

# Productivity Hub

## Sausage Roll Seminar



NEW ZEALAND  
PRODUCTIVITY COMMISSION  
Te Kōmihana Whai Hua o Aotearoa



# Migrant job sorting (work-in-progress)

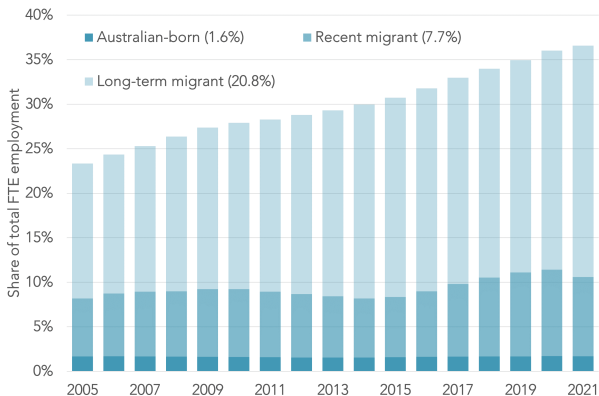
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Productivity Hub  
20 September 2022

These results are not official statistics. They have been created for research purposes from the [Integrated Data Infrastructure (IDI) and Longitudinal Business Database (LBD), which are carefully managed by Stats NZ. For more information about the IDI and LBD please visit <https://www.stats.govt.nz/integrated-data/>. The results are based in part on tax data supplied by Inland Revenue to Stats NZ under the Tax Administration Act 1994 for statistical purposes. Any discussion of data limitations or weaknesses is in the context of using the IDI for statistical purposes, and is not related to the data's ability to support Inland Revenue's core operational requirements.

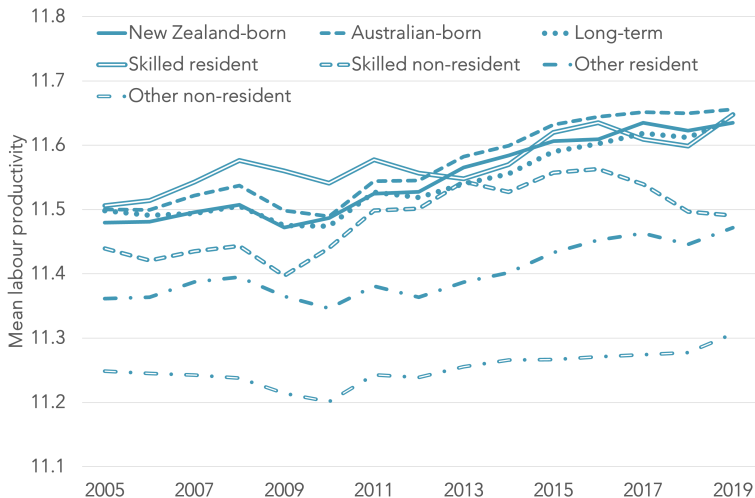
# Motivation



- Migrants are important to the labour force
- Substantial change in migrant population over time
  - Aggregate growth AND changing visa composition
- Potential migrant sorting by firm productivity (Fabling, Maré & Stevens 2022)



# Mean firm labour productivity by migrant category



# Research questions

- Do migrant job characteristics differ from the job characteristics of NZ-born?
- Do job characteristics change the longer migrants stay in NZ?
- Are migrant wage gaps/changes in those gaps “explained” by job sorting?
- These questions relate to multiple (non-migrant) literatures
  - Rent-sharing (eg, Allan & Maré)
  - Role of firms in wage inequality
  - (Who climbs the) Job ladder
  - Scarring effects of recessions
  - Importance of (market/job-specific) knowledge

- Fabling-Maré labour and productivity tables, 2005-2021(19)
- FTE-weighted (or prod & FTE-weighted)
- Unit of observation worker-firm-visa(15 groups)-(March)year
- Other IDI (following Fabling, Maré & Stevens)
  - Birth location (DIA & Census & MBIE)
  - Year of arrival to live in NZ (Census & MBIE)
  - Visa (MBIE with MBIE groupings)
- Migrant-NZ-born gaps estimated for
  - Individual wage ( $w$ , log of gross earnings per FTE)
  - Firm wage premium (firm FE, 2-way FE wage model)
  - Migrant share of co-workers (FTE of co-workers $\geq 1$ )
  - Co-worker mean skill (worker FE, mean zero within sex-yr)
  - Firm size ( $l$ , log of total firm FTE)
  - Firm labour productivity (PFP measured sector)
  - Firm capital labour ratio ( $k-l$  ratio)
- Regressions control for: year; sex $\times$ age; sex $\times$ tenure; firm location & 212 industries (last requires sampling)

