Job-to-Job Transitions and the regional job ladder

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NEW ZEALAND
PRODUCTIVITY COMMISSION
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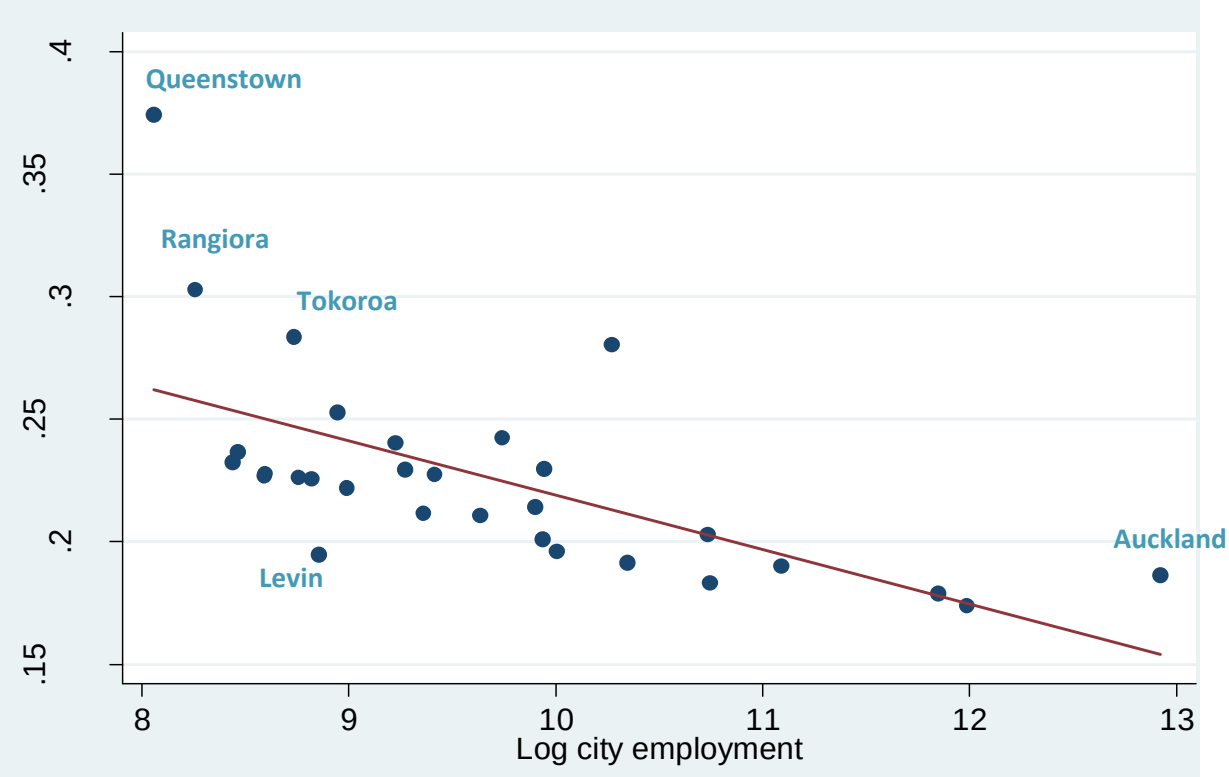
Careful consideration has been given to the privacy, security, and confidentiality issues associated with using administrative and survey data in the IDI. Further detail can be found in the Privacy impact assessment for the Integrated Data Infrastructure available from www.stats.govt.nz.

Motivations

- From a recent NZPC paper on “new jobs, old jobs: the evolution of New Zealand’s cities and towns”
  - A declining in the number of the manufacturing jobs
  - An increase in the quantity of information-intensive work
  - The rapid growth of large “super cities”
  - Internal migration to locations with desirable amenities, either productive or consumption ones

Smaller cities experienced higher job churns, indicating faster job movements



Why job-to-job transition is important

- Job-to-job transition measures worker movements from one job to another without a period of unemployment
- Job-to-job transition plays a crucial role in building career paths and wage growth over the life cycle
  - Topel and Ward (1992) found that higher frequency of job changes in the first ten years of job market among younger workers accounts at least a third of life-time wage growth
  - Haltiwanger et al (2018) showed the job-to-job transition is associated with the firm wage ladder and leads to higher wage growth by one log point

Research focus

- Job-to-job transitions and wage growth
  - Do job changes lead to higher wage?
  - Are there any wage premiums associated with locations?
- Worker mobility and house prices
  - Does higher house prices slow down worker mobility?
  - Which types of workers are affected the most by house prices?

JOB-TO-JOB TRANSITION AND WAGE PREMIUMS

Data

- Built from Fabling and Mare's paper on "addressing the absence of hours information in LEED"
  - Link monthly EMS to plants and enterprises
  - Include FTE estimates indicating part/full-time jobs
  - Working proprietors are not included
- Data restrictions
  - Snapshots of job information in **March** month
  - Workers aged between 18 and 64
  - No jobs that were paid less than $100
  - The two highest paid jobs were selected as main jobs
- The final population pool has 30,719,500 person-jobs.

