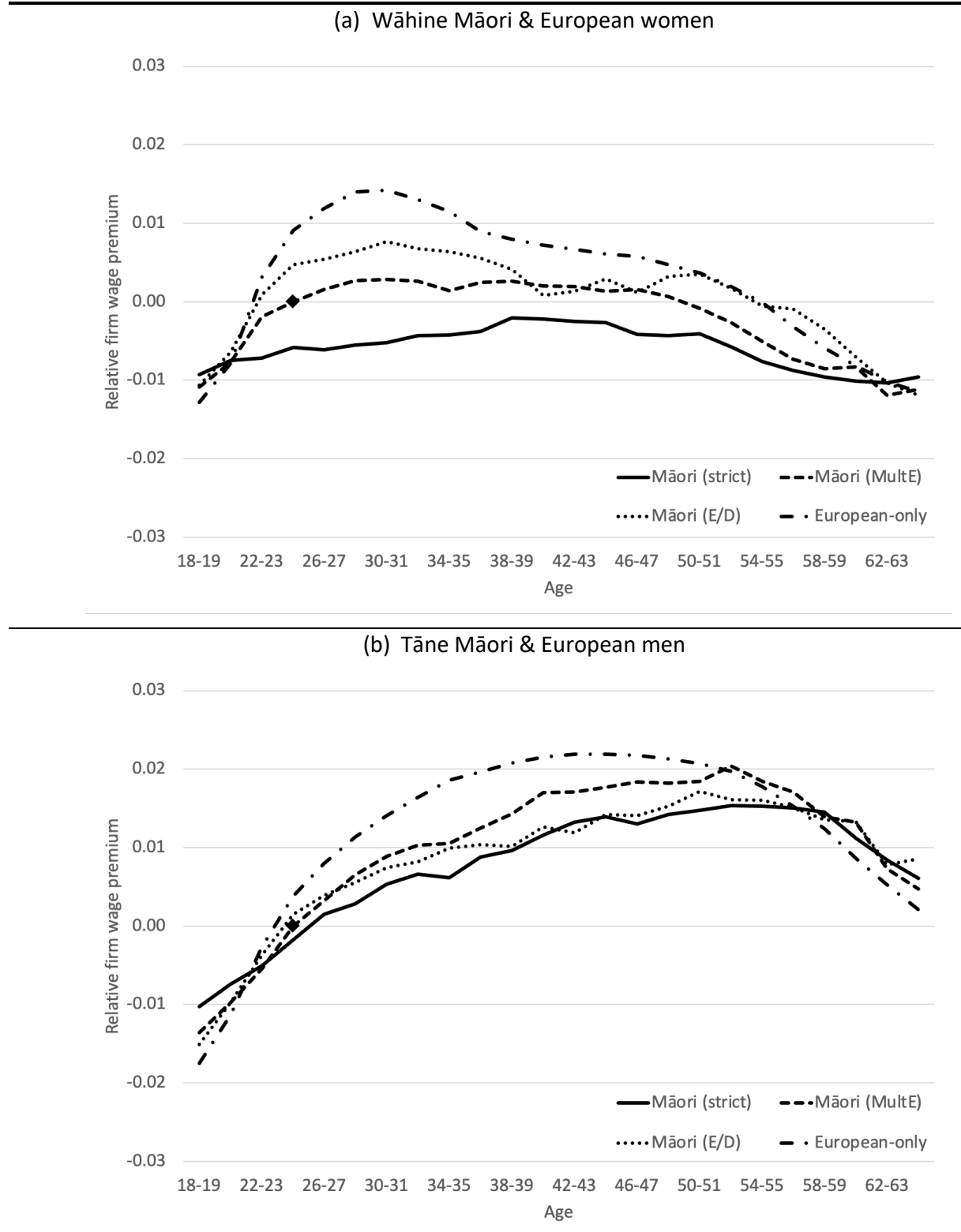


Note: relative to 24-25 year old Māori (MultE)

The life-cycle earnings variation in Figure 5 will be affected by the sorts of firms that Māori employees work in over their working life. Previous studies have shown that young workers

move between jobs in a way that, on average, moves them into better performing and better-paying firms (Maré, Le, et al., 2017; Maré & Hyslop, 2006).

**Figure 6: Relative firm wage premium of Māori employees (by age and sex)**



Note: relative to 24-25 year old Māori (MultE)

Figure 6 and Figure 7 show whether Māori employees move into better-performing firms over their lifetimes, using two measures of firm performance. The first is an estimate of whether the firm is a high-paying firm.<sup>19</sup> The second is an estimate of firm productivity.<sup>20</sup> In each case, the age profile is estimated from a regression that has the same form as equation (2), but with firm wage premium or productivity as the dependent variable.

For tāne Māori, the lifecycle pattern of moving into better paying firms (Figure 6) is similar in shape to the wage pattern in Figure 5, though there is less difference in levels between the three Māori subgroups. Furthermore, the lifecycle growth in average firm premium is only about 5% to 10% as large as the comparable wage growth. The average firm premium for wāhine Māori peaks at about age 30, with minimal growth, or decline, thereafter. Wāhine Māori (strict) are, on average, in low-paying firms throughout their working lives – even controlling for factors such as industry, location, and qualifications. The improvement in firm premium is particularly low for this group when in their 20s. As is the case for tāne Māori, the contribution to earnings of being in a high-paying firm is modest over the lifecycle for wāhine Māori.

A similar pattern is seen when looking at the average productivity of firms in which people work. This can be seen in Figure 7, which plots average firm productivity against worker age for Māori employees. The patterns are more volatile, reflecting the challenges of measuring multifactor productivity as well as the true underlying volatility in firm performance. For tāne Māori, there is not much evidence of a “trading up” to more productive firms as they age. In contrast, European men do seem to be in more productive firms in their mid-30s than they are in when in their mid-20s. For tāne Māori (strict) employees, there appears to be a general decline in average firm quality throughout their working life. Wāhine Māori (E/D) are in relatively high productivity firms throughout working life, with averages similar to those experienced by European women. In contrast, wāhine Māori (strict) are, on average, always in relatively low productivity firms, never surpassing the average experienced by 24-25 year old wāhine Māori (E/D).