# Mean wage by visa type

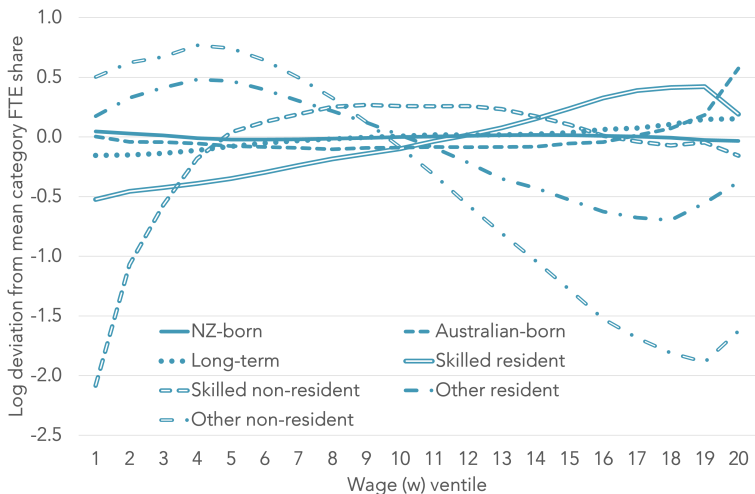
	N(workers)	Mean annual FTE	FTE share	Mean monthly FTE	Wage
New Zealand-born	2,543,286	1,332,862	0.698	0.816	5,581
Australian-born	103,098	31,482	0.016	0.814	6,431
Long-term migrant (LT)	1,006,149	385,800	0.208	0.842	5,914
Skilled resident (SR)	273,858	32,290	0.021	0.855	6,191
Investor/entrepreneur	6,240	494	0.000	0.704	4,352
Primary applicant	159,447	22,562	0.013	0.918	7,092
Secondary applicant	108,204	14,705	0.007	0.764	4,589
Skilled non-resident (SNR)	296,292	26,488	0.017	0.928	5,822
Essential skills	251,175	22,553	0.013	0.922	5,289
Work-to-residence	59,001	5,996	0.004	0.949	7,771
Other resident (OR)	192,009	19,079	0.012	0.788	4,809
Partnership	99,576	11,826	0.006	0.810	4,932
Remaining OR categories	92,433	12,395	0.006	0.767	4,686
Other non-resident (ONR)	857,967	42,968	0.028	0.679	4,053
Work – Family	185,061	14,759	0.007	0.766	4,087
Study-to-work	129,693	11,695	0.006	0.791	3,976
Student	215,040	13,979	0.004	0.442	3,021
Working holiday scheme	390,192	14,307	0.006	0.673	3,955
Remaining ONR categories	169,605	8,583	0.004	0.770	5,213



# Main group – migrants present at 5+ years (“long-term”)

Visa type held in arrival/following year	Proportion of $t \in \{0, 1\}$ FTE	Transition rate $t \in \{5, 6\}$	Transition rate $t \geq 5$
Skilled resident (SR)	0.144	0.884	0.907
Investor/entrepreneur	0.001	0.719	0.752
Primary applicant	0.094	0.879	0.899
Secondary applicant	0.049	0.899	0.926
Skilled non-resident (SNR)	0.248	0.734	0.754
Essential skills	0.200	0.729	0.750
Work-to-residence	0.048	0.752	0.772
Other resident (OR)	0.089	0.811	0.848
Partnership	0.028	0.887	0.920
Remaining categories	0.061	0.776	0.814
Other non-resident (ONR)	0.519	0.471	0.492
Work – Family	0.105	0.811	0.845
Study-to-work	0.018	0.943	0.949
Student	0.081	0.775	0.792
Working holiday scheme	0.231	0.207	0.220
Remaining categories	0.084	0.381	0.413
<b>Total</b>	<b>1.000</b>	<b>0.626</b>	<b>0.648</b>