Data

- The economic activities at the plant level are recorded by the 2006 NZSIOC industries
  - Totally 65 NZSIOC including the public sector
- Each plant is fixed to a **predominant geographic location and industry**
  - 37% of employing plants were recorded to have changed their industry code or location at least once between 2000 and 2018
    - 92% of plants remained in the same one-digit industry code
    - 88% of plants relocated in the same urban areas
- Geographic units:
  - 17 Primary urban areas (>=30,000 residents)
  - 13 Secondary urban areas (between 10,000 and 29,999 residents)
  - 1 minor urban area (1,000 to 9,999 residents), such as Warkworth
  - 1 rural area

Primary and secondary urban areas

- Primary urban areas
  - Auckland, Blenheim, Christchurch, Dunedin, Gisborne, Hamilton, Invercargill, Kapiti, Napier & Hastings, Nelson, New Plymouth, Palmerston North, Rotorua, Tauranga, Wanganui, Wellington, Whangarei
- Secondary urban areas
  - Ashburton, Feilding, Greymouth, Hawera, Levin, Masterton, Oamaru, Queenstown, Rangiora, Taupo, Timaru, Tokoroa, Whakatane

Job-to-job transition classifications

		Status at *t+1*			
		Continuing employed		Exits (to unemployment and non-participation)	Entrants
Status at *t*	Employed (100)	Stayers	Job-to-job transitions (movers)		
		61	21	18	
	Unemployed and non-participants				20

Four categories of job-to-job transitions

- Workers who change firms but stay in the same city and same industry
- Workers who move to a job in a different industry but remain in the same city
- Workers are move to a different city but remain in the same industry
- Workers who change industries and cities

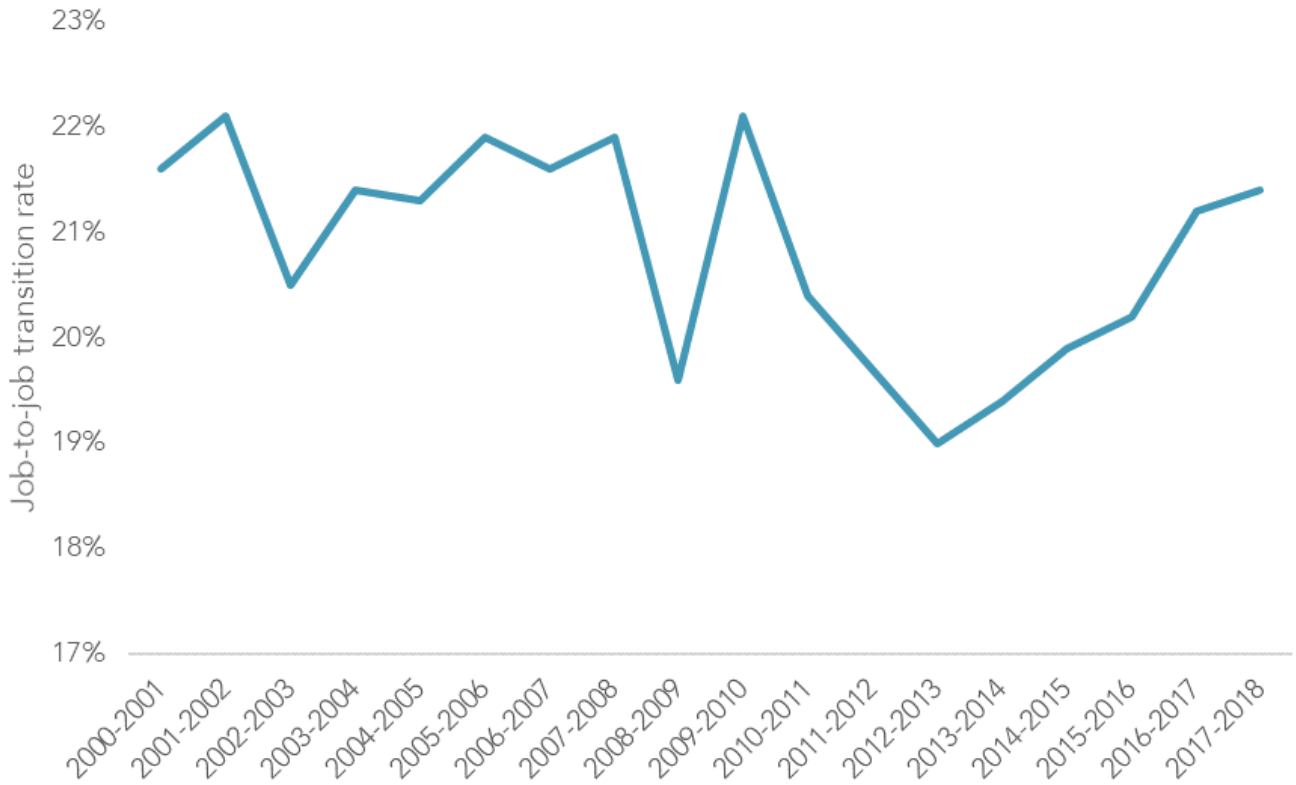
National average Job-to-job transition rate