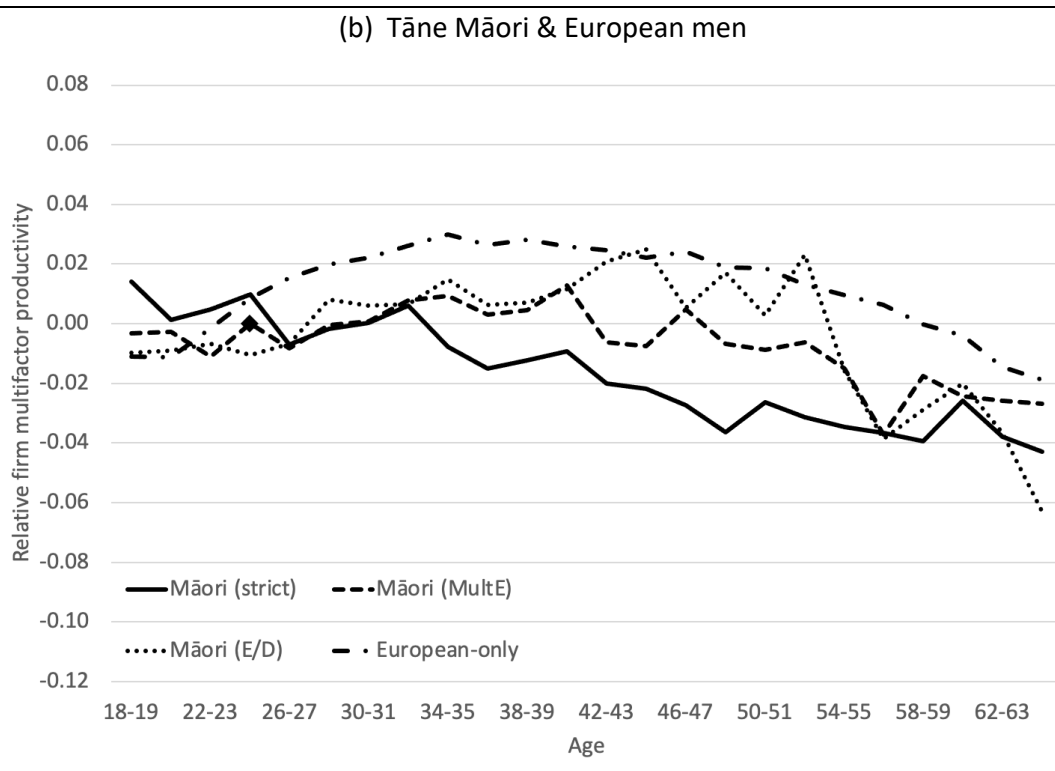
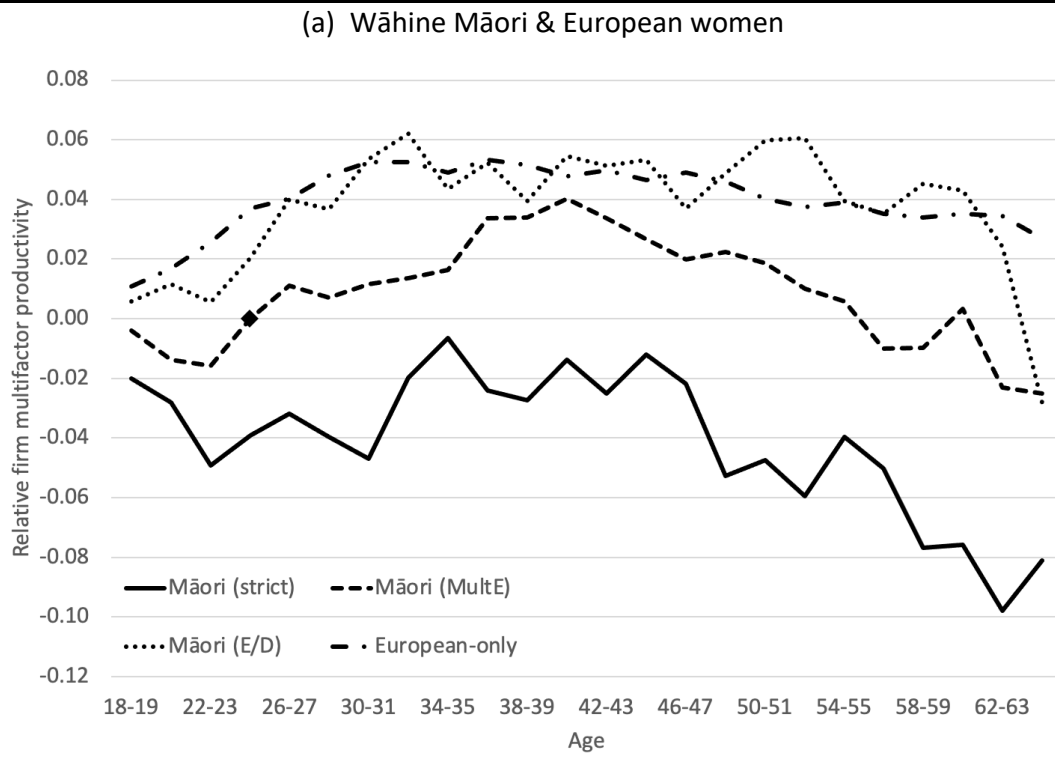
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<sup>19</sup> This is estimated as the firm fixed effect component from a two-way fixed effects wage model (Abowd & Kramarz, 2005; Maré, Hyslop, et al., 2017).

<sup>20</sup> The measure is estimated multifactor productivity from a pooled Cobb-Douglas gross output production function with industry intercepts, as described in Fabling & Maré (2015b).



**Figure 7: Relative mfp of Māori employees (by age and sex)**



Note: relative to 24-25 year old Māori (MultE)

#### 4.4 Does working in a Māori-led firm affect earnings of Māori employees?

In the previous section, we saw that there is less variation in firm pay premiums and firm productivity than in wages – at least for age-specific averages over working life. We now examine whether a specific firm characteristic – whether a firm is Māori-led – is related to earnings differences among Māori employees.

The top panel of Table 8 shows average wages for different groups of Māori workers (in rows), employed in different types of firms, based on whether the firm is WP-led, and if so, if it is led by a Māori working proprietor. All of the averages are expressed as differences from the overall average for all firms. This overall average earnings level (geometric mean) is \$4,320 per full-time equivalent month, shown in the bottom row of the top panel. Wages are generally lower than average in firms that are WP-led (9% lower in Māori-led firms and 11% lower in non-Māori-led firms) and above average, by 6%, in employee-only firms. Within each of the three firm types, Māori employees are paid below the firm-type average: 6-15 percentage points (pp) lower in employee-only firms; 2-6pp lower in non-Māori-led firms, and 2-10pp in Māori-led firms. Some of these differences reflect the fact that Māori employees work in different industries, different locations and, on average, are younger with lower formal qualifications than non-Māori.

The second panel of Table 8, reports relative wage rates, controlling for these observed differences. The reported differentials are calculated from the residuals of a regression of log wages on the main controls, as in the following equation:

$$\ln w_{it} = \alpha + X_{it}\beta_w + e_{it} \quad (3)$$

By construction, the mean residual ( $e_{it}$ ) is zero, and all differentials are interpreted as deviations from the overall mean. The differentials across firm types and groups of Māori employees are much smaller in the adjusted wage than in the top panel. Controlling for observed differences, earnings in Māori-led firms are only 2% below the overall average rate. Furthermore, the adjusted wage of all Māori employees is much closer to the average adjusted rate within each firm type, with a discrepancy of less than 3pp. The greatest difference is for Māori (strict), who are paid 7 percent below the overall average, and 4-8pp below the firm-type average. Māori (E/D) are actually paid 2-4pp above the “all employee” average within each firm type. A comparison of the patterns of raw wage differences and adjusted wage differences implies that the relatively low (raw) earnings rates in Māori-led firms and for Māori employees is in large part due to differences in the observed characteristics of firms and workers who work in those firms (industry, location, firm size, worker age, sex and qualification).

