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## Working Paper

# Earnings and Employment in Foreign-owned Firms

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# Earnings and Employment in Foreign-owned Firms

David C. Maré, Lynda Sanderson and  
Richard Fabling

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New Zealand Treasury Working Paper 14/16

November 2014



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New Zealand Government

## DISCLAIMER

This paper was undertaken while Richard Fabling and Lynda Sanderson were on secondment to Statistics New Zealand. The results in this paper are not official statistics, they have been created for research purposes from the Integrated Data Infrastructure prototype (IDI) managed by Statistics NZ. The opinions, findings, recommendations and conclusions expressed in this paper are those of the authors. Statistics NZ, the New Zealand Treasury, and Motu Economic and Public Policy Research take no responsibility for any omissions or errors in the information contained here.

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# Abstract

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This paper examines remuneration and labour mobility patterns among workers in foreign-owned firms operating in New Zealand. By tracking workers as they move across jobs in different types of firms, we document the extent of the “foreign wage premium” distinguishing between compositional factors (eg, differences in industry and employment composition across foreign and domestic firms) and remaining differences in wage levels and growth rates. We find that much of the average earnings gap between foreign- and domestically-owned firms is due to compositional factors – foreign firms tend to be larger and employ workers who would have received relatively high wages regardless of where they worked. However, even among apparently similar workers and firms, we find a two to four percent earnings gap between workers in domestic and foreign-owned firms. This gap is primarily associated with a wage increase of around two percent on moving from a domestic to a foreign firm, augmented by higher wage growth among foreign-owned firms. However, these premia appear to be specific to foreign-firm employment, as workers who return to domestically-owned firms do not appear to retain the additional earnings associated with foreign-firm employment into their subsequent jobs.

We then consider whether foreign-owned firms source workers differently from other New Zealand firms and whether there are systematic differences in the destinations of departing employees by firm ownership. Although foreign-owned firms do not appear to preferentially hire recent immigrants, employees of foreign owned firms are more geographically mobile within New Zealand than comparable workers in domestically owned firms, and are more likely to emigrate within a year of leaving their job.

**JEL Classification:** D22; J31; F23

**Keywords:** Foreign direct investment (FDI); Earnings; Labour mobility

# Executive Summary

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This paper examines remuneration and labour mobility patterns among workers in foreign-owned firms operating in New Zealand. Foreign direct investment (FDI) is often argued to be a source of direct benefits to the receiving firm, through improvements in management capability and access to overseas technologies and networks as well as financial capital. If the benefits of improved productivity and profitability are shared with local workers, this can in turn lead to higher incomes for New Zealanders. Meanwhile, knowledge embodied in foreign-owned firms may also be available to other local firms, via observation, via transactions with local suppliers and customers, through product market competition, and through labour mobility. Such benefits (both direct and indirect) are often cited as a rationale for reducing barriers to FDI and supporting greater foreign investment into New Zealand.

This paper explores a key potential source of economic benefits from FDI – human capital accumulation and earnings increases by employees of foreign-owned firms operating in New Zealand. We make use of Statistics New Zealand’s Integrated Data Infrastructure, which brings together firm-level administrative and survey data from the Longitudinal Business Database with a range of individual-level information including earnings, migration, and benefit status.

The main focus on the paper is to quantify the foreign wage premium – the gap in average earnings between workers in foreign and domestically-owned firms – and to distinguish between three hypothetical sources of this gap: *worker heterogeneity*, in which foreign-owned firms disproportionately hire “higher quality” employees, who would have earned more regardless of where they work; *firm heterogeneity*, in which foreign-owned firms pay a higher wage for workers of a given quality; and *learning heterogeneity*, in which foreign-owned firms provide better opportunities for human capital development leading to stronger within-job earnings growth. While heterogeneous worker hypothesis suggests that the foreign wage premium is primarily explained by selection, and increased FDI is therefore likely to have relatively limited impacts on aggregate outcomes, the heterogeneous firm and heterogeneous learning hypotheses present a more positive view of FDI benefits. The former implies that foreign investment expands opportunities for New Zealand workers to gain highly paid employment, while the latter suggests potential for positive spillovers, if the knowledge and skills gained in foreign-owned firms can be transferred to other domestic firms through labour mobility.

Focusing on full-time employees, we show that much of the observed earnings gap between foreign and domestic firm employees can be explained by worker and firm composition. Worker characteristics (gender, age, tenure and a time-invariant proxy measure of worker skill) alone account for around 40 percent of the overall 14 percent gap in average monthly starting earnings between foreign and domestically owned firms, while firm characteristics (industry, location and firm size) account for almost 70 percent of the gap. Jointly, worker and firm characteristics explain 80 percent of the overall foreign starting wage premium, leaving a residual gap of 2.7 percent. This residual foreign earnings premium may reflect factors including rent-sharing in the presence of productivity or profitability differentials, compensating differentials for real or perceived lower job security, or efficiency wages to promote greater work effort or discourage worker turnover.

Tracking individual workers as they transition between foreign and domestic employers shows that workers who move into foreign-owned firms gain around a four percentage point higher wage increase than those moving between domestically-owned firms, of which around half appears to be due to differences in firm characteristics (eg, moves to larger firms and more highly paid regions or industries). Controlling for firm composition, a two percentage point premium remains. Finally, workers experience 0.4 percentage points higher wage growth during their tenure at a foreign-owned firm, which may reflect stronger human capital accumulation. Together, these patterns suggest that firm heterogeneity is the primary explanation for the observed wage gap, followed by worker heterogeneity and finally learning heterogeneity. However, workers who later return to domestically owned firms do not appear, on average, to retain any of the extra wage gains accumulated during foreign-firm employment, suggesting that the experience gained in these firms is not especially highly valued by domestic employers.

These findings give little support to the argument that foreign firms provide substantial indirect or spillover benefits to domestic firms through human capital accumulation and labour mobility. This lack of earnings portability may reflect differences in the scale or specialisation of jobs in foreign- and domestically-owned firms, or the applicability of firm and industry-specific skills to other firms. Alternatively, it could arise from changing preferences over job characteristics, with workers leaving foreign-owned firms for lifestyle or other non-financial reasons.

Estimating earnings patterns separately for different groups of workers shows that the earnings benefits of foreign-firm employment are not equally distributed across workers. Rather, younger workers appear to benefit most, with under-25 year olds experiencing both a greater gain to joining a foreign firm and a smaller loss on exit than older groups, while more highly skilled workers attract a stronger wage premium while working in the foreign-firm sector. That is, foreign firms not only tend to hire more highly skilled workers they also remunerate these workers more generously, suggesting that the distribution of the foreign premia may be exacerbating income differentials across skill groups. Meanwhile, although women experience a slightly stronger wage gain on entering a foreign firm, their wage growth within those firms tends to be low, even compared with jobs in similar domestic firms.

Similar comparisons show that the foreign earnings premium also varies across different types of firms. It is highest in smaller firms, and in industries that tend to serve the domestic market, suggesting that foreign owners bring knowledge or networks that are of value to such firms and their employees. At the same time, stronger wage growth in outward facing industries suggests that foreign-owned firms may facilitate the accumulation of knowledge that is relevant to international engagement.

A secondary focus of the paper is to examine differences in labour sourcing behaviour and worker's post-employment destinations between foreign and domestically-owned firms. If foreign firms predominantly source workers from abroad, or if workers leaving foreign-owned firms are more likely to emigrate, this may limit the potential benefits to New Zealand workers (by limiting domestic workers' access to highly paid foreign-firm jobs) and New Zealand firms (by limiting knowledge spillovers through labour mobility).

We find no evidence that foreign-owned firms selectively hire recent migrants to New Zealand or bring in foreign staff to work in their New Zealand operations, mitigating possible concerns that the foreign wage premium may be due in part to the employment of highly paid expatriates. However, we do see a higher emigration propensity among workers who leave foreign-owned firms, which may reflect either a selection effect (individuals

with an interest in future travel may choose to work in foreign-owned firms) or greater opportunities to gain networks and experience while on the job that lower the costs to future emigration. To the extent that foreign-firm employment enhances workers' human capital development, this pattern of increased post-employment emigration may be further limiting knowledge spillovers to other domestic firms through labour mobility. Workers in foreign-owned firms also appear to be more geographically mobile within New Zealand, but less likely to move across industries, consistent with greater job specialisation in foreign-owned firms.

Despite the apparent lack of earnings portability, foreign-owned firms appear to offer some benefits to New Zealand workers, beyond those that are observed in similar domestic firms. These include the opportunity to earn higher incomes during the period of employment, particularly for highly skilled workers, suggesting that the knowledge, technologies, and connections that foreign-owned firms bring are complementary to domestic skills. They also appear to complement urban scale, skills and interactions, with higher estimated foreign wage premia in cities. Finally, as firm size, location, and industry composition themselves explain a substantial proportion of the raw wage gap between foreign and domestic firms, foreign investment is also likely to raise average earnings in New Zealand by shifting the overall composition of the firm population towards more highly-paying firm types (particularly larger firms), an additional gain beyond the individual earnings benefits which are the focus of the paper.

# Contents

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<b>Abstract</b>	<b>i</b>
<b>Executive Summary</b>	<b>ii</b>
<b>1 Introduction</b>	<b>1</b>
<b>2 Literature review</b>	<b>2</b>
<b>3 Conceptual framework</b>	<b>5</b>
<b>4 Data</b>	<b>8</b>
<b>5 Wage impacts of FDI employment</b>	<b>15</b>
5.1 Discussion . . . . .	19
5.2 Heterogeneity of foreign premia . . . . .	22
<b>6 Foreign ownership and worker mobility</b>	<b>24</b>
<b>7 Conclusion</b>	<b>25</b>
<b>Tables</b>	<b>28</b>
<b>References</b>	<b>39</b>
<b>Appendix A: Additional tables</b>	<b>42</b>
<b>Appendix B: Hours analysis using Household Labour Force Survey data</b>	<b>48</b>

## List of Figures

---

1	Wage growth and employment in foreign-owned firms . . . . .	6
2	Prevalence of foreign ownership by selected industries, March 2011 . . . . .	11
3	Prevalence of foreign ownership by selected Labour Market Regions, March 2011 . . . . .	12
4	Components of foreign earnings premium, March 2011 . . . . .	13
5	Worker-level foreign wage premium, March 2011 . . . . .	14



## List of Tables

---

1	Foreign ownership status by year, as at March	28
2	Raw wage premia, firm- and worker-level	29
3	Raw wage premia	29
4	Raw wage transition premia	29
5	Starting wage premium	30
6	End wage premium	30
7	Prevalence of transitions between firms by ownership type, balanced panel	31
8	Entry and exit premia	31
9	Within-job wage growth	32
10	Censoring and job transitions	33
11	Mean reversion in wage growth at job transition	34
12	Foreign-ownership premia by quartiles of residuals from entry earnings growth regression	34
13	Heterogeneity by worker characteristics	35
14	Heterogeneity by firm characteristics	36
15	Sources of new employees	37
16	Destinations of departing employees	38
A.1	Prevalence of foreign ownership by industry, March 2011	42
A.2	Prevalence of foreign ownership by labour market region, March 2011	43
A.3	Summary statistics	44
A.4	Heterogeneity by industry	46
A.5	Heterogeneity by labour market region	47
B.1	Mean hours worked in foreign- and domestically-owned firms	49
B.2	Hours premium by firm type	49

# Earnings and employment in foreign-owned firms

## 1 Introduction

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Foreign direct investment (FDI) has the potential to raise domestic productivity and increase incomes, leading to improved living standards. FDI is often argued to be a source of direct benefits to the receiving firm, through improvements in management capability and access to overseas technologies and networks as well as financial capital. If the benefits of improved productivity and profitability are shared with local workers, this can in turn lead to higher incomes for New Zealanders. Meanwhile, knowledge embodied in foreign-owned firms may also be available to other local firms, via observation, via transactions with local suppliers and customers, through product market competition, and through labour mobility. Such benefits (both direct and indirect) are often cited as a rationale for reducing barriers to FDI and supporting greater foreign investment into New Zealand.

This paper explores a key potential source of economic benefits from foreign direct investment – human capital accumulation and earnings increases by employees of foreign-owned firms operating in New Zealand. International research consistently shows a significant gap between the average wages and salaries earned by workers in domestically-owned firms and those under foreign ownership or control (Lipsey, 2004; Hijzen et al., 2013). We examine the drivers of this foreign wage premium for New Zealand by tracking workers as they move between foreign- and domestically-owned firms, distinguishing between compositional factors (eg, differences in industry and employment composition) and the foreign premium *per se*. Following the taxonomy developed by Malchow-Møller et al. (2013), we separately identify the role of worker heterogeneity, firm heterogeneity, and heterogeneity in the learning opportunities available in foreign-owned firms.

We then consider whether flows of workers between jobs and locations differ across firm types. For example, do foreign-owned firms source workers differently from New Zealand firms? Are ex-employees of foreign firms more likely to leave the New Zealand labour market? These questions have implications for the degree to which any benefits of FDI can be captured by domestic firms and workers, as well as providing some indication of the nature of the differences between foreign and domestic firms which may be driving the relative wage patterns.

We find that while firm and worker composition explain most of the observed wage gap between foreign- and domestically-owned firms, a foreign premium of between 2.7 and 3.5 percent remains after controlling for composition. This premium is primarily the result of a firm-specific wage premium, with workers who join foreign firms gaining on average a two percent higher wage increase than those moving to comparable domestic firms. There is evidence of a small learning premium, with workers in foreign-owned firms experiencing slightly stronger within-job wage growth than those in domestic firms. However, workers

do not appear, on average, to retain any of the extra wage gains experienced during their employment in foreign-owned firms, suggesting that the experience gained in these firms is not especially highly valued by domestic employers.

We find no evidence that foreign-owned firms selectively hire recent migrants to New Zealand or bring in foreign staff to work in their New Zealand operations, mitigating concerns that the foreign wage premium may be due in part to the employment of highly paid expatriates. However, we do see a slightly higher emigration propensity among workers who leave foreign-owned firms, which may reflect either a selection effect (individuals with an interest in future travel may choose to work in foreign-owned firms) or greater opportunities to build networks and gain experience while on the job that lower the costs to future emigration. These higher emigration rates may imply reduced opportunities for knowledge spillovers from foreign to domestic firms through labour mobility within New Zealand. Workers in foreign-owned firms also appear to be more geographically mobile within New Zealand, but less likely to move across industries, consistent with greater job specialisation in foreign-owned firms.

Section 2 provides a brief review of the recent literature from New Zealand and abroad. Section 3 sets out the conceptual framework on which our analysis is based. Section 4 describes the data, while sections 5 and 6 describe the analysis of wage impacts and worker mobility respectively. Section 7 concludes.

## 2 Literature review

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Standard theories of FDI assert that, in the face of additional costs of doing business abroad and greater market-specific knowledge and networks of their competitors, foreign-owned firms rely on firm-specific advantages to enable them to compete in the local market (Markusen, 1995; Melitz, 2003; Dunning & Lundan, 2008). Such advantages may include proprietary product lines, high performance production processes and management practices, and greater access to technology, financial capital, and international networks. The potential for these advantages to be transferred to the domestic economy, either through direct influence over domestic firms that receive foreign investment or indirectly through interaction with other domestic firms, underpins most arguments in favour of efforts to attract and retain foreign investment. However, recent empirical research in New Zealand provides little evidence of productivity improvements associated with FDI, either in the firm receiving the investment (Fabling & Sanderson, 2014) or in other domestic firms in the same or related industries (Doan et al., 2014). Rather, much of the performance gap between domestic firms and recent foreign acquisitions is driven by foreign investors selecting high performance acquisition targets (Fabling & Sanderson, 2014).

While sobering, these findings do not necessarily imply that FDI has not been beneficial for living standards in New Zealand. For example, Fabling & Sanderson (2014) also find that foreign acquisition of existing New Zealand firms tends to be associated with strong increases in average wages, and mild increases in output and employment compared to those in similar firms that remain under domestic ownership. By shifting employment towards firms that were already more productive prior to receiving foreign investment, and increasing earnings of employees within those firms, recent FDI is likely to have raised aggregate productivity and labour market incomes, even in the absence of strong firm-level productivity improvements.

The significant wage gap between foreign- and domestically-owned firms, alongside post-acquisition increases in average wages and employment documented in Fabling & Sanderson (2014), provide an *a priori* indication that the presence of foreign-owned firms improves opportunities for New Zealand workers to gain high-income employment. However, the economic implications of this wage gap differ depending on the source of the gap. For example, if average wages rise in foreign-owned firms solely because these firms selectively hire highly skilled workers who could have earned a similar income elsewhere in the economy, or because foreign owners bring in highly paid executives from offshore, the net gain to New Zealand of foreign ownership may be minimal. In contrast, if foreign-owned firms offer higher wages for a given level of skill and experience, or allow workers to gain skills and knowledge which are of value to them and to their future employers, foreign investment can have a positive effect on aggregate labour market outcomes.

From a policy perspective it is important to understand not only whether foreign firms are having a positive impact on earnings and human capital accumulation in New Zealand on average, but also whether there are differences in these impacts across different types of firms or workers. For example, Huttunen (2007) finds that positive wage impacts from foreign acquisition are concentrated among university-educated workers, and Pesola (2011) finds that more educated workers are also more likely to retain the wage premium associated with foreign firm experience when they move to a domestic firm, implying that FDI may increase the wage gap between skilled and unskilled workers.<sup>1</sup> Andrews et al. (2009) find that acquisition impacts are stronger for firms and workers in the service sector, while Girma & Görg (2007) find little difference in wage impacts between firms in the skill-intensive electronics sector and those in the low-technology food manufacturing sector.<sup>2</sup> To the extent that the government is able to influence the composition of FDI flows into the country (eg, through restrictions on foreign investment under the Overseas Investment Act, or through targeted support provided by New Zealand Trade and Enterprise to potential investors), a better understanding of the effect of different types of investment can help identify where to focus government support.

While the existence of a substantial difference between average wages in foreign and domestic firms is well documented, much of this gap can be explained by the characteristics of the workers and firms involved (see Lipsey, 2004, for a review).<sup>3</sup> For example, simple controls for firm size, industry composition and observable measures of workers' human capital reduce the observed FDI premium in Ghana from 65 percent to 8.5 percent (Görg et al., 2007), and from between 10 and 19 percent (for non-production and production workers respectively) to between 1.2 and 7.3 percent in the US (Doms & Jensen, 1998).<sup>4</sup>

However, even after controlling for observable differences, a significant wage gap remains

<sup>1</sup> Taylor & Driffield (2005) find that FDI has been a significant contributor to wage inequality in the UK manufacturing sector between 1983 and 1992.