Table 2 Labour market status by demographic group (national averages, 2000- 2018)

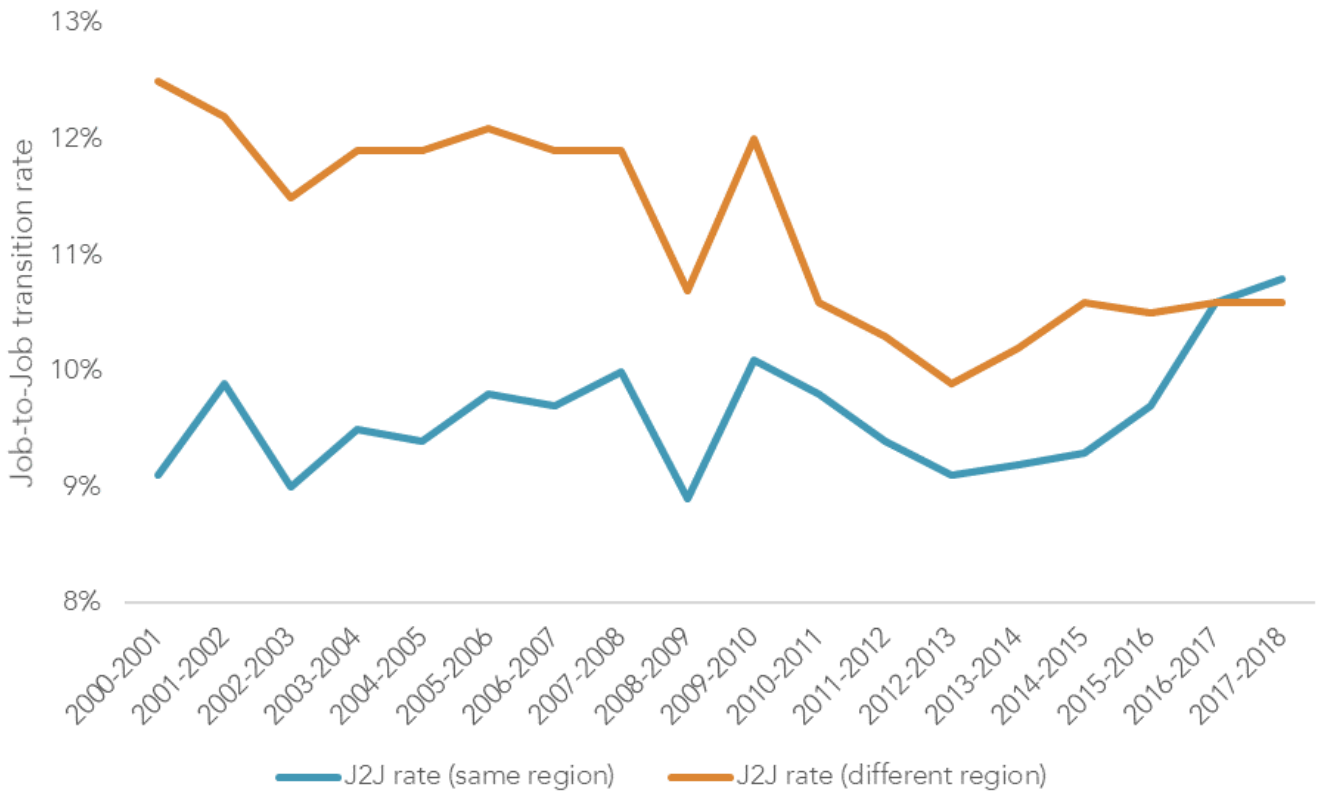
	Stay	Same industry			Different industry			Exit	Entry	Number of Jobs
		Same region	Different region	Total	Same region	Different region	Total			
Female										
18-24	40.3%	5.7%	4.5%	10.2%	11.3%	8.9%	20.2%	29.3%	41.9%	2,406,400
25-54	63.3%	5.1%	4.2%	9.3%	6.0%	4.6%	10.6%	16.9%	18.4%	10,693,100
55-64	69.1%	3.9%	3.6%	7.5%	2.9%	2.5%	5.4%	17.9%	9.9%	2,145,700
Male										
18-24	45.5%	5.1%	4.1%	9.2%	10.7%	9.3%	20.0%	25.3%	39.0%	2,723,000
25-54	65.4%	4.2%	4.1%	8.3%	6.3%	5.8%	12.1%	14.3%	15.2%	10,747,000
55-64	68.8%	2.8%	3.4%	6.2%	3.6%	3.7%	7.3%	17.6%	9.7%	2,004,300
New Zealand										
All	61.4%	4.6%	4.1%	8.7%	6.5%	5.6%	12.1%	17.8%	19.8%	30,719,500