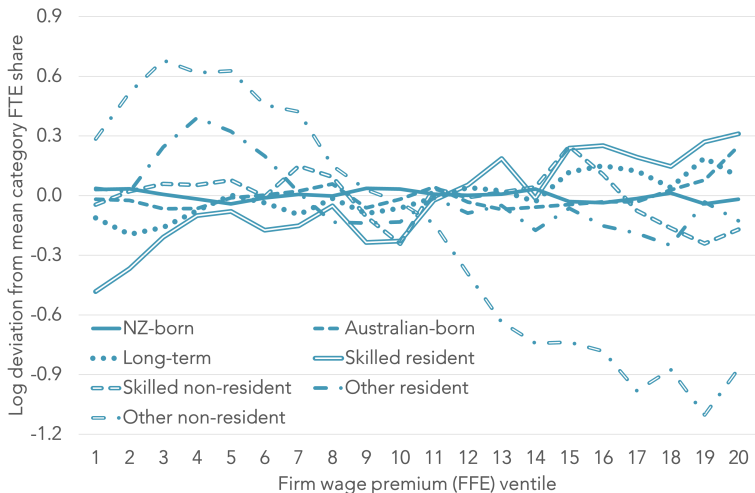
# Employment share by ventile of $w$ (deviation from mean)



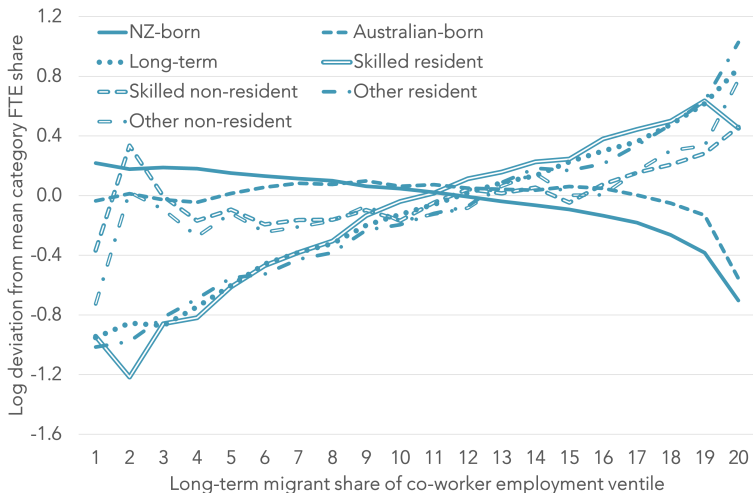
# Substantial (FTE-weighted) heterogeneity across jobs

Ventile	Worker w	Firm FFE	Co-worker			I	Firm	
			LT	RM	Skill		LP	KL
1	7.87	-0.30	0.00	⋮	-0.31	0.12	10.09	6.66
2	7.92	-0.19	0.02	0.00	-0.24	1.08	10.75	8.16
3	7.98	-0.16	0.04	⋮	-0.20	1.61	10.89	8.60
4	8.05	-0.13	0.08	0.00	-0.17	2.03	11.00	8.86
5	8.11	-0.11	0.10	0.01	-0.15	2.41	11.09	9.05
6	8.18	-0.10	0.12	0.02	-0.12	2.78	11.17	9.21
7	8.24	-0.07	0.14	0.02	-0.09	3.15	11.24	9.34
8	8.30	-0.05	0.15	0.03	-0.07	3.51	11.32	9.46
9	8.36	-0.04	0.17	0.03	-0.04	3.88	11.38	9.57
10	8.42	-0.02	0.19	0.04	-0.01	4.25	11.45	9.68
11	8.47	0.00	0.20	0.05	0.02	4.65	11.52	9.79
12	8.53	0.03	0.22	0.05	0.04	5.05	11.59	9.90
13	8.60	0.05	0.23	0.06	0.07	5.49	11.67	10.02
14	8.66	0.07	0.25	0.07	0.09	5.96	11.76	10.14
15	8.74	0.09	0.27	0.09	0.12	6.45	11.85	10.28
16	8.82	0.11	0.29	0.10	0.14	6.93	11.96	10.44
17	8.91	0.14	0.32	0.12	0.17	7.53	12.09	10.65
18	9.02	0.17	0.37	0.16	0.20	8.11	12.26	10.93
19	9.21	0.21	0.43	0.23	0.24	8.70	12.53	11.36
20	9.69	0.31	0.62	0.47	0.38	9.24	13.20	12.47
<b>Total</b>	<b>8.50</b>	<b>0.00</b>	<b>0.21</b>	<b>0.08</b>	<b>0.00</b>	<b>4.64</b>	<b>11.54</b>	<b>9.73</b>