<sup>2</sup> Driffield & Love (2007) find that productivity effects of foreign investment depend crucially on investor motivation, with technology-exploiting FDI (in which the foreign-owned firm enters to exploit their existing technological superiority) providing positive productivity spillovers, while technology-sourcing FDI (in which the firm enters to gain access to local technologies) and efficiency-seeking FDI (in which the firm exploits lower local labour costs) have no, or even negative, spillover effects.

<sup>3</sup> Moreover, where local MNEs (domestically-owned firms with subsidiary companies located offshore) can be distinguished from other domestic firms, the "foreign" wage premium is shown to be more strongly associated with multi-national status than with foreignness *per se* (Doms & Jensen, 1998; Heyman et al., 2007; Iammarino & McCann, 2013).

<sup>4</sup> Foreign wage premia are generally found to be stronger in developing than developed countries (Hijzen et al., 2013), which may reflect larger differences in the characteristics of foreign and domestic firms in these countries, greater concerns about retention of trained workers in an environment with weaker intellectual property protection and/or lower levels of skill and education in the wider labour force, and international rent-sharing across countries (on the latter, see Budd et al., 2005; Egger & Kreickemeier, 2013).

in many countries. To address remaining compositional issues (unobserved worker quality and firm characteristics), the recent literature on earnings impacts of FDI has tended to take one of two approaches: tracking either average or individual wages at firms which transition between foreign and domestic ownership (eg, Heyman et al., 2007; Huttunen, 2007; Fabling & Sanderson, 2014), or tracking individuals as they transition between firms under different ownership (Pesola, 2011; Martins, 2005), or both (Andrews et al., 2009; Hijzen et al., 2013). The former provides a control for selective acquisition of higher performance targets based on (time-invariant) unobservable characteristics of the firm, while the latter controls for selection into foreign firms based on the unobservable characteristics of individual workers.

Studies that focus on changes in average wage associated with acquisition tend to find relatively strong wage impacts of FDI compared with those that consider individual wages. Heyman et al. (2007) find that even after controlling for firm characteristics and worker composition, foreign firms pay average wages that are around 10 percent higher than do domestic Swedish firms. However, when compared at the individual level, the foreign wage premium falls to between 2 and 6 percent. Moreover, they find that among workers who remain with firms following their acquisition by foreign owners, wage growth in the following two years is slower than that in similar firms that remain in domestic ownership.

The difference between individual and firm-level effects is explored by Hijzen et al. (2013), who show that part of the gain in average wages is driven by changing workforce composition, with foreign-acquired firms increasing their skilled labour share.<sup>5</sup> Workers who remain with firms that have been acquired see relatively little wage gain, while workers who transition from domestic to foreign-owned firms experience a wage increase of between six and 15 percent. Hijzen et al. (2013) therefore argue that the positive impact of foreign ownership on wages is driven by the creation of additional, high-wage jobs, rather than impacts on incumbent workers.

In this paper we focus on worker transitions between firms. This decision is driven by a combination of conceptual and practical reasons. From a purely practical perspective, annual information on foreign ownership is available for only a subset of firms in the data that we use, and relatively few firms transition from domestic to foreign ownership over the observation period (Sanderson, 2013; Fabling & Sanderson, 2014). As such, a focus on worker transitions provides a much larger sample and reduces the scope for measurement error compared to analysis of firm transitions.

From a conceptual perspective, a focus on worker transitions provides a long-run perspective on the impacts of foreign ownership. Employment and wage patterns are likely to differ from their long-run equilibrium in the years immediately following acquisition, as the new owners may restructure the existing operations or bring in an interim management team from offshore. Similarly, consideration of acquisition effects can shed light only on the impact of contemporary foreign investment into existing businesses, not that of earlier acquisitions or greenfields investment. By considering transitions of workers between firms, we reduce the potential for our results to be affected by short-term, transitional changes in wages and employment patterns and allow for consideration of a broader range of FDI impacts.

The downside of this approach is that if FDI patterns have changed substantially over time, the wage impact in the current stock of foreign-owned firms may not accurately reflect the potential effect of the marginal investor. Cartwright (2001) and Gawith (2002) argue

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<sup>5</sup> This finding is not universal – Huttunen (2007) finds that among Finnish manufacturers, plants that are acquired tend to reduce the share of skilled labour slightly.

that while historical FDI into New Zealand has been primarily either market-seeking or resource-seeking, more recent investments have targeted high-potential technology firms with the aim of incorporating the technologies and skills held by the New Zealand firm into the wider organisation. To acknowledge the possibility that this change in motivation has affected the composition and hence the average impact of FDI, we consider differences in the estimated foreign-wage premium across industries, regions and firm-size groups (section 5.2).

Looking beyond the direct impacts of foreign-firm experience on worker earnings, a further question is whether skills and knowledge acquired in foreign-owned firms can be transferred to other domestic firms, generating productivity spillovers.<sup>6</sup> International research shows some support for the premise that experience in foreign-owned firms is valued by workers' future domestic employers. Balsvik (2011) examines productivity spillovers associated with labour mobility from foreign to domestically-owned firms, finding that workers with recent experience in foreign-owned firms contribute positively to plant productivity, while Görg & Strobl (2005) find that, in Ghana, new firms founded by individuals with foreign-firm experience are more successful than those run by entrepreneurs who have not worked in foreign-owned firms. Focusing on worker impacts, both Martins (2005) and Pesola (2011) find that experience in foreign-owned firms is rewarded by future employers through higher wages, while Poole (2013) finds that the share of workers with foreign-firm experience also leads to increases in the average wages of continuing workers in domestic firms. She attributes this to productivity spillovers as domestic workers interact with, and gain knowledge from, those with foreign-firm experience.

Although we do not directly examine the existence of productivity spillovers through labour mobility, we identify the two necessary conditions for these to exist: the existence of learning premia for employees in foreign-owned firms, and some transfer of workers between foreign and domestic firms. Section 5 addresses the question of whether earnings increases gained in foreign firms are maintained when workers move to domestic firms, while section 6 digs further into the second condition, examining differences in labour sourcing practices and in the destinations of workers who leave foreign-owned firms.

### 3 Conceptual framework

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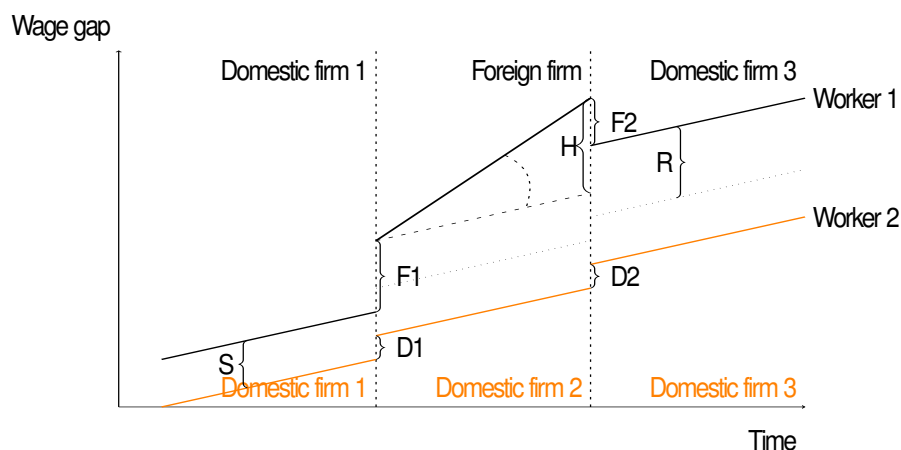
The analysis in section 5 is based on the taxonomy developed by Malchow-Møller et al. (2013), distinguishing three potential explanations for the observed foreign wage premium:

1. heterogeneous workers;
2. heterogeneous firms; and/or
3. heterogeneous learning.

These effects are illustrated in figure 1. The solid black line shows the wage level of a hypothetical worker ("worker 1") who moves from a domestically-owned firm to a foreign-

<sup>6</sup> While Doan et al. (2014) find little evidence of productivity spillovers from FDI, their work uses industry-level measures of supplier-customer relationships based on input-output tables. These measures do not take into account other forms of interaction, such as interfirm labour mobility, which may be an important source of knowledge transfer.

**Figure 1: Wage growth and employment in foreign-owned firms**



owned firm and then to another domestic firm. The lower solid orange line shows the wage level of a worker (“worker 2”) who works for three different domestically-owned firms over the same time period. For comparison, the dotted black line represents a hypothetical wage path for worker 1, had they worked for the same employers as worker 2.

The “heterogeneous worker” hypothesis refers to the possibility that foreign-owned firms may selectively employ workers who would have earned relatively high wages regardless of where they work, due to above-average levels of skill or experience. This “skill gap” or “selection effect” is shown in the diagram as ‘S’ – the *ex ante* wage gap between worker 1 and worker 2. Such a gap might be expected to arise if there are complementarities between skill levels and the technology or production processes applied in foreign firms.

The “heterogeneous firm” hypothesis refers to the situation in which foreign firms pay the same worker a higher wage than the worker could receive in a domestic firm. This may reflect rent-sharing in the presence of productivity or profitability differentials (Katz & Summers, 1989), compensating differentials for real or perceived lower job security (Bernard & Sjöholm, 2003; Görg & Strobl, 2003), or efficiency wages to promote greater work effort or to discourage workers from resigning if, for example, foreign firms face greater hiring or monitoring costs or are concerned about transfer of proprietary knowledge (Fosfuri et al., 2001; Glass & Saggi, 2002).<sup>7</sup>

The effect of selection into high-paying foreign firms is shown in the diagram by the gaps (F1-D1) and (F2-D2). Both workers gain a wage increase on moving to a new firm, but the wage gain by worker 1 from moving to a foreign firm (F1) is larger than that experienced by worker 2 (D1). When worker 1 leaves the foreign firm and returns to a domestic firm, their wage falls as they lose the benefit of the foreign-firm wage premium, while worker 2 again receives a small wage increase (D2).<sup>8</sup>

Finally, the “heterogeneous learning” hypothesis allows for the possibility that workers pick up additional skills or knowledge from working in a foreign firm, which may be reflected both in their earnings trajectory within the foreign-owned firm, and their earnings levels in later jobs. This is shown in the diagram by H and R. H reflects the more rapid wage

<sup>7</sup> Foreign-owned firms may also pay higher wages and/or provide better working conditions if they are more closely held to account by either local authorities or international customers than domestic firms, particularly in countries with lower enforcement of labour standards.

<sup>8</sup> More correctly, the diagram could allow for factors such as the age-wage profile, with slower within and between-job wage growth later in the life cycle. These refinements are omitted for simplicity.

growth experienced by workers during their time at a foreign firm leading to a higher ending wage level, while R shows the ‘retained premium’, in which some portion of the wage gain accumulated by the worker in their time at the foreign firm is retained when they subsequently return to a domestic firm. The difference between the wage level premium at the end of a foreign-firm job and the retained premium in future domestic firm employment reflects the degree to which skills acquired in the foreign firm are applicable and valued by future domestic employers.<sup>9</sup>

The extent to which observed wage premia are driven by each of these sources is likely to affect judgements regarding the value of FDI to New Zealand workers and the economy as a whole. If the foreign wage premium is driven solely by the heterogeneous worker effect, foreign firms are simply choosing workers who would already have been highly paid regardless of the ownership status of their employer, with little or no direct impact on the earnings opportunities of these workers. Effects on the wider economy will depend on the extent to which foreign entry raises overall demand for skilled workers, and hence the returns to skill in both foreign and domestically owned firms. In contrast, if wage premia are driven primarily by firm heterogeneity, foreign investment will directly affect the earnings opportunities of individual workers, and hence average incomes, even in the absence of flow-on effect to wages in domestic firms. Finally, if foreign premia are driven by heterogeneous learning, FDI provides benefits to the individual workers and, to the extent that it increases the total supply of knowledge and skills in the economy, may have positive spillover effects to other New Zealand firms, as some workers may move on to domestic firms bringing with them the knowledge and skills acquired at the foreign firm.<sup>10</sup>

These hypotheses are not mutually exclusive, and the effects may interact with each other. For example, higher potential learning opportunities may also depress the starting wage premium if workers recognise that foreign-firm experience will raise their life-time earnings capacity and are willing to accept a lower initial wage in return for the additional learning opportunities provided through their employment. The extent to which learning opportunities affect starting wages will in turn depend on the specificity of the skills provided – workers will be more willing to accept low starting wages if the skills they expect to gain are applicable across a range of alternative workplaces, rather than being specific to the foreign employer – and the extent of credit constraints which reduce workers’ ability to smooth consumption over the life-cycle.<sup>11</sup>

In practice, a range of other factors may also affect the observed earnings differential between foreign and domestic firms. For example, if foreign firms are less likely to employ part-time staff, higher average earnings may reflect longer hours worked. In addition, if foreign firms are more likely to bring in employees from offshore, some of these workers may be paid more than local staff to reflect dislocation costs or to match their earnings in their home markets. In the analysis of earnings in section 5, we restrict attention to those employees for whom we observe a clean transition between two full-time jobs. However,

<sup>9</sup> An additional possibility, which we do not consider here, is that knowledge spillovers and complementarities between workers may affect the earnings of workers who remain in domestic firms as well as those who move into foreign firms. When worker 1 returns to a domestic firm, knowledge transfer and skill complementary may raise the productivity and hence the earnings of worker 2. If this is the case, the estimated residual impact of working in a foreign firm may be biased downwards, as the control group of workers who remain in domestic firms will also have their earnings raised through contact with other workers. Poole (2013) finds evidence of spillovers of this type in Brazilian firms.

<sup>10</sup> The existence of knowledge *spillovers* does not necessarily imply knowledge *externalities*, if domestic firms in turn pay a higher salary to reflect the benefit of the worker’s new skills. However, knowledge externalities may still exist if, say, the worker brings new information or methods which increase the productivity of all workers, not just themselves.

<sup>11</sup> Pesola (2011) finds no evidence that Finnish workers pay for foreign experience in the form of lower starting wages.



as we observe monthly earnings, rather than the hourly wage, these observed premia may still be affected by differences in hours worked. Appendix B briefly examines this possibility in the New Zealand context. In section 6 we directly examine differences in the probability of hiring workers from overseas.

## 4 Data

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We make use of monthly individual-level earnings data linked to firm characteristics from Statistics New Zealand's Integrated Data Infrastructure (IDI). The IDI is a linked longitudinal database that brings together two existing databases – the Linked Employer-Employee Dataset (LEED), based on wage and salary information from Inland Revenue, and the Longitudinal Business Database (LBD), which holds firm-level information from a range of survey and administrative sources – and an extended range of individual-level data, including migration and benefit status. Employment information is available over the period from 1999 to 2011.

The unit of observation used in this analysis is a 'job' (job spell) – a continuous period of employment of an individual at a firm.<sup>12</sup> Spell-level observations are used in preference to a panel of monthly employment observations as the former provide a convenient method to control for both spell durations and gaps between spells, while the latter would be computationally infeasible for the full population of employee-months. To accommodate information on an individual's previous and future labour market status, the main analysis is restricted to job spells that commence after May 2000 and conclude before April 2010.

The primary population for the examination of wage dynamics is restricted to a "balanced panel" – those job spells for which we observe clean transitions between two full-time jobs at both the start and the end of the spell.<sup>13</sup> This population is extended for the analysis of worker mobility to cover all observed job spells between May 2000 and April 2010.

Employment information is sourced from Pay-As-You-Earn (PAYE) tax returns, which are submitted monthly by all employing firms. These capture all forms of labour income, including wages and salaries, bonuses, and commissions. Starting incomes are calculated in the second month of employment, and ending incomes in the second-to-last month of employment to avoid these measures being contaminated by part-months of employment and unusually large final payments (eg, severance pay).<sup>14</sup> Nominal earnings are adjusted to reflect changes in the consumer price index over the period. Tenure is defined as the total number of months that an individual is employed in a given job spell.

Worker quality, or "skill", is captured through estimates of worker fixed effects, following Hyslop & Maré (2006). These estimates are based on a separate regression of log annual full-time equivalent earnings ( $y_{ijt}$ ) on observable worker characteristics  $x_{it}$  (a flexible

<sup>12</sup> We exclude all periods of employment where the employee has ever received income as a working proprietor of that firm, as there are empirical and conceptual issues with determining the appropriate measure of earnings when workers have an ownership interest. To accommodate periods of leave and other short breaks in employment, we allow for one-month gaps in income receipt within a job spell. Where an income gap extends beyond one month, the periods before and after the gap are treated as two separate jobs with the same employer and are excluded from the main analysis.

<sup>13</sup> Full-time status is identified following Maré & Hyslop (2006).

<sup>14</sup> In cases where an individual receives no income in the relevant month, we use earnings from the third (or third-to-last) month of employment.

function of gender and age), worker fixed effects ( $\theta_i$ ), firm fixed effects ( $\psi_j$ ) and annual time dummies  $\tau_t$ ,  $y_{ijt} = \theta_i + \psi_j + x_{ijt}\beta + \tau_t + \varepsilon_{ijt}$ . The coefficients on the individual worker dummies  $\theta_i$  provide an indication of a worker's earnings potential, capturing a range of time-invariant characteristics not observed in the data including education and innate ability, as evidenced by the relative income of each worker across all their jobs after controlling for observable worker characteristics and the time-invariant effect associated with each firm they work for.