Source: Authors' calculations based on Stats NZ's Linked Employer-Employee Database

Job-to-job transition slowly declined over time, but raised in the last three years



Declining job-to-job transition rate is driven by declining regional job changes



Regional job-to-job transition rates

Origin region	Stay	Same industry			Different industry			Exit	Entry	Number of Jobs
		Same region	Different region	Total	Same region	Different region	Total			
Auckland	62.6%	7.0%	2.1%	9.0%	8.5%	2.8%	11.3%	17.0%	19.6%	4,211,600
Wellington	64.5%	4.8%	3.7%	8.5%	6.2%	4.4%	10.7%	16.3%	17.4%	1,445,700
Christchurch	63.5%	5.1%	4.1%	9.1%	6.2%	4.7%	10.9%	16.5%	18.6%	1,114,200
Medium cities (fast)	64.2%	4.1%	5.2%	9.3%	4.9%	5.8%	10.7%	15.8%	17.8%	1,174,800
Medium cities (slow)	66.3%	3.5%	4.8%	8.3%	4.6%	5.6%	10.2%	15.2%	16.6%	1,556,600
Small cities (fast)	61.2%	1.8%	7.4%	9.2%	3.3%	7.8%	11.2%	18.4%	20.5%	144,300
Small cities (slow)	66.2%	2.5%	6.6%	9.1%	3.4%	6.4%	9.8%	14.9%	16.0%	546,100
Minor urban	65.7%	2.5%	6.6%	9.1%	2.9%	6.3%	9.3%	15.9%	17.3%	819,500
Rural areas	60.9%	2.3%	9.2%	11.6%	3.0%	6.6%	9.6%	17.9%	20.0%	425,500
New Zealand	63.9%	5.0%	4.1%	9.0%	6.2%	4.5%	10.7%	16.4%	18.3%	11,438,300

Source: Authors' calculations based on Stats NZ's Linked Employer-Employee Database

For workers remain in the same industries, workers from larger areas are less likely to change locations

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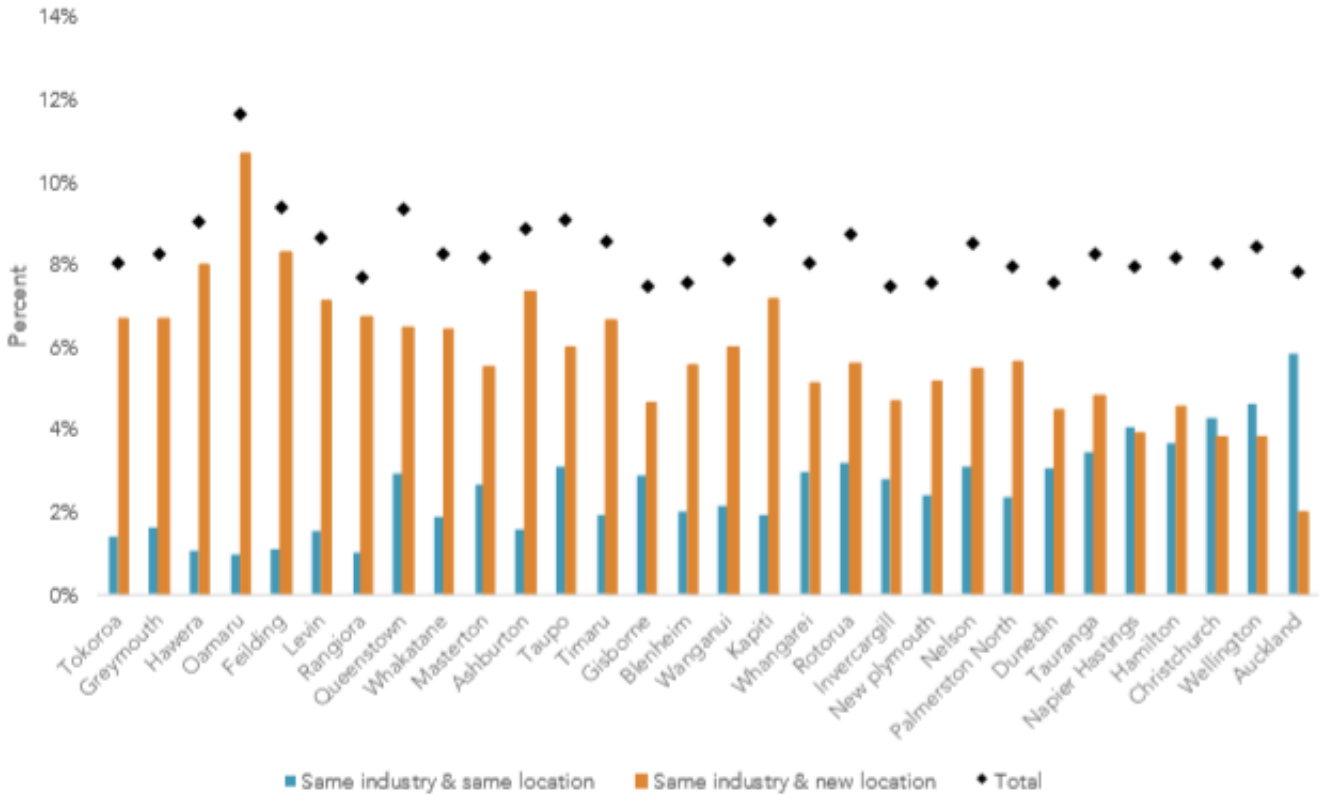
Figure 1 **Fraction of workers in different job-to-job categories by urban areas (all industries, 2000–2018)**