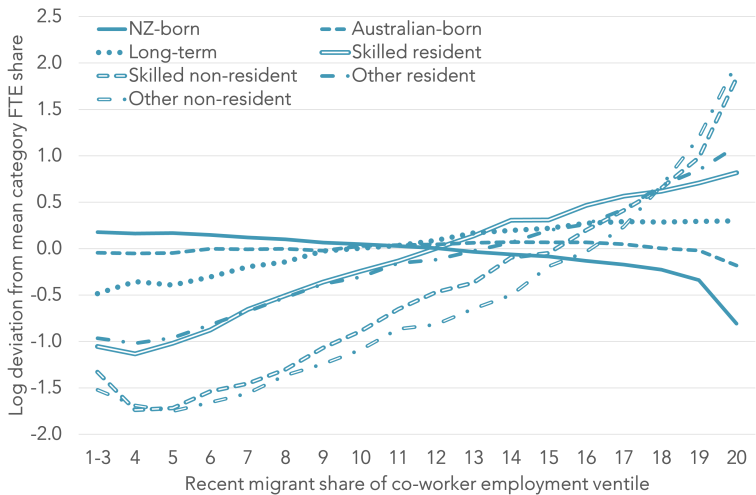
# Employment share ventile – firm wage premium



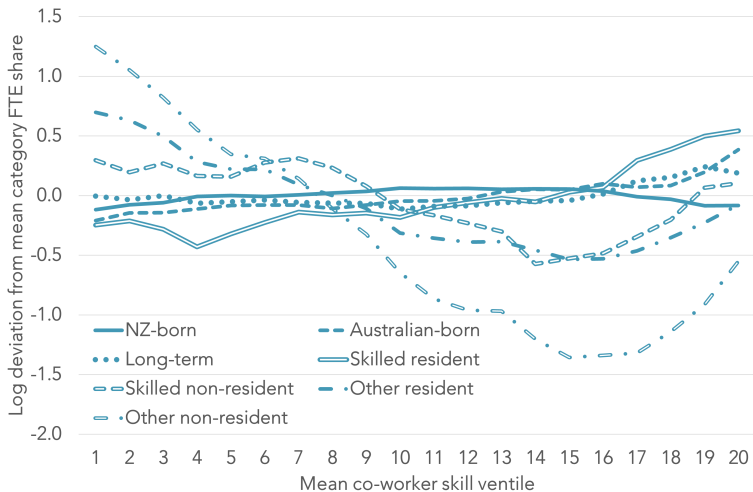
# Employment share ventile – LT migrant co-workers



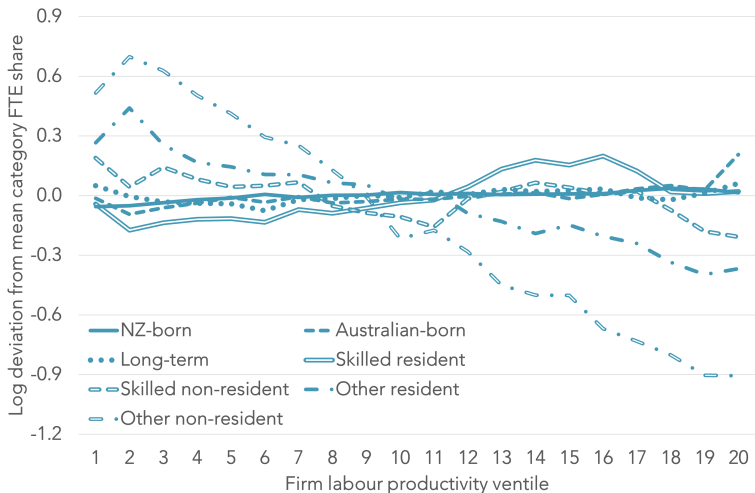
# Employment share ventile – recent migrant co-workers