Alongside earnings and basic demographic information, we also make use of information on benefit receipt supplied by the Ministry of Social Development, and international migration and mobility information from the New Zealand Customs Service. This allows us to identify whether individuals have entered or left New Zealand over the period since 1997, and whether they have received income from a benefit. We restrict our attention to receipt of work-related benefits (eg, unemployment benefit, Working for Families) and injury-related payments from the Accident Compensation Corporation.<sup>15</sup>

At the firm level, foreign ownership is defined as having either 50 percent or higher recorded foreign ownership in the Longitudinal Business Frame (LBF), and/or a positive response to the disclosure question "Is the company controlled or owned by non-residents?" from the IR4 Company Tax return.<sup>16</sup> While the IR4 is filed annually by almost all limited liability companies, updates to foreign ownership information in the LBF are primarily based on responses to the Annual Frame Update Survey, which is full-coverage only for the largest firms.<sup>17</sup> As such, information on foreign investment is less reliable for small, non-corporate firms (eg, sole-proprietors and partnerships). At the same time, the specific questions that are used to identify foreign ownership across the two sources differ, implying that some firms may legitimately respond positively to one but negatively to the other. We therefore take all point-in-time ownership statuses associated with actual survey responses, tax returns, and manual adjustments by Statistics New Zealand's Business Frame operators,<sup>18</sup> and use these to distinguish four types of firms based on their "permanent" ownership status over the observed life of the firm: firms that are "always" foreign-owned at every observation; firms that are "never" foreign-owned; firms that are "mixed" or "sometimes" foreign owned, across time, data sources, or both; and firms for which we have no reliable information about their ownership status ("unknown" ownership).<sup>19</sup> All four groups are used in the analysis, with a focus on the comparison of firms that are "always" and "never" foreign-owned.

Table 1 reports the prevalence of each firm type as at 31 March over the years 2000 to 2011. As our definition of ownership is based on "permanent" ownership status over the life of the firm, there is little variation in reported foreign ownership rates over time aside from an initial decrease in the proportion of firms and employment allocated to the "unknown" ownership category as firms for which we have no FDI information exit the population. The link between foreign ownership status and firm size is apparent, with the two percent of firms that are "always" foreign and the four percent with "mixed" ownership (Panel A) accounting for around nine and twelve percent of employment respectively (Panel B).

<sup>15</sup> This restriction excludes superannuation payments, paid parental leave and student allowances, as these benefit types are not generally associated with labour market disadvantage.

<sup>16</sup> Where firms are part of a group of parent-subsidiary enterprises, we give precedence to responses of the individual firm. If no information is available at the firm level, and the information provided by other group members is consistent, firms are allocated to domestic or foreign ownership based on the group response.

<sup>17</sup> See Sanderson (2013) for a detailed discussion of alternative sources of FDI information in the LBD.

<sup>18</sup> These adjustments are made in response to information about firm ownership from other sources, including other Statistics New Zealand surveys and media reports.

<sup>19</sup> A small number of apparent single-year transitions into and out of foreign ownership from IR4s are ignored where they are inconsistent with other sources of FDI information.

Conversely, domestic firms and those with no ownership information account for a larger share of firms than employment. A similar pattern, though less pronounced, is apparent in the comparison between headcount and full-time equivalent (FTE) employment (Panel C), with foreign-owned firms showing a stronger tendency towards employing full time staff.<sup>20</sup>

The prevalence of foreign ownership differs substantially across industries, and to a lesser extent, across labour market regions (LMRs).<sup>21</sup> Figures 2 and 3 display the proportion of firms and employment associated with each ownership status as at March 2011, for selected industries and regions (more detailed results are shown in appendix tables A.1 and A.2). The proportion of “always” foreign firms ranges between 0.1 percent in Agriculture and 13.7 percent in Chemical and Rubber Manufacturing (0.3 and 33.0 percent of employment, respectively). Missing ownership information is particularly apparent in Agriculture, where there are many small, owner-operator firms, but is also noticeable in many service industries (figure 2). Differences across LMRs are less pronounced, but an urban bias is apparent in foreign investment (figure 3 and table A.2). Always foreign-owned firms account for 13.3 percent of employment in Greater Auckland, compared to 7.1 percent across other urban areas and 4.1 percent in non-urban regions.

Considered at the firm level, the average earnings gap between foreign- and domestically-owned firms is substantial. Figure 4a plots the distribution across firms of the mean log monthly earnings of full-time employees as at March 2011. While the distribution of log earnings for domestic firms is concentrated between 7.9 and 8.7 (monthly earnings of \$2,700-\$6,000), that for always foreign-owned firms is wider, and centered between 8.2 and 9.3 (\$3,600-\$9,900). Looking across all job spells, the average monthly starting wage in a domestic firm is \$3,735, compared to \$5,685 in always foreign-owned firms, a gap of over 50 percent (table 2).

Figures 4b and 4c distinguish two components of the overall wage gap – that associated with differences in the firm fixed effect, which captures whether a firm is a relatively high or low wage employer, and that associated with the mean worker fixed effect across the firm’s employees, which captures whether the firm hires workers who tend to be well paid regardless of where they work. Both components play an important role in explaining the gap in average wages between foreign and domestic firms.

However, measured as a firm-level average, this mean wage gap overstates the worker-level average due to differences in the distribution of firm size across ownership groups (figure 4d). While domestic firms tend to be very small (most have fewer than 10 employees, with average employment of 15.9), foreign-owned firms are much larger, with average employment of 111.7 (table 2) and a substantial proportion of firms in the range of 25 to 1000 employees (figure 4d). As larger firms commonly pay higher wages (eg, Oi, 2004; Troske, 1999), a firm-level calculation that places equal weight on all firms accentuates the foreign wage premium.

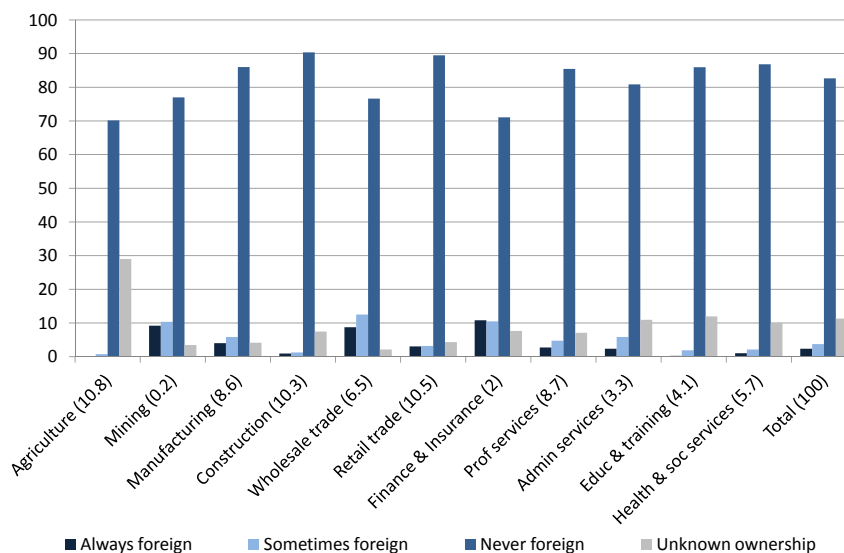
An alternative is to consider the distribution of wages at the worker level, as shown in figure 5. By placing equal weight on each worker, rather than each firm, this effectively

<sup>20</sup> As our method of identifying full time employment is based on wage and benefit income receipt, rather than hours information, the distinction between foreign- and domestically-owned firms may be overstated, as high-wage employees are less likely to be identified as working part time.

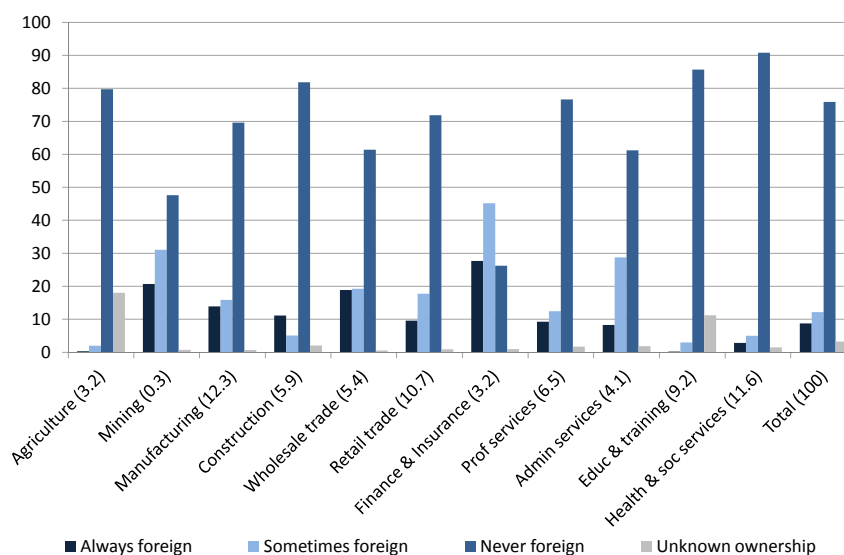
<sup>21</sup> Labour market regions are groupings of labour market catchments as used in Newell & Callister (2009), defined using the algorithm described in Papps & Newell (2002). The classification is available from [http://www.mera.co.nz/projects/LLMAResults/LMC2006/NZ\\_LbrMkt\\_Areas\\_Key2006.xls](http://www.mera.co.nz/projects/LLMAResults/LMC2006/NZ_LbrMkt_Areas_Key2006.xls). Individuals are allocated to LMRs according to the location of their employing firm, as recorded in the LBF. Where a firm operates across multiple regions, individuals are allocated to geographic units by Statistics New Zealand based on information about the relative employment in each plant and the residential or postal address of the employees.

**Figure 2: Prevalence of foreign ownership by selected industries, March 2011**

**(a) Proportion of firms**



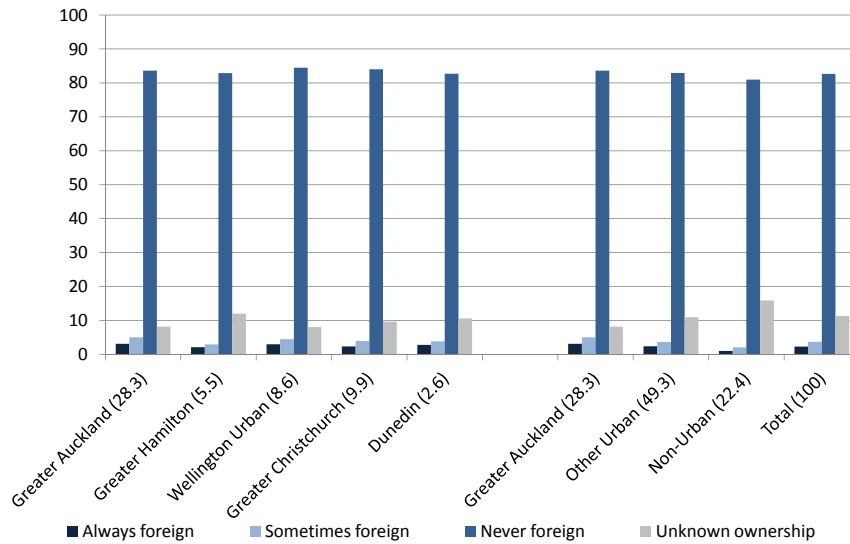
**(b) Proportion of employees**



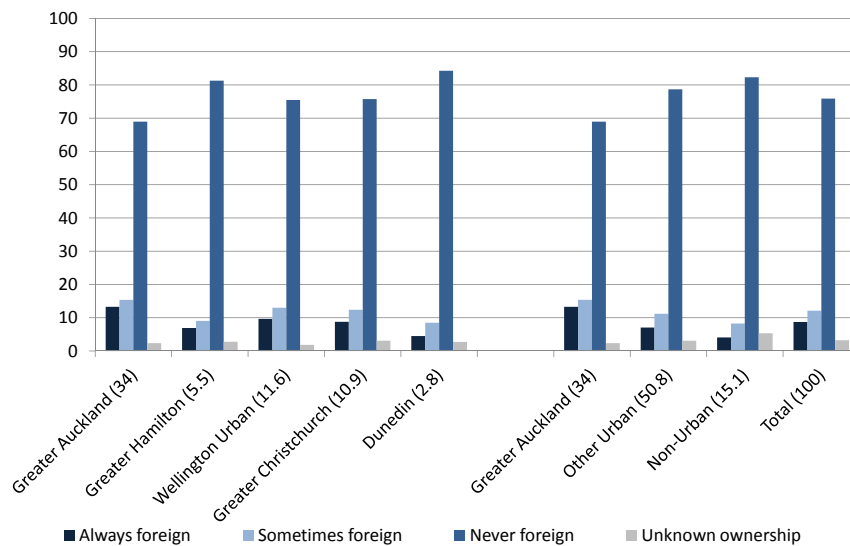
Industry percentages of total firms and employees shown in brackets.

**Figure 3: Prevalence of foreign ownership by selected Labour Market Regions, March 2011**

**(a) Proportion of firms**

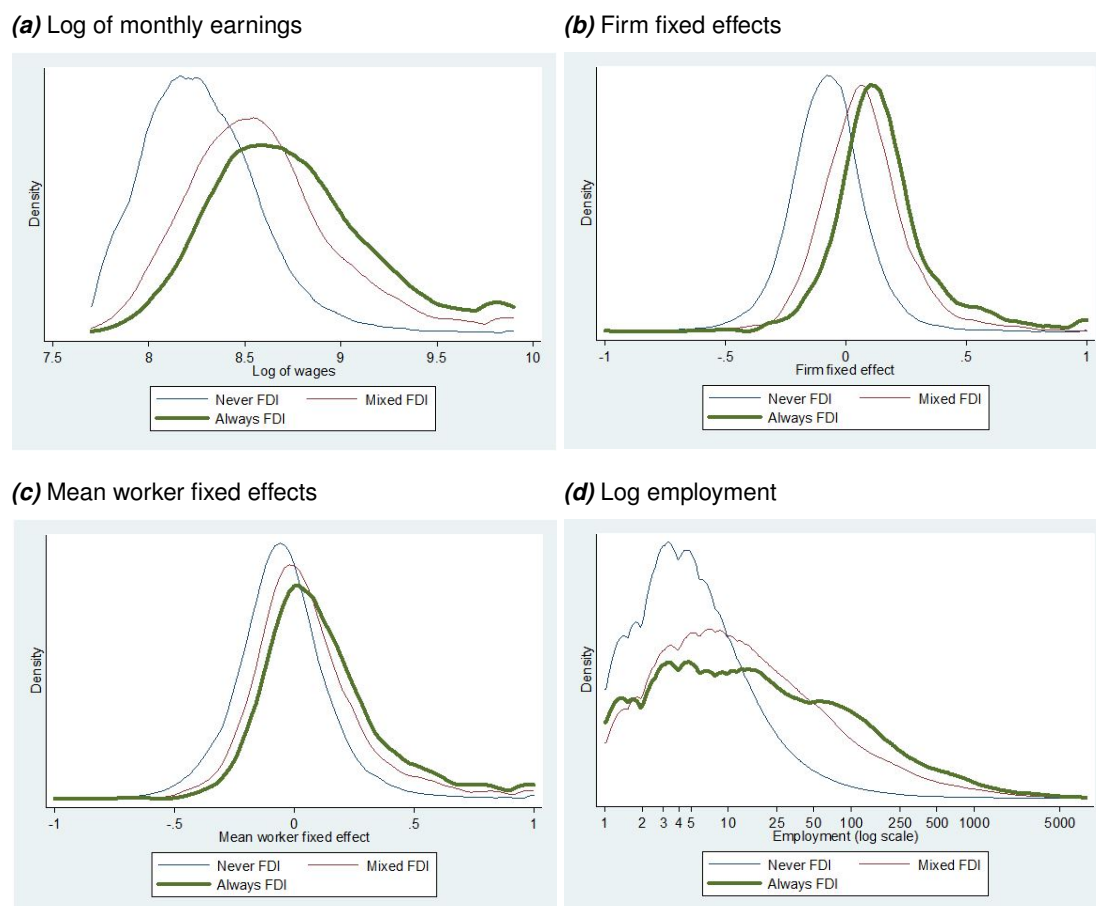


**(b) Proportion of employees**



Regional percentages of total firms and employees shown in brackets.

**Figure 4: Components of foreign earnings premium, March 2011**



Full-time employees only. One observation per firm. Tails of each distribution compressed in accordance with Statistics New Zealand confidentiality protocols.

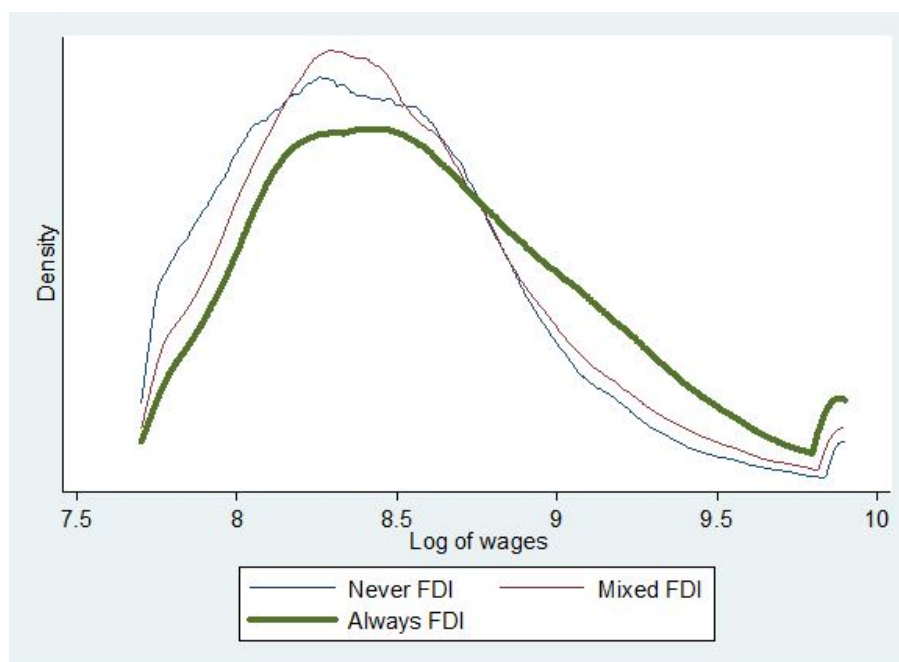
down-weights the small firms that make up the bulk of the domestic firm population, making the two populations more comparable. This substantially reduces the gap between the two distributions, and reduces the apparent foreign starting wage premium from 50 percent to 20 percent (table 2). However, there remains a substantial difference between foreign and domestic wage levels. Section 5 explores the source of this gap, with a focus on the three explanations outlined in section 2 – heterogeneous workers, heterogeneous firms, and heterogeneous learning.