Source: Authors' calculations based on Stats NZ's Linked Employer-Employee Database

Note:

1. Cities are ordered from the smallest (left) to largest (right) population in Census 2013.

For those change industries, workers from larger areas are less likely to change locations

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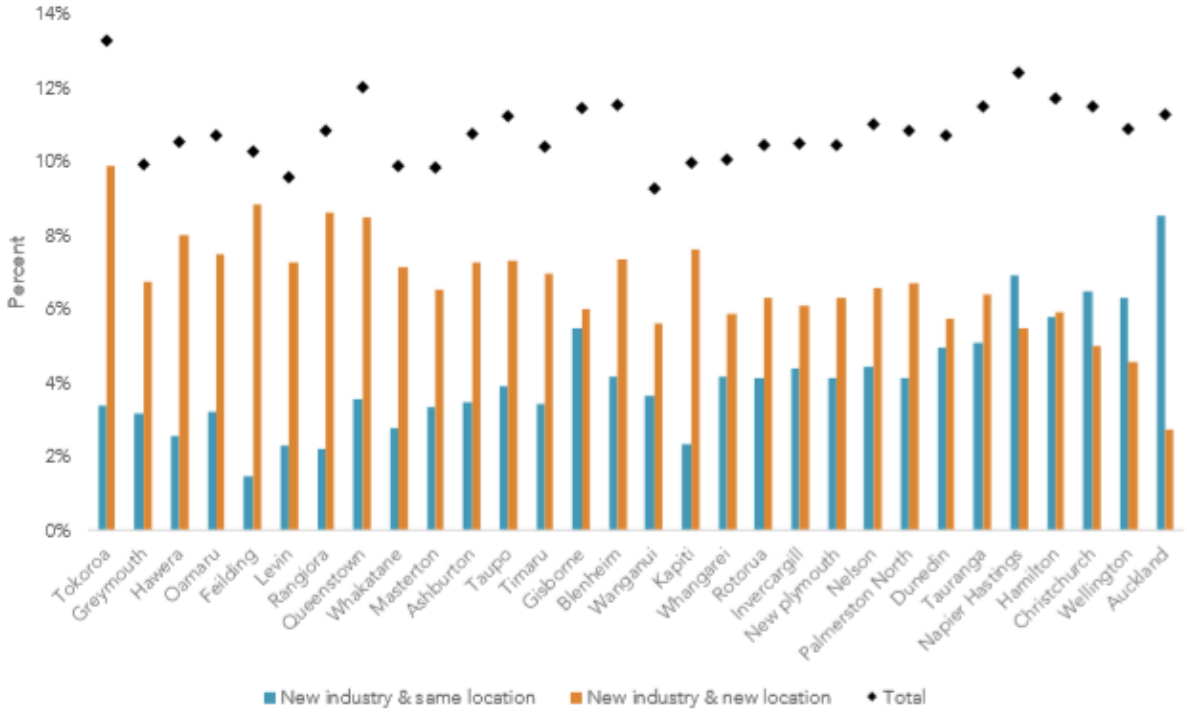
Figure 2 **Fraction of workers in different job-to-job categories by urban area (all industries, 2000 – 2018)**



Source: Authors' calculations based on Stats NZ's Linked Employer-Employee Database

Note:

1. Cities are ordered from the smallest (left) to largest (right) population in Census 2013.

Where do workers move to if they find jobs in a different city?

- There are two general patterns:
  - "Big city" effect (Auckland, Wellington, Christchurch)
    - 53% of workers relocate to one of these three locations
  - Tendency to move to adjacent cities or towns.
    - For Ashburton workers, the top three destination are Christchurch, Timaru and Dunedin.