# Employment share ventile – mean co-worker skill



# Employment share ventile – firm labour productivity

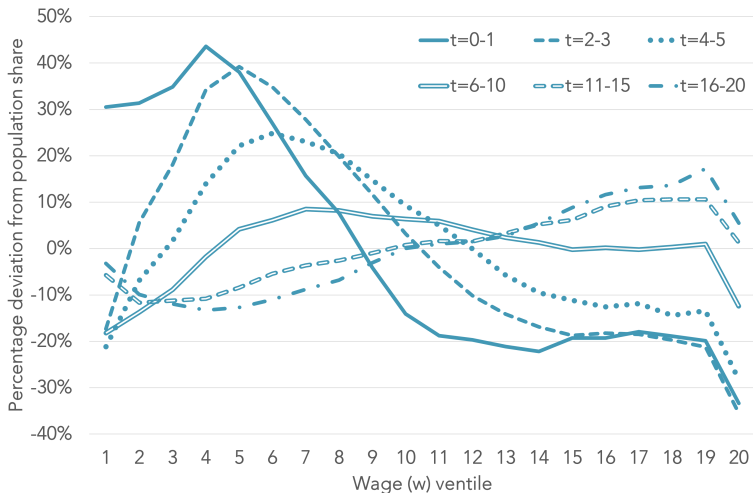




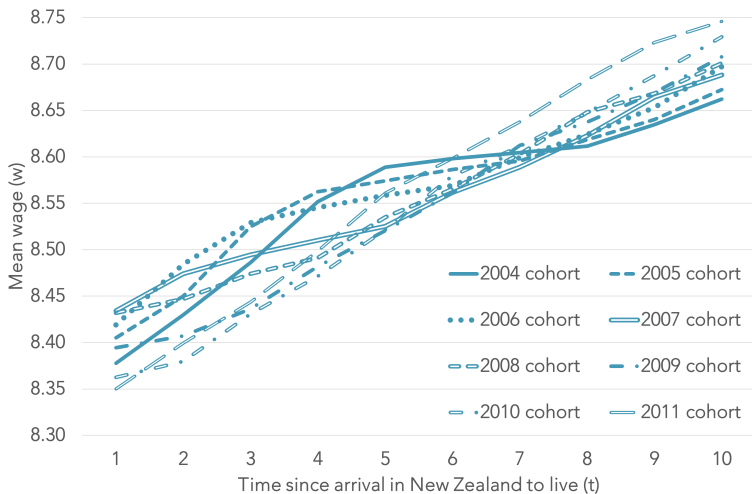
# Summary of ventiles

- Migrants on different visas work in different sorts of firms
- Migrants work in different sorts of firms to NZ-born
- In general, long-term migrants look more like NZ-born than recent migrants do, potentially because
  - Visa system  $t$ -limits migrants with weaker expected labour market outcomes (recall transition rates to LT)
  - Migrants who experience poor labour market outcomes choose to leave NZ or the labour market
  - Migrants learn about labour market opportunities (ie, improved job matching)
  - Migrants and/or employers identify better ways to benefit from migrant skills (changing work methods, training, two-way innovation)
  - Employers learn the true market value of migrants (eg, Dostie, Li, Card & Parent for Canada)
- Focus on ever-LT migrants to partially control for selection
- Then balance panel & introduce NZ-born comparison group – new hires (drop under 18s)

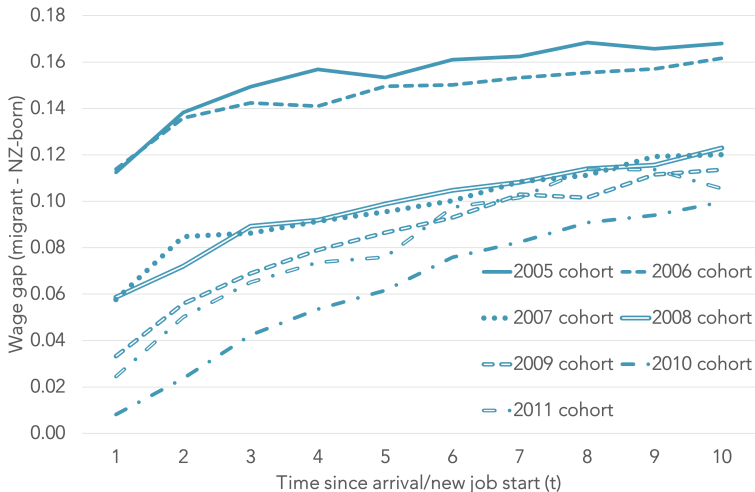
# Wage ( $w$ ) ventile by time since arrival ( $t$ ) for ever-LT