Complete summary statistics at the job level are provided in appendix table A.3, separately for workers in always domestic and always foreign firms.<sup>22</sup> The comparison of spells across foreign and domestic firms shows up a number of differences in the characteristics of both workers and jobs. Completed tenure is longer on average in foreign firms than domestic firms, with a mean length of 20.1 months compared to 16.7 months.<sup>23</sup> Workers in foreign-owned firms are less likely to have been receiving a benefit over the prior year,

<sup>22</sup> Panel A is restricted to the primary regression population used in section 5. This population is restricted to job spells where we observe a clean, full-time transition between jobs at both the start and the end of the relevant job spell. Workers moving in or out of part-time jobs, multiple job holders, and repeated employment spells with the same firm are excluded. Panels B and C relax these constraints, covering all observed job starts and ends within the period from June 2000 to March 2010. This gives the populations used in section 6 to examine worker mobility.

<sup>23</sup> These estimates are lower than the average tenure found by Papadopoulos (2008). Longer spells are excluded from our analysis as we restrict to spells where we can observe a clean transition at either end of the job. Short spells (less than three months) are also excluded as monthly wage changes cannot be observed.

**Figure 5: Worker-level foreign wage premium, March 2011**



Full-time employees only. One observation per worker. Tails of each distribution compressed in accordance with Statistics New Zealand confidentiality protocols.

and are more geographically mobile, with higher proportions having been overseas in the 12 months prior to starting their current job, taking jobs across different regions of New Zealand, and traveling overseas in the 12 months following separation. Panels B and C also show that workers in foreign firms are more likely to be working fulltime, and less likely to hold multiple jobs.

While restricting to the balanced panel substantially reduces the sample size compared to the unrestricted sample of job spells, the two populations present a consistent picture with respect to the size of the raw wage premium (table 3). The inclusion of less stable workers (including those coming from or moving into part-time or multiple job employment, but also workers who are first entering or just leaving the workforce) drives down the mean wage in the unrestricted sample compared to the balanced panel, but the relative foreign premia remain reasonably steady.<sup>24</sup> Meanwhile, the stronger wage premium at the end of each spell compared to the start may reflect either a steeper wage profile or higher average tenure in foreign-owned firms.

This stronger wage growth is also reflected in the raw wage changes associated with job transitions (table 4). This table shows two things: for job starts and ends it shows the average wage change associated with a transition between employers according to the ownership status of the two firms; within-jobs, it shows the average wage change between the first and last month of employment. For the balanced panel, workers moving between domestic firms (D→D) on average experience 2.2 percent wage growth at the start of a job spell (relative to their earnings at the end of their previous job), followed by 3.5 percent growth within the spell. Moving from a domestic to a foreign-owned firm is associated with an average earnings gain of 5.5 percent, a 3.3 percent premium over the domestic-domestic average, while workers that leave foreign-owned firms for domestic

<sup>24</sup> The lower panel of table 3 maintains the requirement that the *current* job-start or job-end is full-time to maintain comparability of earnings, but places no restrictions on either the existence or characteristics of past or future job spells, or job characteristics at the other end of the current spell.

firms experience on average a 6.3 percent decrease in earnings.<sup>25</sup> However, these averages are affected by a wide range of factors, including differences in tenure, and worker and firm composition. Differences between start and end wage changes may reflect differences in timing<sup>26</sup> and the tendency for wage growth to slow with age, as well as any impact of the composition of individuals making each transition. Section 5 focuses on distinguishing the underlying foreign wage premium from differences due to composition.

## 5 Wage impacts of FDI employment

To understand the role of worker, firm, and learning heterogeneity in explaining the foreign-firm wage premium, we now turn to a series of regression analyses, in which we consider the wage dynamics of workers moving between foreign- and domestically-owned firms while controlling for the observable characteristics of the worker, the firm, and the job spell. As a first step, we examine the size of the ‘true’ foreign premium – the wage premium remaining after observable firm and worker characteristics have been controlled for. We then provide estimates for the various sources of foreign premium depicted in figure 1 – the heterogeneous worker effect (S), the heterogeneous firm effect (F1-D1, F2-D2), and the heterogeneous learning effect (H).

To understand the overall size of the foreign wage premium and the role of worker heterogeneity, we estimate two wage level regressions, for wages at the start and end of a job spell, which take the form

$$\ln W_{ijt} = \alpha + \beta^a \delta_j^{always} + \beta^m \delta_j^{mixed} + \beta^u \delta_j^{unknown} + \gamma \mathbf{X}_{it} + \phi \mathbf{Z}_{jt} + \psi_t + \varepsilon_{ijt} \quad (1)$$

in which log of monthly earnings of individual  $i$  in firm  $j$  at time  $t$  ( $\ln W_{ijt}$ ) is regressed on a set of dummy variables capturing the permanent ownership status of firm  $j$  ( $\delta_j^k, k \in \{\text{always, mixed, unknown}\}$ ),<sup>27</sup> a set of worker-level control variables ( $\mathbf{X}_{it}$ ), firm-level control variables ( $\mathbf{Z}_{jt}$ ) and a full set of time (month) dummies ( $\psi_t$ ). At the worker level we control for two time-invariant characteristics – gender and estimated worker fixed effects (WFE) – as well as a quadratic function of age and elapsed time and/or tenure which is adapted to suit the specific dependent variable in question. For the starting wage regression, elapsed time is defined as the gap between the end of the previous job and the start of the current job, to reflect the possibility that the length of time out of employment may affect both the wage offer made by employers and the worker’s reservation wage (Devine & Kiefer, 1993; Rogerson et al., 2005).<sup>28</sup> For the end wage regression, elapsed time reflects tenure in the current job.<sup>29</sup> At the firm level, we control for log employment and its square, and a full set of industry and LMR dummies. In each case the  $\beta$ s reflect the

<sup>25</sup> Including all clean transitions between two full-time jobs shows very similar results (lower panel, table 4).

<sup>26</sup> Wage ends are necessarily later in the period and thus may be affected by worsening economic conditions associated with aftermath of the Global Financial Crisis.

<sup>27</sup> Never foreign-owned firms form the reference group.

<sup>28</sup> See also Addison et al. (2009), who cast doubt on the assumption of a declining reservation wage.

<sup>29</sup> For both start and end wages, the control variables are included as second order polynomials, containing the following terms:  $\{A_1, A_2, A_1^2, A_2^2, A_1 A_2\}$ , where  $A_1$  is the worker’s age (in months) at the start of the relevant period,  $A_2$  is age at the end of the period, and the period in question is either the period of unemployment prior to a job start, or the period of tenure prior to a job end. This specification controls for age, tenure and experience effects, though we cannot separately identify all three and thus cannot interpret the coefficients of the polynomial.



wage premium for each type of ownership, relative to firms that are always domestically owned.

Tables 5 and 6 report results for start and end wages respectively. Column 1 shows raw wage gaps controlling only for time. Worker and firm characteristics are then introduced separately (columns 2 and 3 respectively), providing some indication of the extent to which the average gaps between foreign- and domestically-owned firms are driven by differences in worker and firm composition. Column 4 combines both sets of covariates. The 13-15 percent higher average starting wage observed for “always” foreign firms in table 3 is apparent in column 1 of table 5, where wage is regressed only on ownership type and time effects. As might be expected, the wage premium associated with firms which are sometimes foreign owned is also positive, but weaker than that for the always foreign-owned firms, as this coefficient represents the average premium across all years, including those when the firm is domestically owned.<sup>30</sup> Adding worker characteristics (column 2) reduces the foreign premium to around three fifths of the raw figure, or 8.5 percent, while controlling for firm characteristics alone reduces the foreign premium to 4.3 percent (column 3). Together, the combined impact of firm and worker controls leaves an unexplained foreign premium of 2.7 percent. This reflects the role of factors such as productivity differentials between foreign- and domestically-owned firms, as well as any compensating differential or efficiency wages paid by foreign-owned firms.<sup>31</sup>

By introducing firm and worker controls sequentially, these regressions also provide estimated bounds for the extent to which average starting wages are affected by selective hiring of highly-paid workers into foreign firms – the gap labelled  $S$  in figure 1. Comparing estimated wage premia between columns 1 and 2, and between columns 3 and 4 respectively in table 5 gives us an upper and lower bound for the role of observable and unobservable but time-invariant worker characteristics in explaining the overall foreign wage premium. The gap between the upper and lower bounds reflects the fact that worker and firm characteristics are themselves interrelated – not only are foreign-owned firms more likely to hire a particular type of workers, but across both foreign and domestic firms there are systematic differences in worker composition according to industry, firm size and location. Without controls for firm characteristics (that is, attributing the full effect of both the worker characteristics themselves and the interdependent worker  $\times$  firm characteristics to the workers), the upper estimate of the role of worker characteristics is  $S_u = 0.142 - 0.085 = 0.057$ , a 5.7 percent wage gap attributable to worker heterogeneity. If we instead attribute the impact of interdependent characteristics to the firm – the comparison between columns 3 and 4 – the remaining worker-specific component of the foreign premium is  $S_l = 0.043 - 0.027 = 0.016$ , a 1.6 percent gap attributable to worker quality. This lower bound gives a conservative estimate of the skill gap  $S$ , as it represents the pure impact of worker effects beyond those which are correlated with the composition of foreign firms. Worker and firm characteristics themselves show the expected relationship with wage levels – wages are higher for males and in larger firms, while the coefficient on worker fixed effects is close to one reflecting the construction of the variable.

The foreign premium is somewhat higher for ending wages than starting wages (table 6), suggesting a role for heterogeneous learning in which the return to working in a foreign-owned firm increases over time as workers gain skills.<sup>32</sup> Worker and firm characteristics play a similarly important role in explaining start and end premia, with worker characteristics

<sup>30</sup> This relationship is consistent throughout later regressions, with the exception of the within-job wage growth premium analysis.

<sup>31</sup> Further controls for firm performance (eg, productivity, profitability) would likely reduce this premium further. However, as firm-specific advantages are a core part of the argument for a positive impact of FDI, controlling for these factors could be viewed as dismissing the very phenomenon we are interested in.

<sup>32</sup> Wage growth premia are examined directly in table 9.

alone explaining around 45 percent of the raw end-wage premium, reducing the coefficient on “always foreign” from 0.170 to 0.094, and worker and firm characteristics combining to explain around 80 percent of the raw gap  $((0.170 - 0.035)/0.170)$ .

Although not directly comparable due to methodological differences, these results have some similarities to those found by Malchow-Møller et al. (2013) for Danish firms. The raw wage premia are almost identical across the two countries, at 14.2 percent in New Zealand and 13.2-15.1 percent in Denmark (Malchow-Møller et al., 2013, p.309), and the remaining unexplained premium is also very similar, at 2.7 percent in New Zealand and between 1.9 and 3.7 percent in Denmark. However, based on comparison between the estimated premium controlling only for year, industry and location, and the same regression including also worker fixed effects and observable worker characteristics, Malchow-Møller et al. (2013, p.310) suggest that up to 75 percent of the earnings premium in Denmark is attributable to worker heterogeneity, while the closest comparison in the New Zealand data, between columns 3 and 4 of tables 5 and 6, implies a much lower share of the premium attributable to worker characteristics, at around 40 percent. With data on Swedish firms, Heyman et al. (2007) also show similar raw and residual premia (18-21 percent and 2.0-2.5 percent respectively), with industry and time dummies explaining around 75 percent of the raw gap and observable worker characteristics explaining around 40 percent of the remaining foreign premium.

Having established that worker characteristics, firm composition, and unobserved factors associated with foreign ownership all contribute to the wage gap between foreign and domestic firms, we now turn to the task of distinguishing the relative roles of our other two hypotheses – firm heterogeneity and learning heterogeneity. In order to do this, we focus on worker transitions between foreign- and domestically-owned firms. Table 7 reports the prevalence of each of the possible transitions between foreign and domestic ownership, showing considerable movement of workers between the two. Despite substantial movement across firm types, there is also a clear tendency for workers to transition between firms of the same type. While around 10 percent of all transitions involve a move to a foreign-owned firm, nearly 30 percent of job spells in foreign-owned firms end with a move to another foreign-owned firm (table 4, column 1). Similarly, 80 percent of transitions from domestically-owned firms are into other domestically-owned firms, which make up 73 percent of all transitions (column 3).

Given the use of monthly earnings to measure income growth, rather than hourly wage data, a further explanation for the observed foreign firm premium is that foreign firms may expect longer hours from employees. Appendix B uses hours data for a subset of jobs to show that this is unlikely to explain the observed earnings gap.

To capture the foreign-firm specific element of the earnings premium – the gaps (F1-D1) and (F2-D2) in figure 1 – we estimate:

$$\begin{aligned} \Delta \ln W_{itpc} = & \alpha + \beta_p^a \delta_{previous}^{always} + \beta_p^m \delta_{previous}^{mixed} + \beta_p^u \delta_{previous}^{unknown} \\ & + \beta_c^a \delta_{current}^{always} + \beta_c^m \delta_{current}^{mixed} + \beta_c^u \delta_{current}^{unknown} \\ & + \gamma \mathbf{X}_{it} + \phi \mathbf{Z}_{pc} + \psi_t + \varepsilon_{itpc} \end{aligned} \quad (2)$$

where  $p$  refers to the previous job spell and  $c$  refers to the individual’s current spell with a different employer,  $\Delta \ln W_{itpc}$  is the log difference in earnings between the end of job spell  $p$  and the beginning of job spell  $c$ .  $X_{it}$  includes gender and worker fixed effects, as well as a polynomial function capturing age, tenure in the previous job, and elapsed

time between the end of the previous job and start of the current job.  $Z_{pc}$  includes a full set of industry and labour market dummies for both the previous and current employing firms, two additional dummies capturing whether the job transition involved a change in industry or a change in LMR, and a flexible polynomial function of firm-level employment in both the previous and current employers.<sup>33</sup> As we include dummy variables for the ownership status of both the previous and current employer, coefficients on current firm ownership reflect the relative wage gain associated with moving to a firm of each type relative to moving to a domestic firm, while controlling for the ownership of the previous employer (ie,  $\beta_c^a = F1-D1$ ). Meanwhile, the coefficients on previous firm ownership reflect the relative wage change associated with leaving each type of firm, again compared with leaving a domestically-owned firm (ie,  $\beta_p^a = F2-D2$ ). These provide our estimates of the heterogeneous firm effect.

Columns 2 and 4 of table 8 can be thought of as two different estimates of the heterogeneous firm effect. Both control for worker characteristics (including tenure in the previous job and gap prior to joining the current employer), but while column 2 allows differences associated with the industry, region and firm size composition of the foreign-owned firm population to be included in the overall foreign premia, in column 4 these effects are directly controlled for, leaving only the unobserved foreign premia. When firm composition is not controlled for, entering a foreign-owned firm is associated with a 4.2 percentage point greater wage increase than moving between domestic firms (table 8, column 2, row 4). This premium reflects both the difference in observable firm characteristics between foreign- and domestically-owned firms, with moves to foreign firms also more likely to entail a move to a larger firm (see table A.3), and the premium associated with foreign ownership itself. Controlling for firm characteristics as well (column 4), a two percent entry premium remains, reflecting the part of the foreign wage premium that cannot be explained by differences in firm composition or worker characteristics or by relative wage growth within jobs (as the measure only considers starting wages at the new firm). As such, it is indicative of firm-specific effects such as rent-sharing, compensating differentials and efficiency wages.

As discussed in section 3, the firm heterogeneity hypothesis implies not only that workers will gain from moving into foreign firms, but also that some or all of this wage gain will be reversed when they move back to a domestic firm. This effect is shown in row 1 of table 8, which reports the differential wage change associated with leaving a foreign owned firm relative to a domestic firm. As expected there is a penalty to leaving a foreign firm, with wage growth among exiters being 3.1 percentage points lower than that for workers leaving domestic firms, controlling for both worker and firm characteristics (column 4). This exit penalty more than fully reverses the two percent entry premium experienced when a worker first moves into a foreign-owned firm.

Finally, to identify heterogeneous learning effects (H), we estimate a model of within-job wage growth:

$$\begin{aligned} \Delta \ln W_{ijt} = & \alpha + \beta^a \delta_j^{always} + \beta^m \delta_j^{mixed} + \beta^u \delta_j^{unknown} \\ & + \gamma \mathbf{X}_{it} + \phi \mathbf{Z}_{jt} + \psi_t + \varepsilon_{ijt} \end{aligned} \quad (3)$$

where  $\Delta \ln W_{ijt}$  is the log difference between monthly starting earnings and ending

<sup>33</sup> Employment controls include:  $\ln E_1, \ln E_2, (\ln E_1)^2, (\ln E_2)^2, \ln E_1 \times \ln E_2$ , where  $E_1$  is employee count at the previous firm in the month in which we measure workers' end-of-job earnings, and  $E_2$  is employee count at the current firm, in the month in which we measure starting earnings in that job.

earnings within a job spell.  $X_i$  includes gender, estimated worker fixed effects, and controls for age and tenure within the job, and  $Z_j$  includes a full set of industry and labour market dummies for the current employer and a polynomial expression of firm size at the start and end of the job spell.<sup>34</sup> In this case, coefficients on foreign ownership represent the wage growth premium over the period employed by a foreign-owned firm, after controlling for tenure and other observable characteristics of the firm and worker (including an estimate of unobserved skill levels).

Table 9 follows the same pattern as table 8, sequentially adding worker and firm characteristics. On average, workers in foreign-owned firms experience an extra 2.8 percent growth in wages, relative to workers in domestically-owned firms (table 9, column 1). This reflects in part longer average tenures in foreign firms (table A.3), as well as differences in worker and firm characteristics. Controlling for tenure and worker characteristics reduces the estimated foreign premium by around two-thirds, to 1.1 percentage points. Additionally controlling for firm composition, workers in foreign firms exhibit on average 0.4 percent higher wage growth over the course of their employment than that experienced in domestic firms (table 9, column 4) – the gap labelled H in figure 1. With an average completed tenure of 20 months (table A.3), this implies approximately an additional 0.25 percentage points per year wage growth. This provides some support to the hypothesis that foreign firms provide learning opportunities beyond those available in domestic firms, although these do not appear to be particularly large.