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Job-to-job transitions and wage premium

Table 8 **Real wage changes by job-to-job transition status (national averages)**

	Number	Unadjusted wage growth	Full time wage growth	Adjusted wage growth	FT to FT	FT to PT	PT to FT	PT to PT
Same jobs	18,838,100	4.0%	2.6%	2.7%	71%	6%	6%	17%
Same industry Same location	1,403,500	5.6%	3.8%	1.3%	52%	10%	14%	23%
Different industry Same location	1,993,200	12.2%	3.9%	5.4%	44%	12%	20%	25%
Same industry Different location	1,250,100	4.0%	3.2%	0.6%	57%	10%	13%	20%
Different industry Different Location	1,636,000	9.9%	2.9%	3.8%	43%	13%	20%	24%
All job transitions (average last 4 rows)	6,282,800	8.5%	3.5%	3.1%	48%	11%	17%	23%

Source: Authors' calculations based on Stats NZ's Linked Employer-Employee Database

Linear regression model: wage premiums and job-to-job transitions

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$$ln(\frac{w^d_{it+1}}{w^o_{it}}) = \alpha_0 + \sum_i \alpha_i I^M_{it} + X_{it}\beta + \sum_c \gamma^o_c I^o_{ict} + \gamma^d_c I^d_{ict+1} + \sum_s \delta^o_c I^o_{ist} + \delta^d_c I^d_{ist+1} + \sum_f \phi^o_f I^o_{ift} + \phi^d_f I^d_{ift+1} + \sum_t \lambda_t I_t + e_{it} \quad (2)$$

The variables are:

W^o_{it} and W^d_{it+1}	the real wages in the origin and destination jobs for person i;
X_{it}	the personal attributes of person I, including age, gender and ethnicity;
I^M_{it}	a set of indicator variables indicating the job-to-job transition category (4 transition variables) and whether or not someone switches from part-time to full-time status (4 part/full time switches);
I^o_{ict} and I^d_{ict+1}	a set of indicator variables indicating the origin and destination city of person I (32 origin and 9 destination city variables);[9]
I^o_{ist} and I^d_{ist+1}	a set of indicator variables indicating the origin and destination sector of person I (16 origin and destination sector variables);
I^o_{ift} and I^d_{ift+1}	a set of indicator variables indicating the size of the firm employing person I (5 origin and destination size classifications); and
I_t	a set of year indicator variables.

Wage premiums at job-to-job transitions

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Table 11 **Estimated wage growth premiums relative to workers who change jobs and remain in the same industry and location (all workers, 2000 – 2018)**

	New industry Same location	Same industry New location	New industry New location	Observations	R^2
1. All job changers	3.3%*** (0.07)	0.4%*** (0.08)	2.9%*** (0.08)	6,282,600	0.253
2. Male job changers	2.4%*** (0.10)	1.3%*** (0.10)	2.1%*** (0.11)	3,200,900	0.245
3. Female job changers	4.3%*** (0.11)	-0.5%*** (0.11)	3.8%*** (0.12)	3,081,600	0.262
4. 2000 -2008 job changers	3.8%*** (0.11)	-0.2% (0.12)	3.2%*** (0.13)	2,681,700	0.254
5. 2008 – 2012 job changers	2.4%*** (0.16)	0.5%*** (0.15)	2.3%*** (0.17)	1,385,200	0.247
6. 2012 – 2018 job changers	3.7%*** (0.12)	0.5%*** (0.12)	2.9%*** (0.13)	2,215,600	0.256
7. Auckland Job-changers	3.7%*** (0.11)	0.8%*** (0.25)	2.2%*** (0.26)	2,050,500	0.256
8. Non-Auckland job changers	3.0%*** (0.10)	0.0% (0.10)	2.8%*** (0.10)	4,232,000	0.252