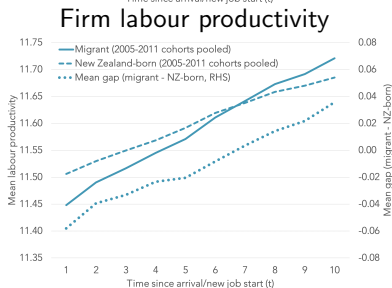
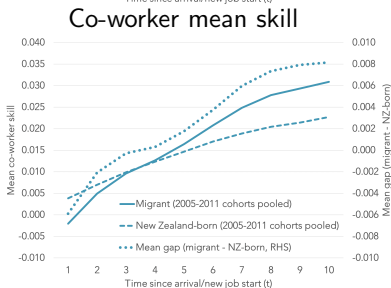
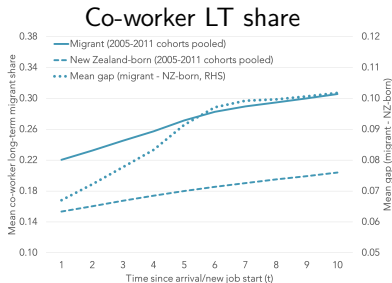
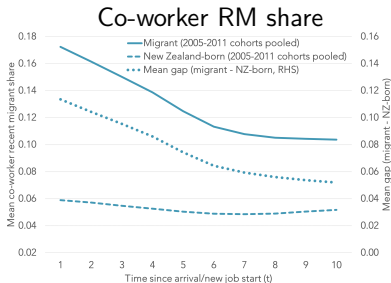
# Mean $w$ by arrival cohort for ever-LT – balanced panel



# Mean $w$ gap by arrival cohort for ever-LT vs new hire – balanced panel (Note: post-GFC)



# Other gaps ever-LT vs new hire – pooled & balanced



# OLS w gap (ever-LT vs all NZ-born) – unbalanced panel

Dependent variable: wage ( $w$ )		Population			Sample		
		(1)	(2)	(3)	(4)	(5)	(6)
Long-term migrant							
$t = 1$		-0.096** [0.008]	-0.101** [0.007]	-0.011 [0.007]	-0.034** [0.006]	-0.035** [0.007]	-0.003 [0.005]
$t = 2$		-0.083** [0.007]	-0.088** [0.006]	-0.026** [0.006]	-0.052** [0.005]	-0.053** [0.005]	-0.016** [0.004]
$t = 3$		-0.063** [0.006]	-0.075** [0.005]	-0.028** [0.005]	-0.056** [0.005]	-0.058** [0.005]	-0.022** [0.003]
$t = 4$		-0.047** [0.006]	-0.065** [0.005]	-0.028** [0.005]	-0.057** [0.005]	-0.059** [0.005]	-0.026** [0.003]
$t = 5$		-0.033** [0.006]	-0.057** [0.005]	-0.031** [0.005]	-0.062** [0.005]	-0.064** [0.005]	-0.034** [0.003]
$t = 6$		-0.009 [0.006]	-0.041** [0.005]	-0.025** [0.005]	-0.057** [0.005]	-0.059** [0.005]	-0.032** [0.003]
$t = 7$		-0.003 [0.006]	-0.036** [0.005]	-0.022** [0.005]	-0.055** [0.004]	-0.057** [0.005]	-0.034** [0.003]
$t = 8$		0.004 [0.006]	-0.031** [0.005]	-0.020** [0.005]	-0.054** [0.004]	-0.056** [0.004]	-0.036** [0.003]
$t = 9$		0.011* [0.005]	-0.026** [0.005]	-0.017** [0.005]	-0.052** [0.004]	-0.054** [0.004]	-0.036** [0.003]
$t = 10$		0.018** [0.005]	-0.020** [0.005]	-0.013** [0.004]	-0.049** [0.004]	-0.050** [0.004]	-0.036** [0.003]
N(observations)		33,091,461			5,342,463		
Adjusted $R^2$		0.015	0.223	0.255	0.283	0.285	0.397
Controls: year		Y	Y	Y	Y	Y	Y
	sex $\times$ age	N	Y	Y	Y	Y	Y
	sex $\times$ tenure	N	N	Y	Y	Y	Y
	location	N	N	N	Y	Y	Y
	industry	N	N	N	N	N	Y