Unlike the between-firm transitions considered above, the within-job growth premium associated with ownership appears stronger among firms which are classed as “sometimes” foreign owned, rather than those that are always foreign owned. This may reflect transitions in ownership within a job spell, with part of the within-job earnings growth in sometimes foreign-owned firms associated with the transition from domestic to foreign ownership.<sup>35</sup>

Comparison to the results of Malchow-Møller et al. (2013) is again complicated by methodological differences, but suggests that while the raw wage growth premium is substantially stronger in New Zealand,<sup>36</sup> almost all of this premium is explained by differences in worker and firm characteristics (compare columns 1 and 3 of table 9). In contrast, a comparison of columns 1 and 6 of (Malchow-Møller et al., 2013, (table 6)), implies that over half of the raw premium remains after additional controls for worker characteristics and firm size are added.<sup>37</sup>

## 5.1 Discussion

Together, these estimates paint a picture in which both worker and firm characteristics are important explanators of the overall difference between foreign and domestic firm earnings,

<sup>34</sup> Consistent with the cross-job regressions, firm size controls include  $\ln E_1$ ,  $\ln E_2$ ,  $(\ln E_1)^2$ ,  $(\ln E_2)^2$ ,  $\ln E_1 \times \ln E_2$ , where  $E_1$  is now employment count at firm  $j$  at the start of the employee’s job spell and  $E_2$  is employment in the same firm at the end of that spell.

<sup>35</sup> Looking at firms classed as “sometimes” foreign owned across the full sample period, transitions from domestic to foreign ownership are more common than from foreign to domestic ownership. Of the 1,974 firms for which we can observe ownership status in 2000/2001, and also in 2010/2011, 17.5% move from domestic to foreign ownership, while only 7.9% transition in the opposite direction.

<sup>36</sup> A raw premium of 2.8 percentage points (column 1) over the domestic average growth of 3.5 percent (table 4) giving a raw premium of around 80 percent compared to the 10 percent premium cited by Malchow-Møller et al. (2013, p.314).

<sup>37</sup> As Malchow-Møller et al. (2013) include industry and location controls in their estimates of the ‘raw’ premium, an alternative comparison would be between columns 3 and 4 of table 9. While this reduces the ‘raw’ premium in New Zealand to around 37 percent (.013/.035), worker characteristics continue to account for over two thirds of this gap.

but are not sufficient to fully explain the foreign wage premium. After controlling for both firm and worker characteristics, workers who enter foreign-owned firms gain around an extra two percentage point increase in earnings relative to workers who transition between domestic firms. In addition, workers within foreign-owned firms experience slightly stronger within-job wage growth (0.4 percentage points above similar workers in similar domestic firms). However, the additional wage growth associated with foreign-firm employment is not retained when workers leave the foreign-owned firm, with the earnings penalty to returning to a domestic firm more than balancing out the combined wage growth associated with the entry and within-job growth premia (2.0% entry premium + 0.4% within-job premium + (3.1%) exit penalty = -0.7% retained premium). This contrasts with findings of positive returns to foreign-firm experience from Malchow-Møller et al. (2013), Pesola (2011) and Balsvik (2011).

One potential explanation of this finding is that domestic firms are not willing to pay a premium for experience gained within foreign firms because some types of knowledge and skills rewarded by foreign firms are not as highly valued by domestic businesses. This might be the case if jobs in foreign firms are more specialised than those in New Zealand firms (perhaps because local subsidiaries have a more narrowly defined role in the larger organisation), or because the skills that are learned are specific to the firm (eg, developing relationships with offshore owners or customers). While we control for firm size in the New Zealand operation, foreign-owned firms may have access to a broader international organisation, allowing workers within the New Zealand operation to specialise in particular tasks.

Alternatively, there may be unobserved selection effects involved in the exit penalty. For example, if working conditions and expectations are stricter in foreign-owned firms, return to a domestic firm may reflect a lifestyle choice on the part of the individual worker, with lower wage growth (or even an absolute wage decline) accepted as a tradeoff for better work-life balance.

More generally, job transitions reflect endogenous choices on the part of firms and workers. As most job changes are voluntary, we only observe a transition if it is beneficial in some way for the worker concerned.<sup>38</sup> If a more generous initial wage offer (relative to both the previous job and other alternative employers) and/or stronger wage growth are factors in workers' employment and job-search decisions, both the wage change associated with job transitions and the wage growth within jobs will be stronger than we would observe if workers were randomly allocated across employers. Conversely, once workers find a job that suits them, their incentive to remain in that job will also be influenced by both wage and non-wage conditions. If a more generous entry wage or stronger within-job wage growth are associated with higher incentives to remain in a job, then observed entry wage growth and within-job growth will be lower across both domestic and foreign firms, as workers with a particularly good job match will tend to remain in that job and thus will not be captured in the regression population.

As an indication of the extent to which selective exit patterns matter, table 10 reports mean residuals from regressions of entry wage growth and starting wage levels on the standard explanatory variables. Residuals are reported separately according to both the ownership of the current employer and workers' subsequent destination, where the latter covers whether or not the worker remains with the firm for an extended period (more than 5 years) and, for those who leave, whether their next employer is foreign or domestically owned. That is, it provides a test of whether workers who remain with the firm long-term

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<sup>38</sup> Relevant factors may include earnings potential and employment conditions, but also lifestyle decisions such as location and job content.

differ from those who leave relatively quickly and, amongst those who do leave, whether those who move to foreign firms differ from those who move to domestic firms, in terms of their unexplained entry wage growth.

Columns 1 and 2 report the comparison between workers who remain in their jobs for more than 5 years and those who move on. For both wage growth and wage levels, workers who stay long-term (those with censored spells) actually tend to be those with slightly lower than expected earnings on entry, though the difference for the wage growth regression is not significant among foreign-firm employees. The gap in mean residuals between censored and completed spells does not differ for workers in domestic firms and those in foreign-owned firms, suggesting that while censoring may be affecting the *average* wage level associated with job transitions, there is no evidence that it affects the *gap* in either wage levels or entry wage growth between foreign and domestic employers.

A second possibility is that workers who move between foreign and domestic firms may be a non-random selection of workers, even controlling for observed differences. Transition patterns may be correlated either with unobserved worker characteristics, or with patterns of transitory wage change, leading to biased estimates of the entry premium or exit penalty. The selection bias can take two forms. First, transition patterns may be correlated with unobserved differences between workers in the lifetime average level or growth rate of earning capacity. Second, transition patterns may be correlated with transitory earnings fluctuations. In this case subsequent earnings changes will reflect mean reversion, as the transitory fluctuations are reversed, in addition to the true impact of moving between firms under different ownership. The impact of mean reversion on foreign entry and exit premia will depend on the prevalence of transitory fluctuations and the strength of mean reversion for different types of transition.

Unobserved characteristics associated with a worker's average wage level are controlled for in the start and end wage regressions (tables 5 and 6) by the inclusion of estimated worker fixed effects, and in tables 8 and 9 by first differencing. Worker-level differences in wage growth are controlled for in tables 8 and 9 only to the extent that worker-specific growth is correlated with unobserved worker-specific wage level components (WFE). If high latent-growth workers disproportionately enter and remain within foreign firms, the estimated impact of entry into FDI firms will be overestimated, and the earnings change associated with entering a domestic firm will be underestimated. In this case, the net exit penalty will be larger than estimated.

Columns 4 to 6 of table 10 examine whether transitions are random, conditional on observed characteristics. Specifically, they show whether the foreign ownership of a worker's next employer is correlated with residual wage levels or wage growth on starting a job, as estimated using equations 1 and 2. By construction, these residuals have zero mean conditional on the ownership type of current employer. They may, however, be non-zero by next employer if transitions are non-random. For workers leaving domestic firms, there is only a small difference in residuals for those moving to foreign firms compared with those moving to domestic firms. Residual start wage levels are only 0.6 percent higher, and residual entry gains are insignificantly lower (column 6). There is much stronger selection among workers leaving foreign firms. Those moving to other foreign firms have 2.8 percent higher residual wage levels, and 2.0 percent higher residual entry gains than those moving to domestic firms. The estimated entry gains and exit penalties associated with jobs in foreign-owned firms may be affected by these selection patterns.

Table 11 shows, however, that these biases are relatively small. Controlling for residual start wage or prior residual entry gains has only a small impact on the estimated exit

penalty, which declines from -0.031 to -0.029, or the estimated entry premium, which rises from 0.020 to 0.023. There is, however, strong evidence of mean reversion, consistent with transitory fluctuations in earnings. Across all types of transitions, a one percent higher residual starting wage is associated with a 0.31 percent lower entry wage change at the next job transition (column 3). Similarly, a one percent higher residual wage gain when starting a new firm is partially reversed by a 0.14 percent lower wage gain at the next job-to-job transition (column 2).

Finally, table 12 investigates whether the persistence of wage gains varies according to the ownership of the firm. Workers are divided into quartiles based on the residual wage gains made when they entered their previous job. The relationship between entry gains and within-job growth does not differ between domestic and foreign firms, as shown by the small and mostly insignificant estimates in column 1.

Unexpected wage gains on hiring are more persistent when the worker's next transition is to a foreign firm. Workers who make residual wage gains at the start of a job – the unexplained gains remaining after controlling for observed characteristics – retain more of their gains if they leave a foreign firm than they would if they were to leave a domestic firm. Workers making the largest (residual) entry gains (Q4 in table 12) lose only 2.0 percent upon leaving a foreign firm, compared with 3.3 percent for workers with the smallest entry gains (Q1 in table 12), and 3.1 percent overall. Those who had previously made large (residual) entry gains also benefit more from starting their next job in a foreign firm, experiencing a 3.1 percent entry premium compared with 2.0 percent overall. In contrast, workers who had previously made the smallest (residual) entry gains receive only a fraction of the foreign premium (0.9 percent). The net exit 'penalty' for high residual gain (Q4) workers is actually a net exit gain of 1.1 percent. For low residual gain (Q1) workers, the penalty is -2.4 percent.

That is, workers with unexpectedly high wage growth appear, subsequently, to be more highly valued by foreign firms. It may be that foreign firms put greater weight on workers' previous earning histories as a guide to worker productivity when hiring workers or setting wage levels. At least for workers with high residual wage growth, there is a longer term advantage to being employed in a foreign firm, even if on average workers leaving foreign firms experience a slightly larger drop in earnings than the gain made by workers joining foreign firms.

## 5.2 Heterogeneity of foreign premia

Table 12 shows one potentially important dimension of heterogeneity in foreign ownership premia. Further comparison of wage premia across different types of workers and firms may provide indications of the learning process associated with foreign ownership and the source of the foreign wage premia. Policymakers may also be interested in variation in the foreign premia across different groups of firms and workers. For example, if the composition of contemporary FDI differs from that experienced in the past (eg, differences in industry focus), estimates based on employees of long-standing foreign-owned firms may not reflect the expected impacts of future FDI flows. Similarly, the relative wage and learning impacts associated with different types of firms and industries may be of interest. Political support for FDI may be conditional on the distribution of benefits, rather than just the average size. In particular, if gains from FDI employment are felt primarily by high-wage, high-skill workers, the decision whether to support further FDI may turn on the role foreign firms play in reducing the emigration of highly skilled New Zealanders. Alternatively, if gains are felt primarily by low skill workers, equity considerations play a

more obvious role in the debate.

To examine further the heterogeneity of potential FDI premia, tables 13 and 14 report the foreign ownership premia associated with always foreign-owned firms from separate regressions for a range of different firm and worker groups.<sup>39</sup> Table 13 reports coefficients on being employed by an always foreign-owned firm for different groups of workers, distinguished according to gender, age groups, and quartiles of the worker fixed effect distribution. Foreign premia differ by age group (panel A), with younger workers on average experiencing both a greater wage boost on entry (column 3) and a lower penalty on leaving a foreign firm (column 5). While the estimated within-job wage growth premium is increasing in age, it is significant only for “prime-age” workers (25-49 years) (column 4).<sup>40</sup>

Both entry premia and exit penalties increase with worker skill, suggesting that not only do foreign firms hire ‘better’ workers, they also pay more to get those workers (panel B). As these workers are more highly paid to begin with, higher premia for the highly skilled are likely to exacerbate income differentials between groups. Finally, while women experience a slightly stronger wage gain on entering a foreign firm, their wage growth within those firms is low, even compared with jobs in similar domestic firms, with the positive growth premium driven by males. Overall, this yields a retained premium (column 6) of almost zero for men and -1 percentage point for women.

Table 14 repeats the analysis above for different types of firms, distinguishing by firm size, location and a series of industry characteristics. Appendix tables A.4 and A.5 provide a more detailed set of industry and location estimates. At the firm level, we consider only start and end wage levels and within job wage growth premia, as transitions between jobs often also involve transitions between industries or firm sizes, such that wage changes will be affected by both the characteristics of the previous firm and the new firm.

Wage level premia are substantially stronger for small firms (panel A), with workers in small foreign firms receiving an average starting wage 19 percent higher than those in similar domestic firms. For medium-sized firms (5-49 employees), the foreign premium falls to 8.7 percent, and falls further to 1.5 percent among larger firms. Wage growth premia are concentrated among medium-sized firms (column 3). Many of the benefits that foreign firms provide (such as improved management capability, access to financial capital, virtual scale and opportunities for specialisation) are potentially much harder to realise for small firms, which are unlikely to have the same access to internal and external resources as larger firms. The foreign wage level premium also appears to be an urban phenomenon, strongest in Auckland and very weak in rural areas (panel B). The knowledge, technologies, or inputs that foreign-owned firms bring may be complementary with the more skilled urban workforce or greater scale of urban activity. The higher rate of interaction within cities may also magnify the advantages that foreign-owned firms bring.

Finally, the pattern of FDI premia across industry groups is consistent with differences in both profitability and learning opportunities across sectors between foreign and domestically-

<sup>39</sup> In any given subgroup there are a range of other factors involved, including both endogeneity in employment paths and potential heterogeneity across other dimensions of worker and firm characteristics. However, allowing for the full range of observable heterogeneity in premia would require a fully interacted model with impacts of FDI allowed to vary by age, by tenure, by location etc., an approach which quickly becomes unmanageable. As such the reported results should again be treated as an observed average, which is of interest when thinking about the distributional impacts of FDI even though it does not imply a deterministic relationship between any of the binary categories considered below and the strength of the FDI premium.

<sup>40</sup> This may reflect in part reflect sample size differences – “prime-age” workers account for around two thirds of the total population.



owned firms (panel C). Insofar as the foreign premia reflect rent-sharing, higher wage level premia in inward facing industries (industries with high levels of imports, low export intensity, and a tendency to supply households) may reflect a greater performance gap between foreign and domestically-owned firms within the domestic market. In contrast, the within-job wage growth premium is strongest in industries with stronger international connectedness (those with high levels of imports and exports), consistent with stronger learning in these industries. Such learning might include development of firm-specific skills and international networks, as well as more general human capital accumulation.

## 6 Foreign ownership and worker mobility

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The analysis of wage premia relies on observing workers before, during, and after each job spell. While this approach gives a good indication of the impacts of foreign-firm employment on individual earnings, it does not fully capture the implications of FDI for the country as a whole. In particular, we are also interested in understanding whether foreign firms draw workers from the same labour pool as domestic firms, including whether they are more likely to hire workers from offshore. Similarly, at the end of a job, employees of foreign firms may be differentially likely to leave the country for a prolonged period or to move across industries and locations. If foreign-owned firms disproportionately draw their workforce from offshore, this may limit access to high-paying job opportunities in foreign-owned firms among current domestic workers. Meanwhile, if workers from foreign-owned firms are more inclined to emigrate at the end of their employment, this may limit opportunities for inter-firm knowledge spillovers.

Table 15 report the results of a series of linear probability models for different pre-employment states or actions ( $x_{ijt}$ ) of the form:

$$\begin{aligned} Prob[x_{ijt}] = & \alpha + \beta^a \delta_j^{always} + \beta^m \delta_j^{mixed} + \beta^u \delta_j^{unknown} \\ & + \gamma \mathbf{X}_{it} + \phi \mathbf{Z}_{jt} + \psi_t + \varepsilon_{ijt} \end{aligned} \quad (4)$$

with worker controls ( $\mathbf{X}_{it}$ ) including gender, age, age squared and estimated worker fixed effects, and firm characteristics ( $\mathbf{Z}_{jt}$ ) including firm size, industry and labour market region. These regressions make use of a five-percent random sample of all job starts, including part-time employees and multiple-job holders, between May 2000 and April 2010.

Columns 1 and 2 of table 15 examine the hypothesis that foreign firms are more likely to hire workers from offshore, with column 1 reporting estimates for the probability that an individual is observed to arrive in New Zealand for the first time within the year prior to employment (“recent migrants”),<sup>41</sup> while column 2 allows for a broader definition of overseas arrivals including both New Zealanders and non-New Zealanders, from either long-term or short-term trips abroad (“recent travellers”). Column 3 addresses the question of whether workers in foreign-owned firms are similarly likely to have been receiving a benefit in the previous year, column 4 looks at whether foreign employees are more likely

<sup>41</sup> First-time arrivals are defined as non-New Zealand citizens who arrive in New Zealand within the 12 months prior to a job start, but have not been observed to either enter or leave New Zealand since international mobility data became available in 1997.

to have moved from another job within New Zealand, while the final two columns restrict to workers who have moved from another New Zealand job and consider the relative probability of job transitions being within the same industry (column 5), and within the same LMR (column 6).

Overall, new employees of foreign-owned firms tend to be slightly more geographically mobile than those in domestic firms, being more likely to have been overseas in the past year and more likely to have moved between labour market regions (columns 2 and 6). However, there is no evidence to suggest that foreign firms are more likely to recruit from overseas (column 1). Conditional on worker and firm characteristics, workers in foreign firms are no more likely to have recently arrived in New Zealand for the first time, mitigating potential concerns that higher average earnings in foreign owned firms reflect preferential employment of highly paid expatriate employees.

New employees of foreign-owned firms exhibit a slightly higher probability of remaining within the same industry, conditional on having moved from another job within New Zealand (column 5). They are also less likely to have received a benefit within the 12 months prior to taking up their job, and are more likely to have previously been observed in another New Zealand-based job (columns 3 and 4).