Job-to-job transitions are more important to younger workers

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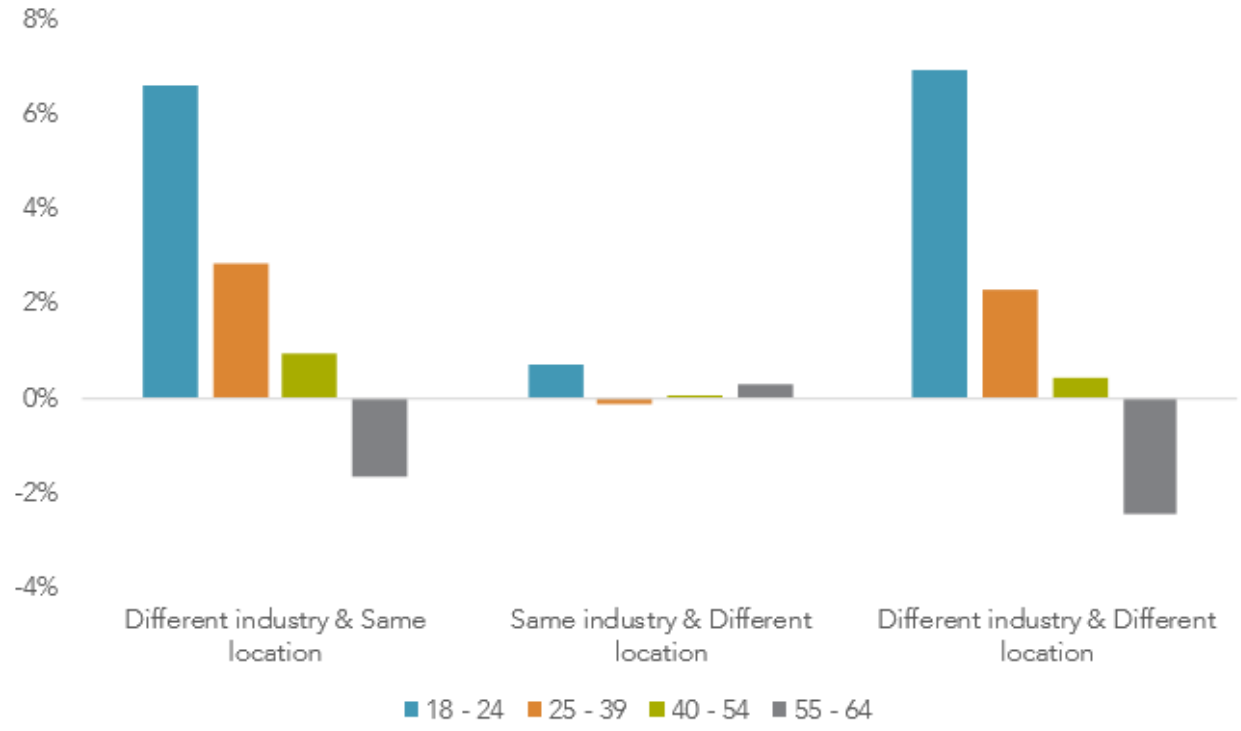
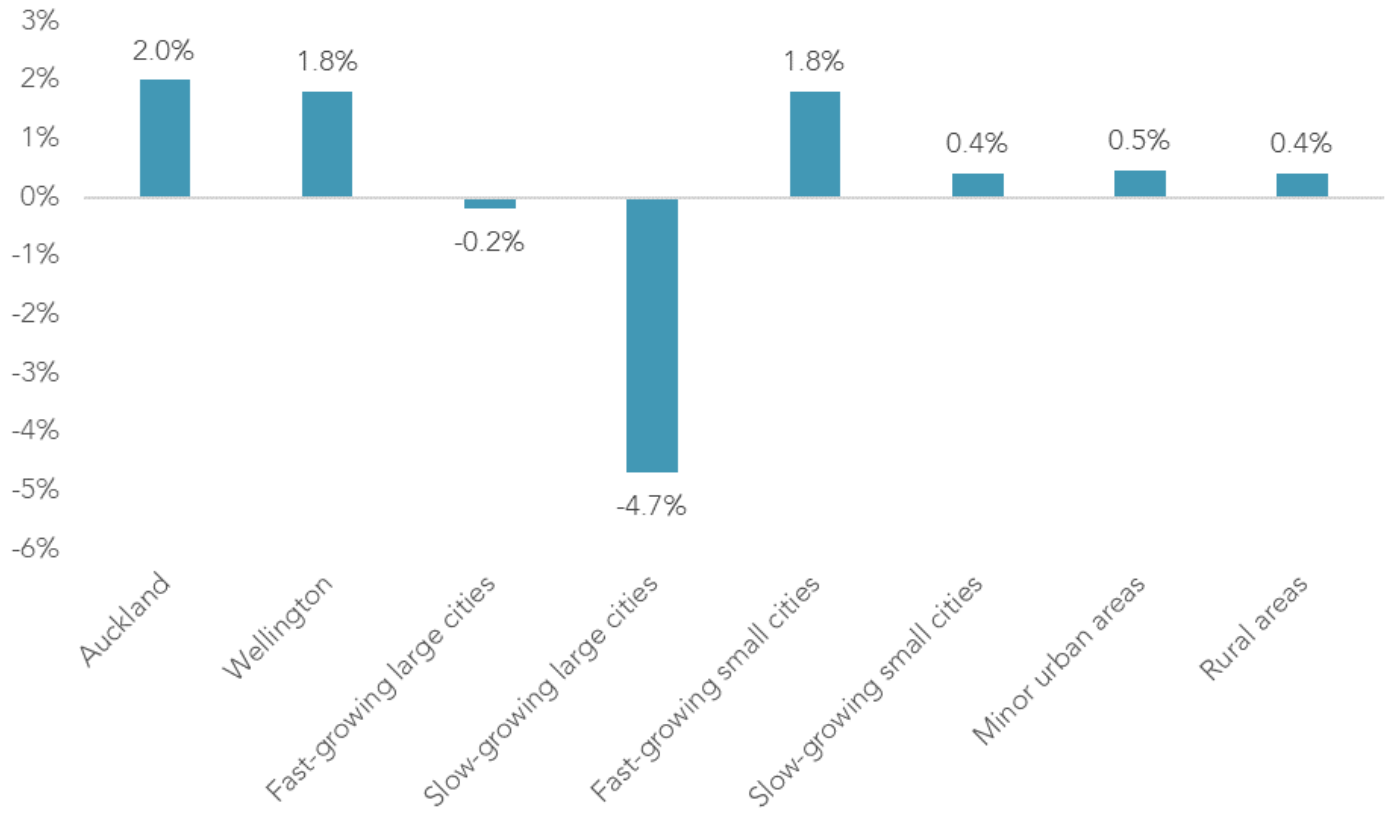
Figure 5 **Average real wage growth by age for different job-to-job categories (all workers, 2000 – 2018)**