**Table 8: Relative wage and productivity differences (raw and adjusted)**

	All firms	Māori-led	Non-Māori -WP-led	Employee-only
	(1)	(2)	(3)	(4)
(a) Wage				
Māori (strict)	-12%	-19%	-17%	-9%
Māori (MultE)	-8%	-15%	-15%	-4%
Māori (E/D)	-5%	-11%	-13%	0%
All Māori employees	-9%	-16%	-15%	-5%
All employees	\$4,320*	-9%	-11%	6%
(b) Wage (adjusted)				
Māori (strict)	-7%	-7%	-7%	-7%
Māori (MultE)	0%	-1%	-1%	0%
Māori (E/D)	2%	2%	1%	3%
All Māori employees	-2%	-3%	-3%	-2%
All employees	\$4,320*	-2%	-3%	1%
(c) Multifactor productivity				
Māori (strict)	-6%	16%	15%	-14%
Māori (MultE)	-1%	13%	14%	-9%
Māori (E/D)	1%	12%	15%	-6%
All Māori employees	-2%	14%	14%	-10%
All employees	0%	9%	15%	-7%
(d) Multifactor productivity (adjusted)				
Māori (strict)	-2%	3%	7%	-6%
Māori (MultE)	0%	0%	5%	-2%
Māori (E/D)	1%	-2%	5%	0%
All Māori employees	-1%	1%	6%	-3%
All employees	0%	-4%	5%	-2%

Notes: Relative to overall mean [\*: geometric mean]. 'adjusted' is regression-adjusted for main controls. Weighted by the number of employees

Panels (c) and (d) of Table 8 summarise the raw and adjusted multifactor productivity (mfp) differences across firm types and for different groups of Māori employees. In contrast to the wage pattern, employee-only firms appear to have lower than average productivity (-7%). Māori-led firms have raw productivity that is 9% above average, and for non-Māori-led firms with working proprietors, the difference is 15% (recalling that mismeasurement of inputs may inflate this gap). Controlling for observed characteristics, including firm size, panel (d) shows that relative productivity is highest in non-Māori-WP-led firms (5% above average). Māori-led firms have adjusted productivity that is 4% below the overall average. Comparing the adjusted wage and adjusted productivity panels, we see a similar pattern to that observed by Chen (2023).<sup>21</sup> Māori-led firms have below average productivity (-4%) and below average wage rates (-2%), but

<sup>21</sup> Chen (2023) uses a different definition of Māori firms, based on BOS data, and uses labour productivity.

the wage rates are closer to average than productivity, a pattern that Chen interprets as evidence of greater sharing of performance-related profits with employees.

For Māori employees, the pattern is different. Māori employees working in Māori-led firms are disproportionately in the more productive Māori-led firms (consistent with the sorting patterns in Table 6) – on average 1% more productive than overall, and 5pp more productive than Māori-led firms generally. However, as discussed above, the (adjusted) wage rates for Māori in Māori-led firms are relatively low (3% below the overall average, and 1pp lower than in Māori-led firms generally). Both the sorting of Māori employees into more productive Māori-led firms, and the relatively low earnings rates of Māori employees within those firms, is seen most strongly for Māori (strict) employees. This group of Māori employees is on average employed in firms that are 3% more productive than average but have earnings that are 7% below average.

It is not necessarily the case that Māori employees in productive Māori-led firms are being underpaid. It may be that those Māori employees are in lower-paying roles, even controlling for observed job characteristics. A way of examining whether this is the case is to look at the changes in earnings experienced by Māori employees when they move between Māori-led firms and other types of firms. Table 9 reports estimates from a regression of earnings changes for employees who change jobs on indicators for the type of firm-to-firm transition they are making:

$$\Delta \ln w_{it} = \alpha + \sum_{f_1} \sum_{f_0} \delta_{f_0 f_1} + X_{it}^M \beta_m + e_{it} \quad (4)$$

where  $f_0$  denotes the type of firm that the employee is leaving from (Māori-led, non-Māori-WP-led; employee-only) and  $f_1$  denotes the type of firm they are moving to. There is a separate coefficient ( $\delta_{f_0 f_1}$ ) for each combination of  $f_0$  and  $f_1$  (nine combinations, measured relative to the gains from an employee-only to employee-only move). The covariates  $X_{it}^M$  include the change in firm size and firm performance associated with the move, age, qualifications, and two sets of industry and FUA indicators (for pre- and post-move firms). The regression is estimated separately for women (columns 1-3) and men (columns 4-6), and for subsets of Māori employees (panels b to d). Panel (a) of Table 9 is estimated across all employees and the underlying regression includes ethnicity indicator variables.

The most regular pattern across all of the panels is that moving from WP-led firms to employee-only firms is associated with relatively large wage gains of 0.9% to 3.2% stronger growth than for a base-case transition (employee-only to employee-only). Of those transitions, the strongest gains are for employees moving from Māori-led firms (1.7% to 3.2%). Workers moving in the other direction, from employee-only to WP-led firms, had relatively slow wage growth – between 0.8% and 2.2% slower than for the base transition.

**Table 9: Wage gains for employees changing jobs (employers)**

From job in:	To job in:			To job in:			
	Māori-led	Non-Māori -WP-led	Employee -only	Māori-led	Non-Māori -WP-led	Employee -only	
	(1)	(2)	(3)	(4)	(5)	(6)	
(a)		All women			All men		
Māori-led	0.0122** [0.0025]	0.0041** [0.0015]	0.0172** [0.0012]	0.0107** [0.0021]	0.0125** [0.0012]	0.0225** [0.0011]	
Non-Māori- WP-led	0.0022 [0.0014]	-0.0033** [0.0006]	0.0101** [0.0005]	0.0010 [0.0012]	0.0045** [0.0005]	0.0150** [0.0005]	
Employee- only	-0.0148** [0.0013]	-0.0196** [0.0006]	base	-0.0170** [0.0011]	-0.0154** [0.0005]	base	
(b)		Wāhine Māori (strict)			Tāne Māori (strict)		
Māori-led	0.0315** [0.0056]	0.0112* [0.0047]	0.0237** [0.0036]	0.0183** [0.0044]	0.0338** [0.0037]	0.0321** [0.0029]	
Non-Māori- WP-led	-0.0053 [0.0046]	0.0077** [0.0024]	0.0105** [0.0021]	0.0027 [0.0037]	0.0106** [0.0020]	0.0168** [0.0019]	
Employee- only	-0.0187** [0.0040]	-0.0125** [0.0023]	base	-0.0144** [0.0031]	-0.0080** [0.0020]	base	
(c)		Wāhine Māori (MultE)			Tāne Māori (MultE)		
Māori-led	0.0081 [0.0060]	0.0083* [0.0039]	0.0170** [0.0033]	0.0137** [0.0047]	0.0164** [0.0034]	0.0218** [0.0029]	
Non-Māori- WP-led	-0.0067 [0.0037]	-0.0033 [0.0018]	0.0093** [0.0017]	0.0017 [0.0033]	0.0082** [0.0016]	0.0171** [0.0017]	
Employee- only	-0.0223** [0.0036]	-0.0180** [0.0018]	base	-0.0186** [0.0030]	-0.0121** [0.0017]	base	
(d)		Wāhine Māori (E/D)			Tāne Māori (E/D)		
Māori-led	0.0056 [0.0094]	-0.0030 [0.0054]	0.0172** [0.0053]	-0.0043 [0.0072]	0.0126** [0.0046]	0.0194** [0.0044]	
Non-Māori- WP-led	0.0076 [0.0058]	-0.0070** [0.0025]	0.0092** [0.0024]	-0.0010 [0.0045]	0.0059** [0.0022]	0.0101** [0.0023]	
Employee- only	-0.0196** [0.0058]	-0.0156** [0.0027]	base	-0.0205** [0.0044]	-0.0139** [0.0024]	base	

Note: \*:significant at 1% \*\*: significant at 5%. Standard errors are clustered by worker (average number of moves = 2.2).

Māori (strict) employees who leave Māori-led firms, however, make stronger wage gains moving to another WP-led firm than when moving to an employee-only firm. For wāhine Māori (strict), the strongest wage growth is associated with a move between two Māori-led firms (3.2% higher than base), whereas for tāne Māori (strict) the strongest growth is for a move from a Māori-led firm to a non-Māori-led WP firm (3.4% higher than base).