# OLS $w$ gap – controlling for other outcomes (prod-only)

Dep: $w$	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
LT ( $t = 1$ )	-0.028** [0.004]	-0.035** [0.004]	-0.024** [0.004]	-0.033** [0.004]	-0.027** [0.004]	-0.026** [0.004]	-0.032** [0.004]	-0.023** [0.004]	-0.024** [0.003]
LT ( $t = 2$ )	-0.035** [0.004]	-0.042** [0.004]	-0.026** [0.003]	-0.039** [0.004]	-0.031** [0.004]	-0.033** [0.004]	-0.032** [0.003]	-0.028** [0.003]	-0.025** [0.003]
LT ( $t = 3$ )	-0.041** [0.004]	-0.048** [0.004]	-0.029** [0.003]	-0.043** [0.004]	-0.037** [0.004]	-0.040** [0.004]	-0.035** [0.003]	-0.033** [0.003]	-0.029** [0.003]
LT ( $t = 4$ )	-0.048** [0.004]	-0.055** [0.004]	-0.034** [0.003]	-0.049** [0.004]	-0.043** [0.004]	-0.047** [0.004]	-0.039** [0.003]	-0.039** [0.003]	-0.034** [0.003]
LT ( $t = 5$ )	-0.057** [0.003]	-0.064** [0.004]	-0.042** [0.003]	-0.057** [0.004]	-0.052** [0.003]	-0.056** [0.003]	-0.046** [0.003]	-0.048** [0.003]	-0.042** [0.003]
LT ( $t = 6$ )	-0.058** [0.004]	-0.064** [0.004]	-0.042** [0.003]	-0.058** [0.004]	-0.052** [0.004]	-0.056** [0.004]	-0.046** [0.003]	-0.049** [0.003]	-0.043** [0.003]
LT ( $t = 7$ )	-0.059** [0.004]	-0.065** [0.004]	-0.043** [0.003]	-0.060** [0.004]	-0.053** [0.004]	-0.058** [0.004]	-0.047** [0.003]	-0.053** [0.003]	-0.045** [0.003]
LT ( $t = 8$ )	-0.057** [0.004]	-0.063** [0.004]	-0.041** [0.003]	-0.058** [0.004]	-0.052** [0.004]	-0.056** [0.004]	-0.046** [0.004]	-0.052** [0.004]	-0.045** [0.004]
Co-worker migrant share		0.043** [0.008]					0.030** [0.006]		0.019** [0.004]
Co-worker mean skill			0.825** [0.012]				0.698** [0.013]		0.506** [0.009]
Firm size ( $l$ )				0.028** [0.002]			0.018** [0.002]		-0.003** [0.001]
Firm labour productivity					0.124** [0.007]		0.060** [0.004]		0.023** [0.002]
Firm $k-l$ ratio						0.041** [0.003]	0.004 [0.002]		-0.001 [0.001]
Firm wage premium (FFE)								1.273** [0.012]	1.049** [0.010]
Change in gap	-0.029	-0.028	-0.017	-0.025	-0.025	-0.030	-0.014	-0.029	-0.021
Adjusted $R^2$	0.446	0.446	0.488	0.455	0.465	0.451	0.497	0.516	0.532