Table 16 reports results for worker mobility at the end of the employment relationship, identifying the relative probability that workers leaving foreign firms will move across countries, firms, and regions. Transition paths at the end of job spells look quite similar to those at the start – workers in foreign-owned firms are more likely to move into other jobs (column 4), less likely to receive a benefit in the following year (column 3), more likely to move across regions (column 6) and less likely to move across industries (column 5) than similar workers in domestic firms. In addition, there is some evidence of higher emigration propensities among employees of foreign-owned firms, where emigration is defined as leaving New Zealand for a period of 6 months or more within 12 months of the end of a job spell (column 1). Workers in foreign-owned firms exhibit a 0.4 percentage point higher emigration propensity than apparently similar workers from domestic firms, a premium of around eight percent compared to the domestic firm average emigration rate of 4.7 percent (table A.3, panel C). This may reflect self-selection, as workers with a greater interest in working overseas may be more inclined to work for foreign-owned firms, or the experience and networks developed through foreign-firm employment may lower the costs and/or risks of emigration, potentially through providing the opportunity to transfer to an overseas branch of the same firm.<sup>42</sup> To the extent that higher wage growth within foreign-owned firms reflects skill acquisition, this evidence of higher emigration rates suggests a further limit on the potential for spillovers to domestically owned firms through labour mobility.

## 7 Conclusion

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Comparison of earnings patterns across foreign and domestically-owned firms shows a clear difference in average individual earnings. Workers in foreign-owned firms earn, on average, around 14 percent more than those in domestically-owned firms. This gap is primarily due to compositional differences, with observable worker and firm characteristics jointly explaining around 80 percent of the raw earnings gap, leaving a residual gap of

<sup>42</sup> As employment data are sourced from New Zealand tax records it is not possible to identify whether a move offshore involved transfer to a related company.

between 2.7 and 3.5 percent for starting and ending wages respectively.

Workers who move into foreign-owned firms gain around a four percentage point higher wage increase than those moving between domestically-owned firms, of which around half appears to be due to differences in firm characteristics (eg, moves to larger firms and more highly paid regions or industries). Controlling for firm composition, a two percentage point premium remains. Finally, workers experience slightly higher wage growth during their tenure at a foreign-owned firm, which may reflect stronger human capital accumulation.

These patterns suggest that firm heterogeneity is the primary explanation for the observed wage gap, followed by worker heterogeneity and finally learning heterogeneity. Firm heterogeneity is apparent in both observable characteristics, with basic firm characteristics explaining over half of the overall 14 percent wage gap on their own, and in unobserved factors which drive the remaining 2 percentage point gap in wage growth associated with joining a new firm. Worker heterogeneity is also apparent both in the extent to which observable characteristics explain differences in starting wages, and in the observation that workers who transition to foreign firms are already achieving higher wage growth and hence higher end-of-job wage levels than those who will move to other domestic firms. While stronger wage growth is apparent in foreign-owned firms, the wage growth gap between foreign and domestic firms is slightly less than half a percent, substantially less than that explained by worker and firm composition.

While working in a foreign firm appears to provide opportunities for high wage employment, on leaving the foreign-firm sector, the additional wage growth associated with foreign firm employment is not retained, on average, with the penalty to returning to a domestic firm more than fully balancing the combined wage growth associated with both entry and within job wage growth premia. Mean-reversion and non-random job transitions cannot account for this pattern. There is, however, heterogeneity in how much of the foreign premium is retained – workers with a high residual wage growth when entering a job have a higher subsequent wage path as a result of employment in a foreign firm.

This suggests little support for the argument that foreign firms provide overall indirect or spillover benefits to domestic firms through human capital accumulation and labour mobility. This lack of earnings portability may reflect differences in the scale or specialisation of jobs in foreign- and domestically-owned firms, or the applicability of firm and industry-specific skills to other firms. Alternatively, it could arise from changing preferences over job characteristics, with workers leaving foreign-owned firms for lifestyle or other non-financial reasons.

Despite this apparent lack of earnings portability, foreign-owned firms appear to offer some benefits to New Zealand workers, beyond those that are observed in similar domestic firms. These include the opportunity to earn higher incomes during the period of employment, particularly for highly skilled workers, suggesting that the knowledge, technologies, and connections that foreign-owned firms bring are complementary to domestic skills. They also appear to complement urban scale, skills and interactions, with higher estimated foreign wage premia in cities.

The foreign-ownership wage premium also varies across firms. It is highest in smaller firms, and in industries that tend to serve the domestic market, suggesting that foreign owners bring knowledge or networks that are of value to such firms and their employees. At the same time, stronger wage growth in outward facing industries suggests that foreign-owned firms may facilitate the accumulation of knowledge that is relevant to international engagement.

Beyond differences in observable worker characteristics, foreign-owned firms also exhibit some differences in labour sourcing behaviour, compared to domestically-owned firms. We find no evidence of foreign-owned firms selectively hiring recent migrants to New Zealand or bringing in foreign staff to work in their New Zealand operations, mitigating possible concerns that the foreign wage premium may be due in part to the employment of highly paid expatriates. However, there is a higher emigration propensity among workers who leave foreign-owned firms, which may reflect either a selection effect (individuals with an interest in future travel may choose to work in foreign-owned firms) or greater opportunities to gain networks and experience while on the job that lower the costs to future emigration. To the extent that foreign-firm employment enhances workers' human capital development, this pattern of increased post-employment emigration may be further limiting knowledge spillovers to other domestic firms through labour mobility. Workers in foreign-owned firms also appear to be more geographically mobile within New Zealand, but less likely to move across industries, consistent with greater job specialisation in foreign-owned firms.

Finally, although most of the results control for firm size, location, and industry composition, these characteristics themselves explain a substantial proportion of the raw wage gap between foreign and domestic firms. As such, foreign investment is likely to have an additional impact on earnings by shifting the overall composition of the firm population towards more highly-paying firm types (particularly larger firms), a gain that is not captured in the analysis.

## Tables

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**Table 1: Foreign ownership status by year, as at March**

Panel A: Proportion of employing firms

	Always	Mixed	Never	Unknown	Total
2000	2.38	3.61	75.69	18.32	119,202
2001	2.30	3.75	79.64	14.31	121,137
2002	2.19	3.70	82.20	11.92	124,935
2003	2.06	3.72	82.54	11.68	129,099
2004	2.01	3.74	82.14	12.10	133,650
2005	2.10	3.74	81.98	12.19	136,833
2006	2.09	3.75	81.98	12.18	138,159
2007	2.13	3.82	81.82	12.24	139,746
2008	2.17	3.79	81.88	12.16	140,805
2009	2.25	3.86	82.14	11.75	137,466
2010	2.28	3.78	82.45	11.49	136,386
2011	2.33	3.72	82.62	11.33	135,564
Total	2.19	3.75	81.49	12.57	1,592,982

Panel B: Proportion of employees

	Always	Mixed	Never	Unknown	Total
2000	9.57	12.65	71.20	6.59	1,168,800
2001	9.06	12.83	73.32	4.78	1,200,000
2002	8.89	12.91	74.12	4.08	1,250,900
2003	8.53	12.73	75.15	3.59	1,295,600
2004	8.44	12.71	75.36	3.50	1,348,900
2005	8.82	12.31	75.30	3.57	1,387,700
2006	8.99	12.32	75.24	3.45	1,418,400
2007	8.99	12.29	75.43	3.29	1,452,400
2008	9.18	12.16	75.33	3.34	1,494,800
2009	8.92	12.23	75.59	3.26	1,486,600
2010	8.60	12.10	76.00	3.30	1,466,500
2011	8.73	12.16	75.87	3.24	1,446,100
Total	8.88	12.43	74.91	3.77	16,416,700

Panel C: Proportion of full time equivalent employment

	Always	Mixed	Never	Unknown	Total
2000	10.58	13.13	70.37	5.92	978,000
2001	10.07	13.20	72.52	4.22	997,300
2002	9.84	13.16	73.36	3.64	1,050,900
2003	9.46	12.96	74.32	3.26	1,088,200
2004	9.28	12.94	74.65	3.13	1,140,100
2005	9.51	12.69	74.58	3.23	1,178,200
2006	9.67	12.67	74.57	3.09	1,205,000
2007	9.64	12.66	74.83	2.87	1,229,500
2008	9.75	12.53	74.81	2.90	1,270,400
2009	9.63	12.64	74.91	2.82	1,264,500
2010	9.28	12.52	75.35	2.85	1,249,700
2011	9.44	12.59	75.19	2.78	1,237,600
Total	9.66	12.79	74.22	3.33	13,889,400

**Table 2: Raw wage premia, firm- and worker-level**

	Never foreign		Always foreign	
	Mean	Std Dev	Mean	Std Dev
<b>Firm-level</b>				
Starting wage	\$3,735	\$1,581	\$5,685	\$2,792
Ending wage	\$3,833	\$1,502	\$6,681	\$10,496
Firm size (E)	15.85	117.57	111.69	352.30
Firm size (lnE)	1.81	1.09	3.10	1.73
N	99,654		1,848	
<b>Worker-level (balanced spells)</b>				
Starting wage	\$4,261	\$2,645	\$5,109	\$3,915
Ending wage	\$4,483	\$4,023	\$5,781	\$8,795
Firm size (E)	480.56	1,438.88	1,007.52	1,351.76
Firm size (lnE)	3.79	2.09	5.97	1.59
N	699,000		96,100	

Sample criteria: Balanced full-time job spells commencing after May 2000 and concluding prior to April 2010. Excludes consecutive spells within the same firm. Firm size is calculated as the mean employment across the start and end of each spell. Firm-level means are calculated by taking the mean across all job spells within the firm which meet the above criteria, then calculating the mean and standard deviation across all firms with at least one applicable job.

**Table 3: Raw wage premia**

	(1) Never foreign	(2) Always foreign	(3) Difference	(4) N(obs)
<b>Balanced panel:</b>				
Start	8.266	8.396	0.130	795,100
End	8.301	8.462	0.160	795,100
<b>All full-time job starts/ends:</b>				
Start	8.170	8.317	0.146	3,282,800
End	8.181	8.390	0.209	3,209,000

Columns 1 and 2 report mean log earnings at the start and end of each job spell, according to whether firms are always or never foreign owned. Column 3 reports the raw wage premium associated with foreign employment (difference between log average earnings). Upper section (balanced panel) restricts to job spells where a clean transition between two full-time jobs can be observed at both the start and end of the spell. Lower section (all jobs) includes all observations of full-time jobs which start after May 2000 and/or end prior to April 2010, regardless of whether the previous or subsequent job is observed.

**Table 4: Raw wage transition premia**

	(1) N(obs)	(2) D→D	(3) F→F	(4) D→F	(5) F→D	(6) Relative to D→D F→F	(7) D→F	(8) F→D
<b>Balanced panel:</b>								
Start	665,700	0.022	0.026	0.055	-0.057	0.004	0.033	-0.079
Job	798,700	0.035	0.065			0.030		
End	680,800	0.014	0.008	0.040	-0.063	-0.005	0.027	-0.077
<b>All clean transitions between two full-time jobs:</b>								
Start	1,673,200	0.020	0.018	0.055	-0.063	-0.002	0.035	-0.082
Job	1,827,900	0.037	0.063			0.026		
End	1,675,600	0.019	0.018	0.056	-0.065	-0.001	0.038	-0.083

Population restricted to job transitions between firms which are 'always foreign' (F) and 'never foreign' (D). Upper panel restricted to job spells where a clean, full-time transition between jobs is observed at both the start and the end of the relevant spell. Workers moving in or out of part-time jobs, multiple job holders, and repeated employment spells with the same firm are excluded. Lower panel applies these restrictions only to the specific job transition in question. Columns 2 to 5 report the average (log) wage change associated with each of the four possible transition paths. Columns 6 to 8 report foreign firm premia relative to transitions between two domestic firms.

**Table 5: Starting wage premium**

	(1) raw	(2) +worker chars	(3) +firm chars	(4) all
<b>Foreign ownership:</b>				
always	0.142*** [0.002]	0.085*** [0.001]	0.043*** [0.002]	0.027*** [0.001]
sometimes	0.078*** [0.001]	0.054*** [0.001]	0.032*** [0.001]	0.021*** [0.001]
unknown	-0.019*** [0.002]	-0.012*** [0.001]	0.007*** [0.002]	0.011*** [0.001]
<b>Worker characteristics:</b>				
female		-0.194*** [0.001]		-0.188*** [0.001]
WFE		0.965*** [0.001]		0.923*** [0.001]
<b>Firm characteristics:</b>				
$\ln E$			0.042*** [0.001]	0.031*** [0.001]
$\ln E^2$			-0.002*** [0.000]	-0.002*** [0.000]
Time dummies	yes	yes	yes	yes
Age and tenure	no	yes	no	yes
Ind dummies	no	no	yes	yes
LMR dummies	no	no	yes	yes
Adjusted $R^2$	0.032	0.588	0.152	0.616
N(obs)	966,900	966,900	966,900	966,900

Significant at: \*\*\* 1%; \*\* 5%; \* 10%. Robust standard errors in brackets. Age and tenure controls for age (at start of job), gap (since end of previous job),  $age^2$ ,  $gap^2$  and  $age \times gap$ . Firm employment measured at start of job spell.

**Table 6: End wage premium**

	(1) raw	(2) +worker chars	(3) +firm chars	(4) all
<b>Foreign ownership:</b>				
always	0.170*** [0.002]	0.094*** [0.001]	0.059*** [0.002]	0.035*** [0.001]
sometimes	0.105*** [0.001]	0.066*** [0.001]	0.048*** [0.002]	0.029*** [0.001]
unknown	-0.022*** [0.002]	-0.009*** [0.001]	0.005* [0.002]	0.013*** [0.001]
<b>Worker characteristics:</b>				
female		-0.184*** [0.001]		-0.182*** [0.001]
WFE		0.993*** [0.001]		0.953*** [0.001]
<b>Firm characteristics:</b>				
$\ln E$			0.035*** [0.001]	0.028*** [0.001]
$\ln E^2$			-0.001*** [0.000]	-0.002*** [0.000]
Time dummies	yes	yes	yes	yes
Age and tenure	no	yes	no	yes
Ind & LMR dummies	no	no	yes	yes
Adjusted $R^2$	0.054	0.580	0.170	0.604
N(obs)	966,900	966,900	966,900	966,900

Significant at: \*\*\* 1%; \*\* 5%; \* 10%. Robust standard errors in brackets. Age and tenure controls for age (at end of job), tenure in job,  $age^2$ ,  $tenure^2$  and  $age \times tenure$ . Firm employment measured at end of job spell.

**Table 7: Prevalence of transitions between firms by ownership type, balanced panel**

Current employer	Next employer				Total
	Always	Sometimes	Never	Unknown	
Always	0.289	0.228	0.469	0.015	96,100
Sometimes	0.191	0.247	0.547	0.015	127,000
Never	0.065	0.095	0.801	0.040	699,000
Unknown	0.040	0.087	0.759	0.118	44,800
Total	0.102	0.128	0.733	0.038	966,900

**Table 8: Entry and exit premia**

	(1) raw	(2) +worker chars	(3) +firm chars	(4) all
<b>Ownership of previous employer (exit penalty):</b>				
always	-0.060*** [0.001]	-0.053*** [0.001]	-0.035*** [0.001]	-0.031*** [0.001]
sometimes	-0.043*** [0.001]	-0.039*** [0.001]	-0.028*** [0.001]	-0.025*** [0.001]
unknown	0.012*** [0.002]	0.003 [0.002]	-0.005** [0.002]	-0.006*** [0.002]
<b>Ownership of current employer (entry premium):</b>				
always	0.041*** [0.001]	0.042*** [0.001]	0.020*** [0.001]	0.020*** [0.001]
sometimes	0.028*** [0.001]	0.028*** [0.001]	0.017*** [0.001]	0.017*** [0.001]
unknown	-0.012*** [0.002]	-0.016*** [0.002]	-0.006** [0.002]	-0.005* [0.002]
<b>Worker characteristics:</b>				
female		-0.011*** [0.001]		-0.012*** [0.001]
WFE		-0.003* [0.002]		-0.005** [0.002]
Time dummies	yes	yes	yes	yes
Age and tenure	no	yes	no	yes
Firm size	no	no	yes	yes
Ind & LMR dummies	no	no	yes	yes
Adjusted $R^2$	0.005	0.033	0.041	0.054
N(obs)	966,900	966,900	966,900	966,900

Significant at: \*\*\* 1%; \*\* 5%; \* 10%. Robust standard errors in brackets. Dependent variable is the change in log earnings associated with a job change. Age and tenure controls for age (at end of previous job), gap prior to commencing current job, age<sup>2</sup>, gap<sup>2</sup> and age×gap. Firm controls include industry and LMR dummies for both the previous and current jobs, and a dummy for whether the worker has moved within the same industry or region.



**Table 9: Within-job wage growth**

	(1) raw	(2) +worker chars	(3) +firm chars	(4) all
<b>Foreign ownership:</b>				
always	0.028*** [0.001]	0.011*** [0.001]	0.013*** [0.001]	0.004*** [0.001]
sometimes	0.027*** [0.001]	0.015*** [0.001]	0.016*** [0.001]	0.008*** [0.001]
unknown	-0.008*** [0.001]	0.000 [0.001]	-0.004** [0.001]	0.003 [0.001]
<b>Worker characteristics:</b>				
female		0.010*** [0.001]		0.005*** [0.001]
WFE		0.037*** [0.001]		0.034*** [0.001]
Time dummies	yes	yes	yes	yes
Age and tenure	no	yes	no	yes
Firm size	no	no	yes	yes
Industry & LMR dummies	no	no	yes	yes
Adjusted $R^2$	0.023	0.069	0.028	0.072
N(obs)	966,900	966,900	966,900	966,900

Significant at: \*\*\* 1%; \*\* 5%; \* 10%. Robust standard errors in brackets. Age and tenure controls for age (at start of job), tenure within job, age<sup>2</sup>, tenure<sup>2</sup> and age×tenure. Firm size controls for employment at start and end of job, as well as squared and interacted terms. Firm controls include industry and LMR dummies for the current job only.