Overall, the pattern of wage gains for employees who change jobs shows that employee-only firms generally pay relatively high wages. Among WP-led firms, Māori-led firms tend to pay

relatively low wages, though for wāhine Māori (strict), moving between Māori-led firms secures them the strongest wage growth.

#### 4.5 Does better firm performance show up in higher wages?

Chen's (2023) interpretation of his findings on the relative productivity and wage levels in Māori firms was that Māori firms may pass on more of the benefits of their performance as wages. Relatedly, Allan & Maré (2022) look at the extent to which firms share the gains from good performance ("rent-sharing") with different sets of workers. They find that, on average, firms pass on about 2.8% of fluctuations in rents. This means that if performance improves by 10%, wages would increase by about 0.3%. For Māori employees, Allan & Maré's estimated pass-through proportion is lower, at 2.6%, and is lower for wāhine Māori than for tāne Māori.<sup>22</sup>

In this section we estimate the degree of pass-through from mfp to wages for different groups of Māori employees, and for different types of firms. Table 10 presents estimates from three types of regressions, as summarised in the following equations:

$$\ln w_{it} = \alpha + \mu_1 * mfp_{it} + X_{it}\beta_{p_1} + e_{it} \quad (5)$$

$$\ln w_{it} = \alpha + \sum_f (\delta_f + \rho_f * mfp_{it}) + X_{it}\beta_{p_2} + e_{it} \quad (6)$$

$$\ln w_{it} = \alpha + \sum_{eth} (\gamma_{eth}^p + \rho_{eth} * mfp_{it}) + X_{it}\beta_{p_3} + e_{it} \quad (7)$$

The overall pass-through is estimated by including a firm's mfp in a wage equation (5) that includes our main controls (including ethnicity indicators). The first column of Table 10 reports the estimated coefficients ( $\mu_1$ ) on mfp separately for all women (panel a) and for all men (panel b). For women, the pass-through is 0.0121, implying that 1.2% of productivity variation is passed on in the form of wages. The coefficient is higher for men (0.0211). Note that a low degree of pass-through means that wages are more stable than productivity – employees don't see strong wage growth when firms are doing well but they equally do not see wage reductions when firms do poorly.

The second column of Table 10 reports separate pass-through parameters for each of the three firm types (Māori-led, non-Māori-WP-led and employee-only), estimated from equation (6). There is stronger pass-through for men than for women, with the highest pass-through of 3.1% for men in non-Māori-led WP firms. Women also experience the strongest pass-through in non-Māori-led WP firms, but this is only 1.7%. In Māori-led firms, pass-through is 1.35% for men and insignificant for women.

<sup>22</sup> In their preferred instrumental variables specification, the overall proportion is 3.1%, and only 0.2% for Māori.

**Table 10: Are wages of Māori employees higher when productivity (mfp) is higher?**

	All firms	All firms	All firms	Māori-led	Non-Māori -WP-led	Employee -only
	(1)	(2)	(3)	(4)	(5)	(6)
(a) Women						
mfp	0.0121** [0.0002]					
firm type X mfp						
Māori-led		-0.0013 [0.0012]				
Non-Māori-WP-led		0.0171** [0.0007]				
Employee-only		0.0146** [0.0002]				
worker type X mfp						
Wāhine Māori (strict)			0.0102** [0.0005]	0.0020 [0.0027]	0.0089** [0.0020]	0.0095** [0.0006]
Wāhine Māori (MultE)			0.0121** [0.0007]	0.0144** [0.0036]	0.0230** [0.0022]	0.0108** [0.0007]
Wāhine Māori (E/D)			0.0138** [0.0011]	0.0174** [0.0061]	0.0255** [0.0033]	0.0126** [0.0011]
(b) Men						
mfp	0.0211** [0.0002]					
firm type X mfp						
Māori-led		0.0135** [0.0011]				
Non-Māori-WP-led		0.0313** [0.0006]				
Employee-only		0.0239** [0.0002]				
worker type X mfp						
Tāne Māori (strict)			0.0169** [0.0006]	0.0221** [0.0019]	0.0203** [0.0017]	0.0151** [0.0006]
Tāne Māori (MultE)			0.0213** [0.0007]	0.0350** [0.0048]	0.0322** [0.0020]	0.0184** [0.0007]
Tāne Māori (E/D)			0.0223** [0.0010]	0.0445** [0.0040]	0.0382** [0.0029]	0.0187** [0.0011]

The remaining columns of Table 10 show the strength of productivity pass-through experienced by Māori employees, based on regression equation (7), which includes separate parameters for each ethnicity group (only coefficients for Māori employees are reported). Column (3) is estimated across all firms, whereas columns (4) to (6) are estimated for workers in Māori-led firms, non-Māori-WP-led firms, and employee-only firms respectively. For both tāne Māori and wāhine Māori, pass-through is strongest for Māori (E/D) and weakest for Māori (strict). This is

true within each of the firm-types. It is also true that pass-through is stronger for tāne Māori than for wāhine Māori – for each group of Māori employees, and for each firm type. For all groups of tāne Māori, the pass-through is strongest within Māori-led firms and weakest in employee-only firms. This is not the case for wāhine Māori, for whom pass-through is generally strongest in non-Māori-led WP firms.

**Table 11: Pass-through of mfp to wage – by sex of employees and Māori-led firm WPs**

	Māori-led firm led by					
	Wāhine only	Tāne only	Both	Wāhine only	Tāne only	Both
	(1)	(2)	(3)	(4)	(5)	(6)
worker type X mfp	Wāhine Māori workers			Tāne Māori workers		
Wāhine Māori (strict)	-0.0004 [0.0022]	0.0018 [0.0041]	0.0146* [0.0060]	0.0276** [0.0035]	0.0178** [0.0026]	0.0279** [0.0047]
Wāhine Māori (MultE)	0.0166** [0.0061]	0.0149** [0.0050]	0.0170** [0.0049]	0.0353** [0.0065]	0.0438** [0.0047]	0.0293** [0.0090]
Wāhine Māori (E/D)	0.0156 [0.0109]	0.0230** [0.0088]	0.0175* [0.0082]	0.0646** [0.0114]	0.0454** [0.0080]	0.0376** [0.0053]

Note: “Both” are Māori-led firms with both wāhine Māori and tāne Māori working proprietors.

In Table 11, we further disaggregate the pattern of pass-through for Māori employees in Māori-led firms, examining possible interactions between the sex of employees and the sex of the Māori working proprietors. Many of the differences in the table are not (statistically) significantly different from each other, and some of the pass-through coefficients for wāhine Māori are not significantly different from zero. The general patterns observed in Table 10 are reflected across wāhine Māori-led and tāne Māori-led firms. The weakest pass-through is for Māori (strict). Beyond that there is not a clear pattern of stronger or weaker pass-through to workers of the same sex as the WPs.

#### 4.5.1.1 Pass-through, identified from stayers

As a further test of pass-through patterns, we look at pass-through from mfp to wages for workers who remain in the same firm. For this analysis, we estimate the relationship between wage change and productivity change, as shown in equations (8) to (10), which are similar to the equations in the previous section:

$$\Delta \ln w_{it} = \alpha + \mu_1 * \Delta mfp_{it} + X_{it}^s \beta_{s_1} + e_{it} \quad (8)$$

$$\Delta \ln w_{it} = \alpha + \sum_f (\delta_f + \rho_f * \Delta mfp_{it}) + X_{it}^s \beta_{s_2} + e_{it} \quad (9)$$

$$\Delta \ln w_{it} = \alpha + \sum_{eth} (\gamma_{eth}^p + \rho_{eth} * \Delta mfp_{it}) + X_{it}^s \beta_{s_3} + e_{it} \quad (10)$$



The covariates ( $X_{it}^S$ ) include the change in firm size and firm mfp; year, worker qualifications and age, and two sets of FUA dummies for the FUA of residence in the year prior to the change and the FUA of residence following the change.