# OLS $w$ gap – by initial industry mean firm wage premium

Dep. var: wage ( $w$ )	Industry quartile					Industry quartile				
	All (1)	Q1 (2a)	Q2 (2b)	Q3 (2c)	Q4 (2d)	All (3)	Q1 (4a)	Q2 (4b)	Q3 (4c)	Q4 (4d)
LT ( $t = 1$ )	-0.028** [0.004]	-0.084** [0.005]	-0.047** [0.009]	-0.004 [0.008]	0.017* [0.008]	-0.024** [0.003]	-0.063** [0.005]	-0.030** [0.008]	-0.012 [0.007]	0.003 [0.006]
LT ( $t = 2$ )	-0.035** [0.004]	-0.071** [0.006]	-0.046** [0.008]	-0.016* [0.007]	0.024** [0.008]	-0.025** [0.003]	-0.046** [0.005]	-0.031** [0.008]	-0.020** [0.006]	0.012* [0.006]
LT ( $t = 3$ )	-0.041** [0.004]	-0.075** [0.006]	-0.056** [0.008]	-0.015* [0.006]	0.040** [0.007]	-0.029** [0.003]	-0.046** [0.005]	-0.043** [0.007]	-0.019** [0.005]	0.023** [0.006]
LT ( $t = 4$ )	-0.048** [0.004]	-0.085** [0.006]	-0.065** [0.007]	-0.017* [0.007]	0.051** [0.007]	-0.034** [0.003]	-0.054** [0.005]	-0.050** [0.007]	-0.022** [0.005]	0.032** [0.006]
LT ( $t = 5$ )	-0.057** [0.003]	-0.097** [0.007]	-0.075** [0.007]	-0.022** [0.006]	0.046** [0.007]	-0.042** [0.003]	-0.067** [0.006]	-0.060** [0.007]	-0.027** [0.005]	0.026** [0.006]
LT ( $t = 6$ )	-0.058** [0.004]	-0.103** [0.007]	-0.072** [0.006]	-0.022** [0.006]	0.047** [0.007]	-0.043** [0.003]	-0.073** [0.006]	-0.059** [0.007]	-0.025** [0.005]	0.028** [0.006]
LT ( $t = 7$ )	-0.059** [0.004]	-0.108** [0.008]	-0.074** [0.007]	-0.020** [0.006]	0.055** [0.007]	-0.045** [0.003]	-0.082** [0.007]	-0.066** [0.007]	-0.023** [0.006]	0.036** [0.006]
LT ( $t = 8$ )	-0.057** [0.004]	-0.109** [0.008]	-0.068** [0.007]	-0.017** [0.006]	0.063** [0.007]	-0.045** [0.004]	-0.085** [0.007]	-0.063** [0.006]	-0.018** [0.006]	0.042** [0.006]
Controls for firm chars.	N	N	N	N	N	Y	Y	Y	Y	Y
Change in gap over time										
$\beta_{t=8}^{(-)} - \beta_{t=1}^{(-)}$	-0.029	-0.025	-0.021	-0.013	0.046	-0.021	-0.022	-0.033	-0.006	0.039
$H_0:$	p-value from test that specified gaps are equal									
$\beta_{t=1}^{(-)} = \beta_{t=1}^{(a)}$	-	-	0.000	0.000	0.000	-	-	0.000	0.000	0.000
$\beta_{t=1}^{(-)} = \beta_{t=1}^{(b)}$	-	0.000	-	0.001	0.000	-	0.000	-	0.067	0.001
$\beta_{t=1}^{(-)} = \beta_{t=1}^{(c)}$	-	0.000	0.001	-	0.058	-	0.000	0.067	-	0.090
$\beta_{t=8}^{(-)} = \beta_{t=8}^{(a)}$	-	-	0.000	0.000	0.000	-	-	0.001	0.000	0.000
$\beta_{t=8}^{(-)} = \beta_{t=8}^{(b)}$	-	0.000	-	0.000	0.000	-	0.001	-	0.000	0.000
$\beta_{t=8}^{(-)} = \beta_{t=8}^{(c)}$	-	0.000	0.000	-	0.000	-	0.000	0.000	-	0.000



# Conclusions

- Original questions
  - *Do migrant jobs differ from NZ-born jobs?*  
**[Yes]** Migrants sort into lower wage/productivity jobs
  - *Do job characteristics change the longer migrants stay in NZ?*  
**[Yes]** LT migrant “look” more like NZ-born than recent migrants, particularly controlling for age & tenure. Conversely, adding location increases gap. Gap is stable or slightly  $\downarrow$  over  $t$
  - *Are migrant wage gaps/their evolution “explained” by job sorting?*  
**[Partially]** Adding ind suggest  $\uparrow$  gap over  $t$ . Combined, job characteristics explain around half of change in wage gap
- Heterogeneity in results (initial job industry). Additional results in paper by cohort and by initial visa (4 groups)
  - Former: initial differences between cohorts – perhaps due to macro conditions – appear to fade over time
  - Latter: initial gaps between skilled and other migrants persist over  $t$ , likely reflecting ability (even conditioning on ever-LT)