**Table 10: Censoring and job transitions**

	(1)	(2)	(3)	(4)	(5)	(6)
	Censored	Sample: First 5 years Complete	Difference	Next: Domestic	Sample: Balanced panel Next: Foreign	Difference
<b>Currently domestic</b>						
mean residual from:						
start wage regression (eqn. 1)	-0.010 [0.002]	0.000 [0.000]	0.011***	0.000 [0.000]	0.006 [0.002]	0.006***
entry wage growth regression (eqn. 2)	-0.005 [0.003]	0.000 [0.001]	0.005*	0.001 [0.001]	-0.004 [0.002]	-0.005
N(obs)	12,000	324,200		302,400	24,100	
<b>Currently foreign</b>						
mean residual from:						
start wage regression (eqn. 1)	-0.010 [0.005]	0.001 [0.001]	0.010**	-0.010 [0.002]	0.018 [0.002]	0.028***
entry wage growth regression (eqn. 2)	-0.005 [0.007]	0.000 [0.002]	0.005	-0.007 [0.002]	0.013 [0.003]	0.020***
N(obs)	2,100	41,000		23,600	14,000	

Significant at: \*\*\* 1%; \*\* 5%; \* 10%. Robust standard errors in brackets. Columns 1-3 use all clean transitions between two full-time jobs where the new job start occurs after May 2000 and before December 2005. Job spells are defined as “censored” if they extend longer than 5 years (ie, over half the length of the primary analysis period). Columns 4-6 use all balanced panel spells for which there is sufficient information on past and future job spells, dividing spells according to whether the workers next job is in a foreign or domestic firm. Residuals are estimated based on earnings regressions at the start of the job spell. Transitions into and out of firms which are sometimes foreign owned and those with unknown ownership are not shown.

**Table 11: Mean reversion in wage growth at job transition**

	(1)	(2)	(3)
<b>Ownership of previous employer (exit penalty):</b>			
always	-0.031*** [0.001]	-0.029*** [0.002]	-0.029*** [0.001]
sometimes	-0.025*** [0.001]	-0.020*** [0.002]	-0.024*** [0.001]
unknown	-0.006*** [0.002]	-0.001 [0.002]	-0.007*** [0.002]
<b>Ownership of current employer (entry premium):</b>			
always	0.020*** [0.001]	0.020*** [0.002]	0.023*** [0.001]
sometimes	0.017*** [0.001]	0.015*** [0.002]	0.017*** [0.001]
unknown	-0.005* [0.002]	-0.011*** [0.003]	-0.006** [0.002]
<b>Wage residuals at start of previous job spell:</b>			
Residual $\Delta \ln w_{start}$		-0.143*** [0.002]	
Residual $\ln w_{start}$			-0.313*** [0.002]
Adjusted $R^2$	0.054	0.074	0.107
N(obs)	966,900	513,800	966,900

Significant at: \*\*\* 1%; \*\* 5%; \* 10%. Robust standard errors in brackets. All regressions control for time, age and tenure, firm size, industry and labour market region. Residuals are estimated from earnings equations (eqn. 3 and 1) at the start of the previous job (ie, the start of the job which ends with a transition between two employers over which the entry and exit premia are estimated). Column 1 repeats column 4 of table 8 for reference purposes. Reduced sample in column 2 reflects the need for additional information about the previous job spell in order to estimate residuals of  $\Delta \ln w_{start}$ . A regression of the full sample using  $\Delta \ln w_{start}$  rather than the residuals produces very similar results to column 2, suggesting that this sample reduction is not strongly affecting the results.

**Table 12: Foreign-ownership premia by quartiles of residuals from entry earnings growth regression**

Quartiles of residuals of $\Delta \ln W_{start}$ regression	Within-job	Exit	Entry	N(obs)
Q1 (low wage growth on entry)	-0.001 [0.003]	-0.033*** [0.004]	0.009* [0.004]	128,500
Q2	0.008** [0.003]	-0.035*** [0.004]	0.024*** [0.004]	128,500
Q3	-0.002 [0.003]	-0.030*** [0.004]	0.019*** [0.003]	128,500
Q4 (high wage growth on entry)	-0.001 [0.004]	-0.020*** [0.004]	0.031*** [0.004]	128,500
Overall premia	0.004*** [0.001]	-0.031*** [0.001]	0.020*** [0.001]	966,900

Significant at: \*\*\* 1%; \*\* 5%; \* 10%. Robust standard errors in brackets. Entry wage growth residuals (the extent to which the observed wage change for a given job spell is high/low compared to predicted wage growth given worker and firm characteristics) are estimated at the start of a job following equation 2. These are used to define four groups, based on whether transition into that job involved an unexpectedly high (Q4) or unexpectedly low (Q1) wage change. Then, within-job wage growth premia are estimated for the job spell (eqn. 3), and entry and exit premia are estimated using data from the end-of-job transition (exit from the current job, entry into the next job, eqn. 2), with separate regressions for the four groups. Overall premia are taken from tables 8 and 9 for comparison, and include job spells with insufficient information on the previous spell to enable estimation of residuals.

**Table 13: Heterogeneity by worker characteristics**

Worker group	(1) Start level	(2) End level	(3) $\Delta W$ at entry	(4) $\Delta W$ within job	(5) $\Delta W$ at exit	(6) Retained premium (3)+(4)+(5)	(7) N(obs)
<b>Panel A: Age groups</b>							
≤24 years	0.022*** [0.002]	0.022*** [0.002]	0.025*** [0.003]	-0.001 [0.003]	-0.014*** [0.003]	0.010	194,800
25-49 years	0.028*** [0.001]	0.036*** [0.001]	0.020*** [0.002]	0.005*** [0.001]	-0.032*** [0.002]	-0.007	649,900
50+	0.016*** [0.003]	0.032*** [0.004]	0.015*** [0.004]	0.006 [0.004]	-0.044*** [0.005]	-0.023	122,300
<b>Panel B: Quartiles of worker fixed effects</b>							
Q1 (low)	0.006** [0.002]	0.016*** [0.002]	0.003 [0.002]	0.005* [0.002]	-0.014*** [0.003]	-0.006	241,700
Q2	0.021*** [0.002]	0.027*** [0.002]	0.014*** [0.003]	0.004 [0.002]	-0.029*** [0.003]	-0.011	241,700
Q3	0.031*** [0.002]	0.037*** [0.002]	0.023*** [0.003]	0.004 [0.002]	-0.034*** [0.003]	-0.007	241,700
Q4 (high)	0.046*** [0.002]	0.052*** [0.003]	0.042*** [0.003]	0.001 [0.003]	-0.045*** [0.003]	-0.002	241,700
<b>Panel C: Gender</b>							
Female	0.027*** [0.002]	0.027*** [0.002]	0.024*** [0.002]	-0.006** [0.002]	-0.028*** [0.002]	-0.010	327,500
Male	0.025*** [0.001]	0.037*** [0.002]	0.019*** [0.002]	0.010*** [0.002]	-0.032*** [0.002]	-0.003	639,500
<b>Panel D: Overall</b>							
All workers	0.027*** [0.001]	0.035*** [0.001]	0.020*** [0.001]	0.004*** [0.001]	-0.031*** [0.001]	-0.007	966,900

Significant at: \*\*\* 1%; \*\* 5%; \* 10%. Robust standard errors in brackets. Each reported coefficient is from a separate regression, estimated for the specified sub-sample of workers. All regressions include controls for time, industry, labour market region, age and tenure. Columns 1 and 2 follow column 4 of tables 5 and 6 respectively, columns 3 and 5 follow table 8 (column 4), and column 4 follows table 9 (column 4).

**Table 14: Heterogeneity by firm characteristics**

Firm group	(1) Start level	(2) End level	(3) $\Delta W$ within job	(4) N(obs)
<b>Panel A: Firm size (number of employees)</b>				
<5	0.192*** [0.010]	0.208*** [0.011]	0.013 [0.011]	124,800
5-49	0.087*** [0.003]	0.102*** [0.003]	0.014*** [0.003]	367,800
50+	0.015*** [0.001]	0.019*** [0.001]	0.001 [0.001]	474,200
<b>Panel B: Location</b>				
Greater Auckland	0.036*** [0.001]	0.040*** [0.002]	0.002 [0.002]	353,500
Other Urban	0.027*** [0.002]	0.035*** [0.002]	0.003 [0.002]	453,600
Non-Urban	-0.005 [0.004]	0.010* [0.004]	0.014*** [0.004]	158,100
<b>Panel C: Industry characteristics</b>				
Export intensive	0.020*** [0.002]	0.045*** [0.003]	0.022*** [0.003]	219,800
Not export intensive	0.031*** [0.001]	0.034*** [0.001]	-0.001 [0.001]	746,800
Import intensive	0.030*** [0.002]	0.058*** [0.003]	0.030*** [0.003]	244,600
Not import intensive	0.026*** [0.001]	0.027*** [0.001]	-0.004** [0.001]	722,000
Serving households	0.057*** [0.002]	0.064*** [0.002]	0.004 [0.002]	271,300
Not serving households	0.015*** [0.001]	0.022*** [0.001]	0.003* [0.001]	695,400
<b>Panel D: Total</b>				
	0.027*** [0.001]	0.035*** [0.001]	0.004*** [0.001]	966,900

Significant at: \*\*\* 1%; \*\* 5%; \* 10%. Robust standard errors in brackets. Each reported coefficient is from a separate regression, estimated for the specified sub-sample of firms. All regressions include controls for time, industry, labour market region, age and tenure. Workers in multi-location firms are allocated to regions by Statistics New Zealand based on their recorded home addresses. Industry allocations: Industries are allocated to groups based on Statistics New Zealand's National Accounts Input-Output tables for the 2007 year. Export intensive industries are defined by ranking industries by the export share of total output, with the top 25 percent classed as "export intensive". Import intensity and the share of output purchased by households are defined similarly.

**Table 15: Sources of new employees**

	(1)	(2)	(3)	(4)	(5)	(6)
	Recent immigrants	Recent travellers	Recent benefit recipients	Last job observed	Within-ind move   last job observed	Within-region move   last job observed
<b>Foreign ownership:</b>						
always	0.001 [0.001]	0.005* [0.002]	-0.006* [0.003]	0.024*** [0.002]	0.037*** [0.003]	-0.010** [0.003]
sometimes	0.004*** [0.001]	0.006*** [0.002]	-0.007** [0.002]	0.011*** [0.002]	0.026*** [0.003]	-0.016*** [0.003]
unknown	-0.006*** [0.001]	-0.008*** [0.002]	0.013*** [0.003]	-0.004 [0.003]	0.034*** [0.003]	0.009* [0.004]
<b>Worker characteristics:</b>						
female	-0.018*** [0.001]	-0.023*** [0.001]	0.013*** [0.001]	0.016*** [0.001]	-0.033*** [0.002]	-0.004* [0.002]
WFE	-0.022*** [0.001]	-0.037*** [0.002]	-0.263*** [0.002]	0.081*** [0.002]	0.178*** [0.003]	-0.048*** [0.003]
<b>Firm characteristics:</b>						
$\ln E$	0.010*** [0.001]	0.008*** [0.001]	0.006*** [0.001]	0.005*** [0.001]	0.023*** [0.001]	-0.015*** [0.001]
$(\ln E)^2$	-0.001*** [0.000]	-0.000*** [0.000]	-0.001*** [0.000]	-0.001*** [0.000]	-0.003*** [0.000]	-0.000* [0.000]
Adjusted $R^2$	0.041	0.048	0.078	0.072	0.073	0.048
Mean of dependent variable	0.051	0.081	0.240	0.797	0.280	0.438
N(obs)	466,200	466,200	466,200	466,200	371,400	371,400

Significant at: \*\*\* 1%; \*\* 5%; \* 10%. Robust standard errors in brackets. Linear probability model of the probability of observing a given pre-employment state or transition type (reported coefficients are marginal effects). All regressions include controls for worker age and age<sup>2</sup>, time, industry and labour market region. Age and firm size measured at the start of the job spell. Population for columns 1-4 includes all job starts, including part-time employees and those where we do not observe either the previous or next job spell. Columns 5 and 6 restrict to spells where the previous spell is observed and is with a different employer.

**Table 16: Destinations of departing employees**

	(1)	(2)	(3)	(4)	(5)	(6)
	Future emigrants	Future travellers	Future benefit recipients	Next job observed	Within-ind move next job observed	Within-region move next job observed
<b>Foreign ownership:</b>						
always	0.004** [0.002]	0.001 [0.002]	-0.014*** [0.003]	0.005* [0.002]	0.007* [0.003]	-0.028*** [0.003]
sometimes	0.000 [0.001]	-0.003 [0.002]	-0.009*** [0.002]	0.006** [0.002]	0.013*** [0.002]	-0.027*** [0.003]
unknown	-0.007*** [0.001]	-0.015*** [0.002]	0.008** [0.003]	0.018*** [0.002]	0.032*** [0.003]	0.033*** [0.003]
<b>Worker characteristics:</b>						
female	-0.007*** [0.001]	-0.018*** [0.001]	0.018*** [0.001]	0.009*** [0.001]	-0.012*** [0.001]	-0.021*** [0.002]
WFE	0.029*** [0.001]	0.020*** [0.002]	-0.250*** [0.002]	0.029*** [0.002]	0.105*** [0.003]	-0.022*** [0.003]
<b>Firm characteristics:</b>						
$\ln E$	0.004*** [0.001]	0.008*** [0.001]	0.006*** [0.001]	0.015*** [0.001]	0.022*** [0.001]	-0.002 [0.001]
$(\ln E)^2$	-0.000*** [0.000]	-0.000*** [0.000]	-0.001*** [0.000]	-0.002*** [0.000]	-0.003*** [0.000]	-0.001*** [0.000]
Adjusted $R^2$	0.013	0.028	0.069	0.062	0.063	0.068
Mean of dependent variable	0.048	0.127	0.241	0.827	0.254	0.503
N(obs)	454,800	454,800	454,800	454,800	376,200	376,200

Significant at: \*\*\* 1%; \*\* 5%; \* 10%. Robust standard errors in brackets. Linear probability model of the probability of observing a given post-employment state or transition type (reported coefficients are marginal effects). All regressions include controls for worker age and age<sup>2</sup>, time, industry and labour market region. Age and firm size measured at the end of the job spell. Population for columns 1-4 includes all job ends, including part-time employees and those where we do not observe either the previous or next job spell. Columns 5 and 6 restrict to spells where the subsequent spell is observed and is with a different employer.

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## Appendix A: Additional tables

**Table A.1: Prevalence of foreign ownership by industry, March 2011**

NZSIOC	Percentage of firms					Percentage of employees				
	Always	Mixed	Never	Unknown	Total	Always	Mixed	Never	Unknown	Total
Agriculture	0.14	0.74	70.13	28.99	14,673	0.30	1.97	79.73	18.00	46,660
Forestry and Logging	2.05	1.37	87.67	8.90	438	1.98	0.91	94.51	2.59	3,280
Fishing, Aquaculture & Agriculture, Forestry & Fishing Support Services	0.40	0.81	86.41	12.38	2,229	0.98	2.17	91.67	5.18	14,290
Mining	9.20	10.34	77.01	3.45	261	20.68	31.02	47.57	0.72	4,835
Manufacturing:	4.01	5.84	86.01	4.14	11,604	13.90	15.87	69.58	0.66	177,495
Food, Beverage & Tobacco Products	6.37	6.37	77.62	9.63	2,118	14.48	17.41	67.44	0.67	68,360
Textile, Leather, Clothing and Footwear	1.03	3.08	89.38	6.51	876	12.00	6.00	80.78	1.22	8,170
Wood & Paper Products	2.29	2.80	92.11	2.80	1,179	14.81	11.25	73.44	0.50	16,885
Printing	1.69	5.49	90.30	2.53	711	13.48	24.51	61.27	0.75	7,345
Petroleum, Chemical, Polymer and Rubber Products	13.66	13.98	71.12	1.24	966	33.04	17.39	49.28	0.29	17,250
Non-Metallic Mineral Products	2.50	7.50	86.88	3.13	480	8.12	15.00	75.90	0.97	5,665
Metal products	2.23	6.68	88.87	2.23	1,887	6.29	18.86	73.86	1.00	19,090
Transport Equipment, Machinery & Equipment	3.67	5.31	88.87	2.15	2,373	9.90	15.55	74.22	0.34	28,295
Furniture & other	0.89	2.07	92.31	4.73	1,014	2.18	3.42	93.24	1.17	6,435
Electricity, Gas, Water & Waste Services	6.59	10.18	77.84	5.39	501	7.67	20.02	71.73	0.58	11,990
Construction	0.94	1.26	90.35	7.45	14,019	11.11	5.08	81.80	2.01	84,600
Wholesale Trade	8.71	12.52	76.65	2.13	8,748	18.85	19.23	61.39	0.53	78,520
Retail Trade	3.04	3.17	89.48	4.30	14,292	9.55	17.73	71.82	0.91	154,000
Accommodation & Food Services	0.57	1.61	87.30	10.52	10,980	5.76	8.98	81.71	3.55	90,200
Transport, Postal & Warehousing	3.31	6.55	81.12	9.02	4,623	10.58	15.25	72.98	1.18	64,260
Information Media & Telecommunications	7.94	16.14	72.49	3.44	1,134	45.08	26.23	28.45	0.24	27,065
Financial & Insurance Services	10.80	10.46	71.09	7.65	2,667	27.69	45.16	26.20	0.94	46,940
Rental, Hiring & Real Estate Services	1.09	4.41	76.37	18.14	4,698	5.29	13.46	74.52	6.73	20,800
Professional, Scientific & Technical services	2.73	4.74	85.44	7.09	11,769	9.25	12.43	76.62	1.70	94,100
Administrative & Support Services	2.36	5.86	80.86	10.92	4,452	8.24	28.74	61.18	1.85	59,500
Education & training	0.22	1.89	85.93	11.97	5,565	0.18	2.94	85.65	11.23	132,640
Health Care & Social Assistance	1.02	2.11	86.84	10.04	7,680	2.81	4.97	90.78	1.44	167,100
Arts & Recreation Services	0.42	1.17	83.79	14.62	2,832	1.01	2.28	93.73	2.99	26,780
Other services	0.56	0.83	76.61	22.00	11,196	2.19	3.98	82.90	10.93	50,300
Total	2.33	3.72	82.62	11.33	135,564	8.73	12.16	75.87	3.24	1,446,100