**Table 12: Are wages of Māori employees higher when productivity (mfp) is higher?**

	All firms	Māori-led	Non-Māori -WP-led	Employee-only
	(1)	(2)	(3)	(4)
worker type X $\Delta$ mfp				
Wāhine Māori (strict)	0.0012 [0.0038]	0.0139 [0.0090]	-0.0003 [0.0222]	0.0006 [0.0039]
Wāhine Māori (MultE)	0.0140** [0.0053]	0.0623 [0.0577]	0.0177 [0.0193]	0.0131* [0.0055]
Wāhine Māori (E/D)	0.0131* [0.0066]	-0.0340 [0.0627]	0.0135 [0.0103]	0.0125 [0.0080]
N(observations)	91,902	3,576	23,979	64,344
worker type X $\Delta$ mfp				
Tāne Māori (strict)	0.0086** [0.0032]	0.0264 [0.0142]	0.0422** [0.0116]	0.0053 [0.0032]
Tāne Māori (MultE)	0.0076* [0.0035]	0.0389 [0.0264]	0.0505** [0.0145]	0.0041 [0.0036]
Tāne Māori (E/D)	0.0003 [0.0045]	-0.0031 [0.0580]	0.0111 [0.0195]	0.0000 [0.0046]
N(observations)	156,147	5,151	38,430	112,563

*Note: estimates are for 10-year changes in wages and productivity, for employees who have remained with the firm for 10 years.*

In Table 12, we report coefficients based on 10-year changes in wages and 10-year changes in mfp for Māori employees who remain with the same firm for those 10 years. They are all much smaller than the coefficients in Table 10 – generally around one tenth as large. This reflects the substantial variation in mfp and in wages, some of which is genuine, and some of which reflects volatility in the estimated mfp measure. This sample is highly selective and includes only about 2% of the sample used for one-year changes. It also, by construction, is restricted to long-serving employees, who may be more likely to see their wages adjust in response to firm performance.<sup>23</sup> The 10-year pass-through parameters in Table 12 are suggestive of stronger pass-through in non-Māori-WP-led firms, and for Māori (E/D) but they are imprecisely estimated and do not show a clear pattern.<sup>24</sup>

<sup>23</sup> Allan & Maré (2022) find pass-through of 3.9% for employees with 3 or more years of tenure, compared with no pass-through for new (less than one year) employees.

<sup>24</sup> Pass-through parameters estimated from year-on-year changes in mfp and wages are presented in Appendix Table 11.

## 5 Summary and discussion

This study provides a range of novel insights into the performance of Māori-led firms and the employment and earnings of Māori employees in Māori-led firms. It also documents an approach to identifying Māori-led firms that differs in minor but important ways from existing definitions. The differences reflect the fact that our research question about earnings and productivity in firms with Māori working proprietors requires a tight focus on the subset of Māori firms that have employees, that have working proprietors, and for which productivity estimates are available (private-for-profit firms). Our definition also differs from previous analysis in that we measure whether a firm is “Māori-led” as a permanent characteristic of each firm – to facilitate longitudinal analysis of earnings and performance. We document an improved approach to identifying Māori descent from available administrative and census data, which enhances our classification of firms, working proprietors, and employees. While our data-derived identification of Māori-led firms will inevitably fail to capture the richness of what is distinctive about Māori enterprises, it provides new evidence on the earnings of Māori employees in Māori-led firms.

The first main finding is that Māori employees are disproportionately employed in Māori-led firms – just under 8% of Māori jobs, and 4.6% of all jobs are in Māori-led firms. To put these low shares in perspective, the majority of all jobs (66%) and of jobs held by Māori employees (65%), are in firms that do not have working proprietors (ie, we see no evidence that the firm’s owners work actively in the firm). The probability of working in a Māori-led firm is particularly high for young (18-30 year old) tāne Māori who have Māori descent and identify Māori as their only ethnicity (our Māori (strict) definition).

We document the age variation in wages separately for wāhine Māori and tāne Māori, finding that, among Māori employees, wages grow relatively slowly for Māori (strict) employees – especially for wāhine Māori, who experience particularly slow wage growth at younger ages. The patterns of wage growth by age are correlated with the sort of firms where Māori are employed. For tāne Māori, there is a clear pattern of moving to higher-paying firms throughout working life, although the implied improvement in wages as a result of moving to better-paying firms accounts for only about one tenth of the actual wage growth. For wāhine Māori, there is a strong pattern of moving to better-paying firms until about age 30, but only small or negative changes after that. Wāhine Māori (strict) are on average in relatively poor-paying firms throughout their working lives.

We also look at whether Māori employees tend to work in relatively productive firms. The magnitude of effects is again small. Both tāne and wāhine Māori (strict) employees tend to work in relatively low-productivity firms throughout working ages, with a trend decline in the average productivity of firms that they work in at different ages. Other groups of wāhine Māori work in relatively productive firms in their 30s and 40s, similar to patterns for employees overall. For other tāne Māori, there is relatively little variation between different subgroups in the productivity of the firms in which they work at different ages.

There is limited scope for employment in Māori-led firms to alter these overall patterns, given the low proportion of Māori employees working in such firms. On average, Māori-led firms have relatively high productivity (9% above average mfp) but pay relatively low wages (9% below average). These raw differences largely reflect observed differences between firms other than being Māori-led, such as industry, location, capital intensity, and firm size. Controlling for such factors, as well as the age, sex and qualification of people who work in Māori-led firms, the performance of Māori-led firms looks much closer to average. Adjusted wages are only 2% below average, and adjusted productivity is 4% below average. Māori employees within Māori-led firms are disproportionately in the more productive (adjusted mfp 1% above average) Māori-led firms, though with (adjusted) average wages that are 3% below average. The low average adjusted wage reflects the relatively low wages received by Māori (strict) employees (7% below average), which occurs despite the fact that Māori (strict) employees are in more productive Māori-led firms. One possible explanation of this pattern is that productive Māori-led firms offer employment opportunities to Māori (strict) employees who would have difficulty finding employment elsewhere, or would otherwise receive low pay when employed.

To investigate this issue, we examine wage changes for employees who move between jobs. The dominant pattern reflects the fact that firms without working proprietors pay higher average wages. Moving to an employee-only firm is associated with increases in wages, whereas moving out of an employee-only firm is associated with a decline in wages. Among Māori, we find a distinctive pattern for Māori (strict) who move out of a Māori-led firm. Wāhine Māori (strict) moving out of a Māori-led firm get a higher wage increase (3.2%) when moving to another Māori-led firm than when moving to either an employee-only firm (2.4%) or a non-Māori-led WP firm (1.1%). Tāne Māori strict also secure increases (1.8%) when moving from a Māori-led firm to another Māori-led firm, although increases are larger when moving to other types of firms.

The final question we address is whether Māori employees earn more when in relatively productive firms. Overall, the relationship between firm performance and average wages is fairly

weak. We estimate that, in firms where productivity (mfp) is high, wages are only slightly higher. The pass-through of firm performance to wages is only 1.2% (for women) to 2.1% (for men) higher. While small, these estimates are similar to what is found in other recent studies. A low pass-through means that employees do not get an immediate boost in wages from good firm performance, but equally do not experience a drop in wages when performance is low. In Māori-led firms, productivity performance is less reflected in wages, with 1.4% pass-through for men and insignificant pass-through for women. However, wages for tāne Māori are more strongly related to firm performance within Māori-led firms (2.2% to 4.5% pass-through) than within other firms. There is also stronger pass-through within Māori-led firms for wāhine Māori (up to 1.7%) than for women generally, but at similar levels to pass-through in other types of firms.

Overall, the wage effects for Māori employees of working in a Māori-led firm are not large. Māori-led firms account for a relatively small proportion of Māori employment, and, controlling for firm and worker characteristics, pay wages that are slightly lower than average. Māori employees are more likely to work in the more productive Māori-led firms. There is suggestive evidence that Māori-led firms might offer employment opportunities and prospects for subsequent wage growth to low-earning Māori employees. Wāhine Māori experience relatively strong earnings growth when moving between Māori-led firms, and better productivity is slightly more likely to be reflected in higher earnings for Māori employees, especially for tāne Māori.

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## Appendix

### Appendix 1: Methods for identifying Māori individuals and Māori-led firms

This appendix summarises the methods used to identify Māori individuals (employees or WPs) and Māori-led firms based on information available within the IDI. It provides evidence to support the various judgements made for imputation, allocation, and classification thresholds. The first section summarises our approach to identifying Māori individuals based on descent and ethnicity. The second summarises how we classify some firms as Māori-led using a time-invariant definition of the firm based on the ethnicity and descent of working proprietors.

#### *Identifying Māori based on descent and ethnicity*

To identify Māori-led firms, we first need to identify working proprietor ethnicity and descent. Level one ethnicity comes from the IDI personal details table, which is constructed by Stats NZ who prioritise the available survey or administrative data sources based on consistency with Census. Thus, individuals are associated with one or more ethnicities based on a single source.<sup>25</sup> Firms can, therefore, be classified as multiple ethnicities based on individual WPs having multiple ethnicities and/or because there are multiple WPs with non-overlapping ethnicities.

High quality self-reported Māori descent data are also available from Census (2013 and 2018). Our first point of difference from Te Puni Kōkiri (2022) is to expand the range of data sources used to identify Māori descent to include birth and death records (from the Department of Internal Affairs, DIA) and Household Labour Force Survey (HLFS) responses. These sources augment the Census (2013 and 2018) data used by TPK and align the identification of Māori descent with the same sources used in the Administrative Population Census (APC). Since descent is a permanent individual characteristic, we pool responses across all data sources giving priority to positive responses over negative responses (and negative responses over don't know responses).<sup>26</sup>

Since Māori descent is available from fewer data sources than ethnicity, there is a gap between the coverage of ethnicity and descent. Given the data sources involved, the absence of descent is concentrated in individuals born overseas (ie, not in DIA data) and who have spent time outside of New Zealand (ie, not in a Census).

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<sup>25</sup> The exception to this is Census 2013 and 2018 responses, which Stats NZ pools into a single source. We use these pooled responses, noting that doing so raises the proportion of multi-ethnicity individuals above the rate present in either Census.

<sup>26</sup> This approach differs from the APC, which prioritises across sources in a similar manner to the personal details table. The APC currently uses Census 2013 only to fill administrative gaps, which reduces its usefulness for research.

Coverage of Māori descent data is also affected by missing responses in the DIA births dataset. We address this missingness by exploiting the systematic relationship between parent and child descent – both of which are captured by DIA – inferring missing descent for children where we observe parental descent in any data source. Appendix Table 1 reports patterns of descent in all DIA birth records where this is observed for mother, father and child.<sup>27</sup>

**Appendix Table 1: Parent-child descent relationships in DIA births data**

Māori descent		Child Māori descent		p(child has descent)
Mother	Father	Y	N	
N	N	3,201	965,643	0.003
N	Y	101,973	8,382	0.924
Y	N	107,697	5,913	0.948
Y	Y	190,506	1,911	0.990
Y		298,203	7,824	0.974
	Y	292,479	10,293	0.966
	<b>Total</b>	<b>403,377</b>	<b>981,849</b>	<b>0.291</b>

Key to our approach are two facts – firstly, births data identify many individuals (both parent and child) of Māori descent, substantially augmenting the Census coverage. Secondly, conditional on having a mother or father of Māori descent, 97% of children are reported as Māori descent. On that basis, we impute child descent as Māori when at least one parent has Māori descent, and non-Māori when both parents are non-Māori descent.

Note that these birth records cover many individuals outside our population of interest. By keeping all individuals, our goal is to create a Māori descent methodology that is applicable to a broad set of research and statistical goals, improving on the APC table available to IDI users.

Appendix Table 2 shows the relative contributions of data source(s) to the identification of Māori descent. As we did within a data source, across data sources we prioritise sources with positive responses over those with negative responses.<sup>28</sup> We separately identify source contributions for all individuals with descent data as well as for our population of interest, which is the combination of WP and employees in WP firms (labelled “L pop”). The final two columns of the table identify the proportion of individuals who are identified as Māori descent by the relevant source. Individuals who have their descent identified by multiple (agreeing) sources are combined into a single row in the table, and this group accounts for 43.5% of all individuals, and over half of the individuals in our population of interest.

<sup>27</sup> We restrict to birth records where parent one is identified as “mother” and parent two is identified as “father”. This is the dominant pattern in the data and reflects the case where descent is likely to be inheritable from either parent.

<sup>28</sup> In less than one percent of prioritised descent observations, we only observe “don’t know” responses. We classify these individuals as non-Māori descent.



The largest single source is Census, accounting for around a third of individuals. Given the relatively small scope of the HLFS, DIA data accounts for the bulk of the remainder of observations. Observed child descent is less important to coverage for our population than all observations because labour force participation is low for children. Inferred child observations are more important because DIA missing observations are more prevalent the further back the birth is and, therefore, the older the individual is now.

Other than deaths, non-Census data sources have higher proportions of individuals with Māori descent than present in Census, reflecting the fact that they are more likely to capture individuals who were born in New Zealand and, potentially, undercoverage of Māori in Census. The number of non-Census individuals with Māori descent is, therefore, material to identification of Māori-led firms. Finally, Appendix Table 2, reassuringly, shows that the proportion of individuals with Māori descent is similar in the observed and inferred birth data.

**Appendix Table 2: Source contribution to identification of Māori descent**

Source	N(individuals)		Source share of individuals		Within source p(Māori descent)	
	All	L pop	All	L pop	All	L pop
Census	2,088,177	882,777	0.325	0.345	0.143	0.144
Birth (child, obs)	561,261	14,940	0.087	0.006	0.360	0.528
Birth (child, inferred)	213,618	109,947	0.033	0.043	0.419	0.489
Death	446,277	27,318	0.069	0.011	0.102	0.223
Birth (parent)	292,332	110,307	0.046	0.043	0.223	0.308
HLFS	27,636	7,368	0.004	0.003	0.245	0.324
Multiple	2,795,007	1,402,938	0.435	0.549	0.216	0.216
<b>Total</b>	<b>6,424,302</b>	<b>2,555,595</b>	<b>1.000</b>	<b>1.000</b>	<b>0.204</b>	<b>0.209</b>

#### *Identifying Māori-led firms based on working proprietor descent and ethnicity*

We classify firms as “Māori-led” based on the ethnicity and descent of working proprietors associated with the firm. Working proprietors (WP) are identified using the criteria outlined in Fabling & Maré (2015a). Essentially, the criteria aim to identify individuals receiving income from a business as a result of combined ownership and labour input. This income is detected as:

- Sole proprietors paying themselves PAYE income, defined as payroll (EMS) payments where the payer and payee IR numbers are the same;
- Sole proprietors reporting self-employment income in their (IR3) personal tax return;
- Individuals receiving partnership income as reported in a (IR7P) Partnership tax return;

- Owners (shareholders) receiving substantial (more than \$26,000 in 2023 dollars) remuneration, with no PAYE deducted, as reported in (IR4s) Company Shareholder tax returns.