**Table A.2: Prevalence of foreign ownership by labour market region, March 2011**

LMR	Percentage of firms					Percentage of employees				
	Always	Mixed	Never	Unknown	Total	Always	Mixed	Never	Unknown	Total
Northland West	0.75	1.5	78.76	18.98	1,596	4.43	5.18	83.8	6.59	10,620
Northland East	1.78	2.97	81.82	13.42	3,531	4.11	9.25	81.85	4.79	29,200
Greater Auckland	3.14	5.06	83.6	8.20	38,331	13.28	15.38	68.96	2.38	492,300
Thames Coromandel	0.73	1.38	80.65	17.25	3,705	6.11	7.42	79.91	6.55	22,900
Greater Hamilton	2.15	2.96	82.86	12.03	7,404	6.92	9.06	81.26	2.77	79,500
Taranaki Rural	0.57	1.59	72.92	24.91	2,637	1.63	9.66	79.66	9.05	16,570
Taranaki Urban	3.51	4.39	77.83	14.27	2,733	8.38	13.33	74.64	3.66	26,260
Tauranga	2.21	3.71	84.09	9.99	5,016	3.99	10.64	81.6	3.77	45,100
North Central North Island	1.55	2.19	83.31	12.95	5,607	6.25	8.27	80.85	4.64	49,600
Gisborne - Opotiki	1.76	1.89	77.71	18.64	2,382	4.92	5.53	82.92	6.63	18,090
Napier - Hastings	2.37	3.62	83.48	10.52	4,305	4.89	10.89	80.67	3.56	45,000
Hawkes Bay - Central North Island Rural	0.83	1.3	77.28	20.59	2,535	2.21	10.46	79.95	7.38	16,260
Palmerston North	3.00	4.5	81.48	11.01	3,597	7.41	12.1	77.04	3.46	40,500
Wanganui	2.21	3.41	80.92	13.45	1,494	4.48	7.11	84.64	3.77	14,060
Horowhenua - Wairarapa	1.14	2.53	77.69	18.63	2,367	3.99	8.68	81.55	5.78	17,290
Wellington Urban	2.98	4.52	84.45	8.06	11,688	9.67	13.01	75.46	1.85	167,500
Nelson - North of West Coast	1.87	2.94	83.32	11.87	4,497	3.67	11.74	79.95	4.65	40,900
Marlborough - North Canterbury	1.36	3.39	82.58	12.67	2,652	3.45	8.63	83.56	4.37	18,550
Greater Christchurch	2.36	3.98	84.02	9.64	13,476	8.77	12.39	75.73	3.11	157,400
South Westland - Rural South Canterbury	1.17	2.57	85.51	10.75	6,417	3.29	8.02	85.39	3.29	48,600
Central Otago - North and East Southland	0.79	1.46	79.44	18.31	2,670	2.40	6.43	84.75	6.43	17,110
Dunedin	2.83	3.86	82.68	10.63	3,498	4.50	8.5	84.25	2.75	40,000
Greater Invercargill and Stewart Island	1.62	2.38	82.17	13.82	3,147	2.89	7.98	85.47	3.66	30,070
Missing/Undefined	10.11	5.62	56.18	28.09	267	4.89	13.53	60.15	21.43	2,660
Greater Auckland	3.14	5.06	83.60	8.20	38,331	13.28	15.38	68.96	2.38	492,300
Other Urban	2.42	3.68	82.93	10.98	66,777	7.05	11.18	78.65	3.12	733,400
Non-urban	1.06	2.09	80.96	15.89	30,291	4.07	8.28	82.30	5.35	218,700
Total	2.33	3.72	82.62	11.33	135,564	8.73	12.16	75.87	3.24	1,446,100

**Table A.3: Summary statistics**

	Ownership status of current employing firm			
	Never foreign		Always foreign	
	Mean	Std Dev	Mean	Std Dev
<b>Panel A: Balanced spells</b>				
Female†	0.326	0.469	0.383	0.486
Age at start	35.143	11.283	34.717	10.510
Firm size (E)	481	1439	1008	1352
Firm size (lnE)	3.787	2.090	5.973	1.586
Firm size (lnE) at start	3.760	2.100	5.949	1.589
Firm size (lnE) at end	3.664	2.153	5.894	1.630
Length of job (months)	16.688	16.123	20.124	17.615
Entered this firm with no gap after previous job end†	0.350	0.477	0.314	0.464
Gap after previous job before this job start (months)	5.095	9.993	4.484	9.513
Change in firm size from previous job ( $\Delta \ln E$ )	-0.362	2.459	0.796	2.444
Previous job was in always foreign-owned firm†	0.063	0.243	0.284	0.451
Enters next firm with no gap between jobs†	0.341	0.474	0.327	0.469
Gap after job end before next job start(months)	4.962	9.808	4.897	10.064
Change in firm size in next job ( $\Delta \ln E$ )	3.664	2.153	-0.716	2.436
Next job is in always foreign-owned firm†	0.065	0.246	0.289	0.453
Previous firm was smaller than current firm†	0.432	0.495	0.600	0.490
Recent immigrant†	0.009	0.093	0.009	0.097
Recent traveler†	0.022	0.146	0.024	0.152
Recent benefit recipient†	0.143	0.350	0.108	0.311
Previous job was in same industry†	0.443	0.497	0.393	0.488
Previous job was in same region†	0.636	0.481	0.612	0.487
Next firm is smaller than current firm†	0.560	0.496	0.405	0.491
Future traveler†	0.066	0.249	0.071	0.257
Future emigrant†	0.028	0.164	0.032	0.177
Length of absence (months) — future traveler	5.279	3.450	5.698	3.566
Future benefit recipient†	0.117	0.322	0.078	0.268
Next job is in same industry†	0.445	0.497	0.386	0.487
Next job is in same region†	0.635	0.481	0.609	0.488
Re-migrant†	0.001	0.025	0.000	0.019
Repeat traveler†	0.005	0.073	0.004	0.065
N(obs)	699,000		96,100	

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	Ownership status of current employing firm			
	Never foreign		Always foreign	
	Mean	Std Dev	Mean	Std Dev
<b>Panel B: All job starts after May 2000</b>				
Full-time†	0.403	0.491	0.566	0.496
Multiple job holder†	0.176	0.381	0.135	0.341
Current job spell in same firm as previous spell†	0.095	0.294	0.069	0.253
Previous job was in always foreign-owned firm†	0.030	0.170	0.203	0.403
Previous firm was smaller than current firm†	0.274	0.446	0.438	0.496
Recent immigrant†	0.047	0.212	0.055	0.227
Recent traveler†	0.078	0.269	0.093	0.290
Recent benefit recipient†	0.245	0.430	0.211	0.408
Previous job was in same industry†	0.295	0.456	0.284	0.451
Previous job was in same region†	0.408	0.492	0.382	0.486
N	7,893,700		688,000	
<b>Panel C: All job ends before December 2010</b>				
Full-time†	0.414	0.493	0.573	0.495
Multiple job holder†	0.186	0.389	0.144	0.351
Next job spell in same firm as current spell†	0.099	0.298	0.069	0.254
Next job is in always foreign-owned firm†	0.033	0.178	0.211	0.408
Next firm is smaller than current firm†	0.717	0.451	0.574	0.494
Future traveler†	0.132	0.338	0.153	0.360
Future emigrant†	0.047	0.212	0.064	0.244
Months out of NZ in 12 months following job end	0.480	1.896	0.649	2.242
Length of absence (months) — future traveler	5.673	3.605	6.287	3.637
Future benefit recipient†	0.247	0.431	0.200	0.400
Next job is in same industry†	0.297	0.457	0.256	0.436
Next job is in same region†	0.463	0.499	0.435	0.496
N(obs)	7,567,700		686,900	

**Sample definitions:** Panel A restricted to job spells where we observe a clean, full-time transition between jobs at both the start and the end of the relevant job spell. Workers moving in or out of part-time jobs, multiple job holders, and repeated employment spells with the same firm are excluded. Panel B covers all observed job starts from June 2000 onwards, while Panel C covers all observed job ends up to March 2010. Analysis in section 5 based on the Panel A population, while that in section 6 uses the populations in Panels B and C.

**Variable definitions:** Variables marked with † are binary variables set to 1 if the statement is true, 0 otherwise. *Recent immigrant:* First observed arrival in New Zealand occurred within 12 months prior to starting this job. *Recent traveler:* Entered New Zealand from overseas within 12 months prior to starting this job (includes return from short-term trips). *Recent benefit recipient:* Receiving benefit within 12 months prior to starting this job. *Future traveler:* Leaves New Zealand within 12 months after this job ends (including temporary departures). *Future emigrant:* Leaves New Zealand within 12 months after this job ends and remains away for  $\geq 6$  months. *Future benefit recipient:* Receiving benefit within 12 months after this job ends. *Re-migrant:* First observed arrival in New Zealand occurred within 12 months prior to starting this job and leaves New Zealand within 12 months after this job ends and remains away for  $\geq 6$  months. *Repeat traveler:* Entered New Zealand from overseas within 12 months prior to starting this job and leaves again within 12 months of job ends (includes short-term travel).

**Table A.4: Heterogeneity by industry**

	Start level	End level	Within job	N(obs)
Agriculture	-0.005 [0.023]	-0.001 [0.025]	0.004 [0.022]	50,300
Forestry and Logging	0.112*** [0.024]	0.121*** [0.031]	0.003 [0.032]	8,800
Fishing, Aquaculture and Agriculture, Forestry and Fishing Support Services	0.203*** [0.042]	0.126* [0.063]	-0.092 [0.067]	13,100
Mining	0.146*** [0.018]	0.128*** [0.021]	-0.016 [0.021]	3,700
Food, Beverage and Tobacco Product Manufacturing	0.023*** [0.005]	0.063*** [0.006]	0.040*** [0.006]	52,400
Textile, Leather, Clothing and Footwear Manufacturing	-0.009 [0.014]	0.021 [0.017]	0.021 [0.017]	6,300
Wood and Paper Products Manufacturing	0.013 [0.008]	0.018 [0.010]	-0.006 [0.010]	25,800
Printing	-0.005 [0.013]	-0.003 [0.014]	0.008 [0.014]	6,600
Petroleum, Chemical, Polymer and Rubber Product Manufacturing	0.068*** [0.006]	0.078*** [0.007]	0.004 [0.007]	13,700
Non-Metallic Mineral Product Manufacturing	-0.011 [0.017]	-0.005 [0.020]	0.045* [0.019]	8,400
Metal Product Manufacturing	0.044*** [0.007]	0.076*** [0.008]	0.030*** [0.009]	20,200
Transport Equipment, Machinery and Equipment Manufacturing	0.014* [0.006]	0.049*** [0.007]	0.039*** [0.007]	25,900
Furniture and Other Manufacturing	0.071*** [0.019]	0.068** [0.021]	-0.013 [0.025]	6,200
Electricity, Gas, Water and Waste Services	-0.047*** [0.011]	0.010 [0.014]	0.039** [0.014]	7,700
Construction	0.010** [0.004]	0.040*** [0.004]	0.030*** [0.005]	96,200
Wholesale Trade	0.064*** [0.003]	0.078*** [0.004]	0.010** [0.003]	68,100
Retail Trade	0.030*** [0.004]	0.019*** [0.004]	-0.014** [0.004]	77,400
Accommodation and Food Services	0.017** [0.006]	0.003 [0.006]	-0.021*** [0.006]	38,100
Transport, Postal and Warehousing	0.036*** [0.005]	0.039*** [0.006]	0.006 [0.006]	54,700
Information Media and Telecommunications	0.075*** [0.008]	0.080*** [0.009]	-0.015 [0.009]	20,000
Financial and Insurance Services	0.046*** [0.004]	0.046*** [0.006]	-0.001 [0.006]	35,400
Rental, Hiring and Real Estate Services	0.102*** [0.009]	0.106*** [0.011]	0.000 [0.010]	16,500
Professional, Scientific and Technical Services	0.076*** [0.004]	0.066*** [0.004]	-0.013** [0.004]	65,700
Administrative and Support Services	0.080*** [0.004]	0.079*** [0.004]	0.006 [0.004]	67,000
Education and Training	0.025 [0.036]	-0.012 [0.033]	-0.038 [0.034]	70,400
Health Care and Social Assistance	-0.041*** [0.007]	-0.045*** [0.008]	-0.006 [0.009]	41,200
Arts and Recreation Services	0.167*** [0.028]	0.068** [0.025]	-0.104*** [0.019]	9,500
Other Services	0.032** [0.011]	0.065*** [0.012]	0.036** [0.012]	27,600

Significant at: \*\*\* 1%; \*\* 5%; \* 10%. Robust standard errors in brackets. See notes to table 14 for further detail.

**Table A.5: Heterogeneity by labour market region**

	Start level	End level	Within job	N(obs)
Northland West	-0.012 [0.025]	-0.025 [0.024]	0.019 [0.024]	6,200
Northland East	-0.017 [0.012]	-0.017 [0.012]	-0.007 [0.013]	19,000
Greater Auckland	0.036*** [0.001]	0.040*** [0.002]	0.002 [0.002]	353,500
Thames Coromandel	0.017 [0.011]	0.018 [0.012]	-0.002 [0.012]	16,900
Greater Hamilton	0.012* [0.005]	0.023*** [0.006]	0.010 [0.006]	54,300
Taranaki Rural	0.099*** [0.026]	0.074** [0.028]	-0.025 [0.026]	13,100
Taranaki Urban	0.091*** [0.012]	0.121*** [0.013]	0.018 [0.012]	16,000
Tauranga	0.027*** [0.008]	0.034*** [0.009]	-0.007 [0.009]	32,000
North Central North Island	-0.025*** [0.007]	0.017* [0.008]	0.039*** [0.008]	41,000
Gisborne - Opotiki	-0.026 [0.014]	-0.022 [0.014]	0.000 [0.015]	10,400
Napier - Hastings	0.033*** [0.008]	0.042*** [0.009]	0.003 [0.010]	26,300
Hawkes Bay - Central North Island Rural	-0.019 [0.016]	0.022 [0.017]	0.057** [0.018]	10,800
Palmerston North	0.030*** [0.007]	0.055*** [0.008]	0.021** [0.008]	22,600
Wanganui	0.022 [0.018]	0.040* [0.020]	0.010 [0.020]	6,900
Horowhenua - Wairarapa	0.047** [0.017]	-0.009 [0.017]	-0.067*** [0.018]	9,700
Wellington Urban	0.028*** [0.003]	0.029*** [0.004]	-0.003 [0.003]	105,300
Nelson - North of West Coast	0.028** [0.010]	0.019 [0.011]	-0.007 [0.011]	25,200
Marlborough - North Canterbury	0.007 [0.014]	0.039* [0.016]	0.036* [0.015]	13,100
Greater Christchurch	0.033*** [0.003]	0.043*** [0.004]	0.010* [0.004]	96,900
South Westland - Rural South Canterbury	0.003 [0.008]	-0.006 [0.009]	-0.007 [0.009]	34,900
Central Otago - North and East Southland	-0.027 [0.020]	0.056* [0.026]	0.078** [0.024]	11,800
Dunedin	0.029*** [0.008]	0.037*** [0.010]	0.004 [0.010]	20,000
Greater Invercargill and Stewart Island	0.041*** [0.011]	0.034** [0.012]	-0.018 [0.013]	18,900

Significant at: \*\*\* 1%; \*\* 5%; \* 10%. Robust standard errors in brackets. See notes to table 14 for further detail.



## Appendix B: Hours analysis using Household Labour Force Survey data

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While the core source of income data in the IDI does not include information on either hourly pay rates or hours worked, a linked survey dataset – the Household Labour Force Survey (HLFS) – gathers information on employment status, including full-time and part-time status, and both actual hours worked in a reference week and usual hours worked. Linking hours information from HLFS snapshots with the spell data used for the main analysis in this paper, tables B.1 and B.2 compare the reported usual hours worked in main jobs by employees across firms of different ownership types.

Table B.1 reports mean hours worked across the four ownership types, for both the complete set of observations for which this linking can be done and for a restricted sample which considers only full-time job spells.<sup>43</sup> In the full sample, workers in always foreign-owned firms work around 2.5 hours per week longer than those in domestically-owned firms. However, when restricting to full-time job spells the average hours gap is very small, and, if anything, shows slightly higher hours worked in domestic firms.

Table B.2 reports OLS regression results where the dependent variable is log usual hours worked, sequentially introducing controls for worker and firm characteristics, full time status, and sample restrictions. As implied by the means reported in table B.1, job spells in foreign-owned firms involve around 12 percent higher usual hours worked than those in domestic firms. But this gap becomes insignificant when controls for firm and worker characteristics are introduced, with all gaps across firm types disappearing when full- and part-time status is controlled for in column 4. Thus, it appears unlikely that differences in hours worked are driving the observed earnings gaps between foreign and domestic firms, as the raw hours gap is fully explained by the worker and firm controls, and the restriction to full-time status that we apply in the main regression analysis.

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<sup>43</sup> Defined as job spells that are classified as full time at both the start and end of the spell, following Maré & Hyslop (2006).

**Table B.1: Mean hours worked in foreign- and domestically-owned firms**

	All matched job spells			Full-time job spells only		
	Mean	Std Error	N(spells)	Mean	Std Error	N(spells)
always	38.145	0.080	6,200	42.175	0.138	1,200
sometimes	36.431	0.074	9,200	42.834	0.134	1,600
never	35.283	0.032	61,300	42.731	0.059	9,700
unknown	32.408	0.178	2,900	44.940	0.438	370
Total	35.490	0.027	79,700	42.855	0.051	12,800

Source: Household Labour Force Survey data on usual hours worked linked to job spells. Columns 1-3 include all job spells for which linked hours information is available. Columns 4-6 restricted to full-time job spells. Hours observations weighted to give equal weight to each job spell.

**Table B.2: Hours premium by firm type**

	(1)	(2)	(3)	(4)	(5)
always	0.124*** [0.005]	0.130*** [0.011]	0.028** [0.010]	0.002 [0.010]	-0.010 [0.006]
sometimes	0.063*** [0.005]	0.052*** [0.010]	0.023** [0.009]	0.011 [0.008]	0.006 [0.005]
unknown	-0.160*** [0.010]	-0.149*** [0.019]	-0.109*** [0.017]	-0.069*** [0.016]	-0.011 [0.016]
Adjusted R <sup>2</sup>	0.007	0.006	0.272	0.354	0.137
N(obs)	264,900	62,200	62,200	62,200	34,100
N(spells)	79,300	25,200	25,200	25,200	12,800

Significant at: \*\*\* 1%; \*\* 5%; \* 10%. Robust standard errors in brackets. Source: Household Labour Force Survey data linked to job spells. Regressions are weighted to give equal weight to each job spell. Column 1 reports raw differences for all available observations. Column 2 reports raw differences, restricting to the population for which standard control variables are available. Columns 3-5 includes controls for worker, firm and job characteristics: gender, WFE, age and tenure, industry and LMR dummies. Column 4 adds a binary control for whether the worker is classed as full-time at both the start and end of their job spell (based on Maré & Hyslop, 2006), while column 5 includes worker, firm and job controls and also restricts attention solely to full-time job spells.