The base definition of a Māori WP is a WP who has either Māori ethnicity or Māori descent. In this setting, missing descent data relative to ethnicity data, will result in minor under-identification of Māori WP, since Māori ethnicity is strongly associated with Māori descent. Table 3 shows this association in more detail for our WP population, including individuals where these data are missing, weighted by the number of firm-year observations associated with each WP.<sup>29</sup> Around five percent of observations are associated with WPs who have missing descent data. However, in almost 90% of these cases, WP ethnicity is observed and, in such cases 5.6% of observations are Māori ethnicity. As discussed above, this figure is below the population average (of 6.3%) because of the selective nature of the descent data sources.

**Appendix Table 3: Māori ethnicity and descent for working proprietors**

Ethnicity	Descent			Total	p(Māori descent)	Share missing
	Missing	Non-Māori	Māori			
Missing	17,622			<b>17,622</b>		1.000
Non-Māori	131,601	2,493,855	82,824	<b>2,708,280</b>	0.032	0.049
Māori	7,839	4,464	168,474	<b>180,777</b>	0.974	0.043
<b>Total</b>	<b>157,062</b>	<b>2,498,319</b>	<b>251,298</b>	<b>2,906,679</b>	0.091	0.054
p(Māori ethnicity)	0.056	0.002	0.670	0.063		

Applying Appendix Table 3 incidence rates to the 17,622 observations where neither ethnicity nor descent is observed, suggests we may be missing around 1,500 Māori WP observations due to this gap in the IDI data, or approximately 0.6% of observed Māori WP observations.<sup>30</sup> In the analysis that follows, we treat observations of this type as non-Māori.

While our primary analysis defines WP as being Māori through ethnicity or descent, Appendix Table 3 indicates that this measure captures two large sub-groups of working proprietors – those who have Māori descent and identify as Māori ethnicity (168,474 observations), and those who have Māori descent, but do not identify as Māori ethnicity (82,824 observations). To test whether this distinction affects Māori employee or firm outcomes, we introduce a secondary definition of Māori WPs that requires descent and ethnicity (ie, the largest group). Since almost all Māori WPs have Māori descent, this secondary definition is very similar to TPKs ethnicity-only alternative measure (their “ethnicity variation”).<sup>31</sup>

<sup>29</sup> We exclude 54 observations (associated with 6 WPs) where descent is present, but ethnicity is missing.

<sup>30</sup> The 1,500 estimate is derived by assuming that 5.6% of observations are Māori ethnicity (~1,000 observations), and that, of the non-Māori ethnicity observations, 3.2% are Māori descent (~500 observations).

<sup>31</sup> The exception being the 4,464 WP observations where individuals identify as Māori ethnicity but aren't of Māori descent.

To fully implement each definition of Māori WP, we must impute missing descent for the cases where ethnicity is non-missing. The strong correlation between descent and ethnicity in Appendix Table 3 suggests that descent is highly likely to match stated ethnicity, and that is what we assume. As before, we can use the incidence rates in Appendix Table 3 to estimate the misallocation this approach may create. In the case of the primary definition, we potentially miss around 4,000 observations of Māori WPs from classifying missing descent as non-Māori for non-Māori ethnicity WPs (ie, 3.2% of 131,601). For the secondary definition, we potentially overcount Māori WPs by 200 observations from classifying missing descent as Māori for Māori ethnicity WPs (ie, 3.6% of 7,839). As a proportion of the total, misclassification affects up to 0.2% of observations, which we find tolerable, especially given the overall rate of missing data is 5.4%. To reiterate, the low rate of misclassification is a consequence of the strong relationship between ethnicity and descent for Māori, and our focus on a period where ethnicity data coverage in the IDI is very high.

Having identified Māori WPs, further rules are needed to classify a firm as Māori-led, based on the mix of working proprietors and the duration of involvement with the firm. We want to derive a Māori-led classification of firms as a permanent characteristic of each firm. Using our primary definition of Māori-led firms (“owned and run by at least one Māori working proprietor”), Appendix Table 4 demonstrates the impact on the total number of Māori-led firm-year observations from various rules for determining the permanent status of each firm. The population for this table is all firms that have a Māori WP (based on ethnicity or descent) in at least one year. The first row of the table identifies firm-years where there is a Māori WP at the firm, while the second row indicates whether the firm satisfies the rules identified in subsequent rows. The first column of numbers, therefore, reports observations where there is a Māori WP present in the current year and where the permanent rule identifies the firm as being a Māori-led firm. The second and third columns, respectively, shows observations that are gained or lost from shifting from a contemporaneous Māori WP in the year (TPK) rule to the permanent rule. The final three columns of the table report these gains, losses and the net effect as a proportion of contemporaneous Māori WP firm observations.

**Appendix Table 4: Alternative permanence rules for Māori-led firms**

Has Māori WP in year	N(firm-year observations)				Deviation from current year rule		
	Y	N	Y	Total	Gain	Loss	Net
Meets Māori-led firm rule	Y	Y	N	Y			
Every year	155,598	0	82,236	155,598	0.000	0.346	-0.346
90%+ of years	178,644	1,806	59,190	180,450	0.008	0.249	-0.241
75%+ of years	209,877	8,535	27,957	218,412	0.036	0.118	-0.082
50%+ of years	229,818	21,192	8,016	251,010	0.089	0.034	0.055
Any year	237,834	42,762	0	280,596	0.180	0.000	0.180

The rules we test are all simple and based on the proportion of years of operation that a firm has a Māori WP (including years where the firm employs but doesn't have active WPs). The first rule is the most restrictive, requiring a firm to always have a Māori WP. This rule excludes over 80,000 observations where a firm currently has a Māori WP (35% of all such observations). At the other extreme, the last rule only requires that a firm has a Māori WP in at least one year of operation. This rule includes over 40,000 observations where the firm does not have a Māori WP (or, potentially, any WP), increasing the pool of Māori-led firm-year observations by 18%. Our judgement is that the majority (50%+) rule is the best for our purposes. We make this assessment based on the relatively low exclusion of observations where firms have Māori WP (3.4%) and the relatively low net gain in total observations (5.5%) which, combined, make the Māori-led firm sample very similar in size to the TPK analysis while adding the beneficial property of a permanent classification.

Appendix Table 5 provides support to the desirability of the permanent classification for our analysis of worker outcomes. Specifically, for employees (FTE) in firms where there is a current WP but where a 'current-year' classification would not align with our permanent classification, we test whether the prior or following year is aligned.<sup>32</sup> The bottom row of the table reports the ratio of these employment counts, confirming that the firm is more likely than not to be at most one year away from a consistent status – ie, either a non-Māori-led firm with no Māori WP, or a Māori-led firm with a Māori WP. If firm practices that affect employees are persistent over these transitions – as we expect them to be – or if these transitions reflect measurement issues, then "smoothing" away year-on-year Māori-led firm status changes is beneficial to our analysis.

<sup>32</sup> Excluding the 2005 and 2020 years, and firms that are not active in the prior or subsequent year.

**Appendix Table 5: Employment where current WP status doesn't match permanent status**

Has Māori WP in year	N	Y	
Meets 50%+ firm rule	Y	N	Total
Total FTE, of which	62,700	71,400	134,100
next/prior year supports rule	36,700	38,100	74,800
p(next/prior year supports rule)	0.585	0.534	0.558

Finally, Appendix Table 6 demonstrates that, just as individuals can identify with multiple ethnicities, firms can also be classified as ethnic firms associated with more than one ethnicity. A high proportion of Māori-led firms are also European-led firms. This appears to be driven by multiple ethnicity (Māori-European) individuals, rather than WP diversity, noting that here Māori includes ethnicity or descent for consistency with the primary firm definition. Over 86% of Māori-led firms are also European-led, with the presence of dual (or more) Māori-European ethnicity working proprietors accounting for all but 5pp of that share. Firms that are both Māori-led and European-led account for 93% of FTE employment in Māori-led firms, with 87% of Māori-led firm employment being both Māori-led and European-led as a result of having dual (or more) Māori-European WPs.

**Appendix Table 6: Proportion of Māori-led firms that are also European-led firms**

	Total Māori-led	Also European-led		Proportion also European-led		
		Total	With dual ethnicity	Total	With dual ethnicity	No dual ethnicity
Number of Māori-led firms (2005-2020)	28,014	24,270	22,746	0.866	0.812	0.054
Mean annual number of Māori-led firms	15,688	13,991	13,062	0.892	0.833	0.059
Mean annual FTE in Māori-led firms	47,356	43,794	41,075	0.925	0.867	0.057

## Appendix 2: Additional results

**Appendix Table 7: Productivity population firm counts**

	All firms			Māori-led firms			
	All	WP-led	WP-led with workers	All Māori-led	Wāhine-only	Tāne-only	Both wāhine & tāne
2005	308,529	259,737	92,292	14,193	4,986	8,019	1,188
2006	311,952	260,253	92,367	15,012	5,256	8,475	1,281
2007	314,070	259,638	91,197	15,480	5,421	8,736	1,320
2008	315,837	259,035	90,363	15,918	5,598	8,961	1,356
2009	311,556	253,818	86,010	15,840	5,553	8,928	1,356
2010	305,061	249,165	81,870	15,633	5,514	8,790	1,329
2011	305,481	250,635	81,732	15,681	5,553	8,814	1,314
2012	304,578	249,501	81,030	15,720	5,523	8,871	1,326
2013	303,987	248,040	80,622	15,732	5,511	8,943	1,281
2014	305,667	249,222	81,720	15,879	5,505	9,078	1,293
2015	306,510	246,876	81,411	15,852	5,448	9,117	1,287
2016	311,196	248,949	81,066	16,023	5,451	9,270	1,302
2017	317,724	253,236	82,119	16,185	5,499	9,375	1,311
2018	313,242	243,930	79,854	16,017	5,391	9,288	1,335
2019	323,406	255,198	81,987	16,038	5,400	9,297	1,344
2020	325,740	256,500	79,812	15,552	5,208	9,036	1,311

**Appendix Table 8: FTE employment in Māori-led firms**

	All Māori-led	Wāhine-only	Tāne-only	Both wāhine & tāne
2005	40,800	12,600	23,300	4,900
2006	42,800	13,300	24,400	5,200
2007	43,700	13,600	24,800	5,400
2008	44,600	13,700	25,300	5,600
2009	44,100	13,500	24,800	5,700
2010	41,800	12,700	23,500	5,600
2011	42,300	12,700	23,800	5,800
2012	43,100	12,800	24,400	5,900
2013	44,400	13,100	25,200	6,100
2014	46,600	13,500	26,700	6,400
2015	49,000	14,100	28,300	6,600
2016	50,600	14,500	29,400	6,700
2017	52,900	15,000	31,000	7,000
2018	55,300	15,700	32,100	7,400
2019	56,600	15,700	33,300	7,700
2020	57,700	15,900	34,000	7,800

**Appendix Table 9: Firm-level mean of firm performance**

	Labour productivity	Unweighted			FTE-weighted	
		Capital-labour ratio	Firm size (L)*	Firm wage premium	Firm size (L)*	Monthly wage*
Māori-led	11.15	9.49	3.8	-0.110	19	\$4,340
Māori-led (secondary)	11.12	9.43	3.8	-0.111	22	\$4,393
Wāhine Māori-led	11.10	9.51	3.9	-0.115	18	\$4,219
Tāne Māori-led	11.18	9.46	3.9	-0.104	23	\$4,468
Non-Māori-WP-led	11.17	9.66	3.6	-0.119	17	\$4,223
Employee-only	10.84	9.96	3.0	-0.085	159	\$5,093
All firms	11.04	9.76	3.4	-0.105	78	\$4,802

Notes: First four columns are unweighted firm-year means. Final two columns are weighted by firm FTE. \*=geometric mean

**Appendix Table 10: Industry share & employee share of FTE**

	All	Māori-led firm		All other firms
		Wāhine	Tāne	
Agriculture, Forestry & Fishing	0.107	0.137	0.096	0.049
Mining	0.001	0.000	0.001	0.005
Manufacturing	0.108	0.084	0.111	0.206
Electricity, Gas, Water & Waste Services	0.003	0.004	0.002	0.014
Construction	0.202	0.177	0.211	0.103
Wholesale Trade	0.042	0.042	0.038	0.084
Retail Trade	0.103	0.114	0.091	0.133
Accommodation & Food Services	0.056	0.072	0.043	0.063
Transport, Postal & Warehousing	0.053	0.055	0.052	0.072
Information Media & Telecommunications	0.004	0.004	0.003	0.027
Financial & Insurance Services	0.006	0.006	0.006	0.051
Rental, Hiring & Real Estate Services	0.009	0.010	0.009	0.009
Professional, Scientific & Technical Services	0.213	0.182	0.261	0.093
Administrative & Support Services	0.033	0.041	0.028	0.050
Arts & Recreation Services	0.007	0.007	0.005	0.011
Other Services	0.055	0.064	0.044	0.030
Māori (strict)	0.105	0.118	0.109	0.058
Māori (MultE)	0.131	0.139	0.128	0.076
Māori (E/D)	0.060	0.062	0.057	0.038
Non-Māori	0.704	0.681	0.707	0.828
Share of total FTE	0.043	0.018	0.031	0.957

**Appendix Table 11: Are wages of Māori employees higher when productivity (mfp) is higher? – year-on-year changes for employees staying in the same firm**

	All firms (1)	Māori-led (2)	Non-Māori-WP- led (3)	Employee-only (4)
worker type X $\Delta$ mfp				
Wāhine Māori (Strict)	0.0010** [0.0004]	0.0020 [0.0013]	0.0022* [0.0009]	0.0008* [0.0004]
Wāhine Māori (MultE)	0.0005 [0.0003]	-0.0015 [0.0014]	0.0036** [0.0009]	0.0002 [0.0003]
Wāhine Māori (E/D)	0.0003 [0.0005]	0.0015 [0.0023]	-0.0011 [0.0018]	0.0005 [0.0005]
N(observations)	5,203,143	228,186	1,489,362	3,485,595
worker type X $\Delta$ mfp				
Tāne Māori (Strict)	0.0009** [0.0003]	0.0018 [0.0013]	0.0033** [0.0007]	0.0004 [0.0003]
Tāne Māori (MultE)	0.0009** [0.0003]	0.0036* [0.0018]	0.0027** [0.0007]	0.0005 [0.0003]
Tāne Māori (E/D)	0.0010** [0.0004]	0.0086** [0.0027]	0.0041** [0.0010]	0.0002 [0.0004]
N(observations)	7,942,560	344,550	2,233,434	5,364,576



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