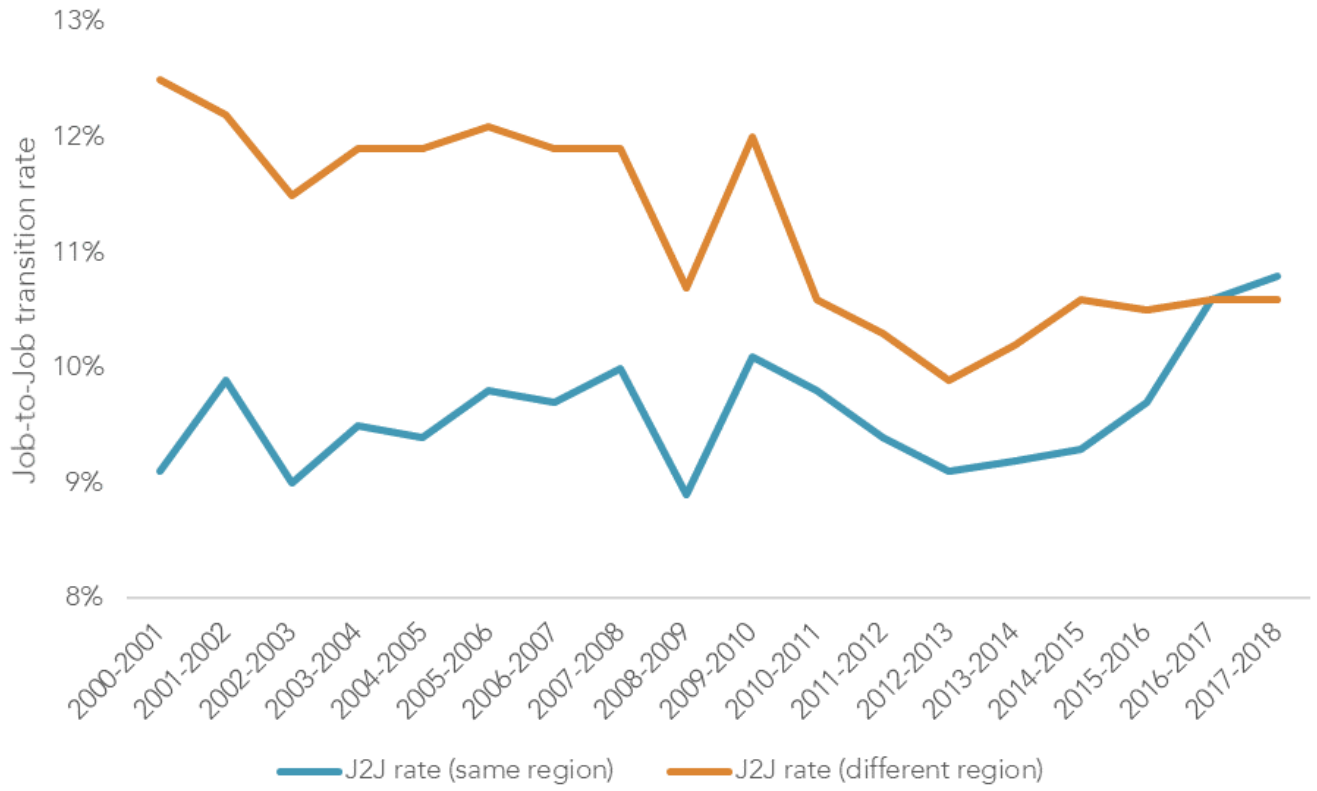
Source: Authors' calculations based on Stats NZ's Linked Employer-Employee Database

Wage premiums at the destination locations



WORKER MOBILITY AND HOUSE PRICES

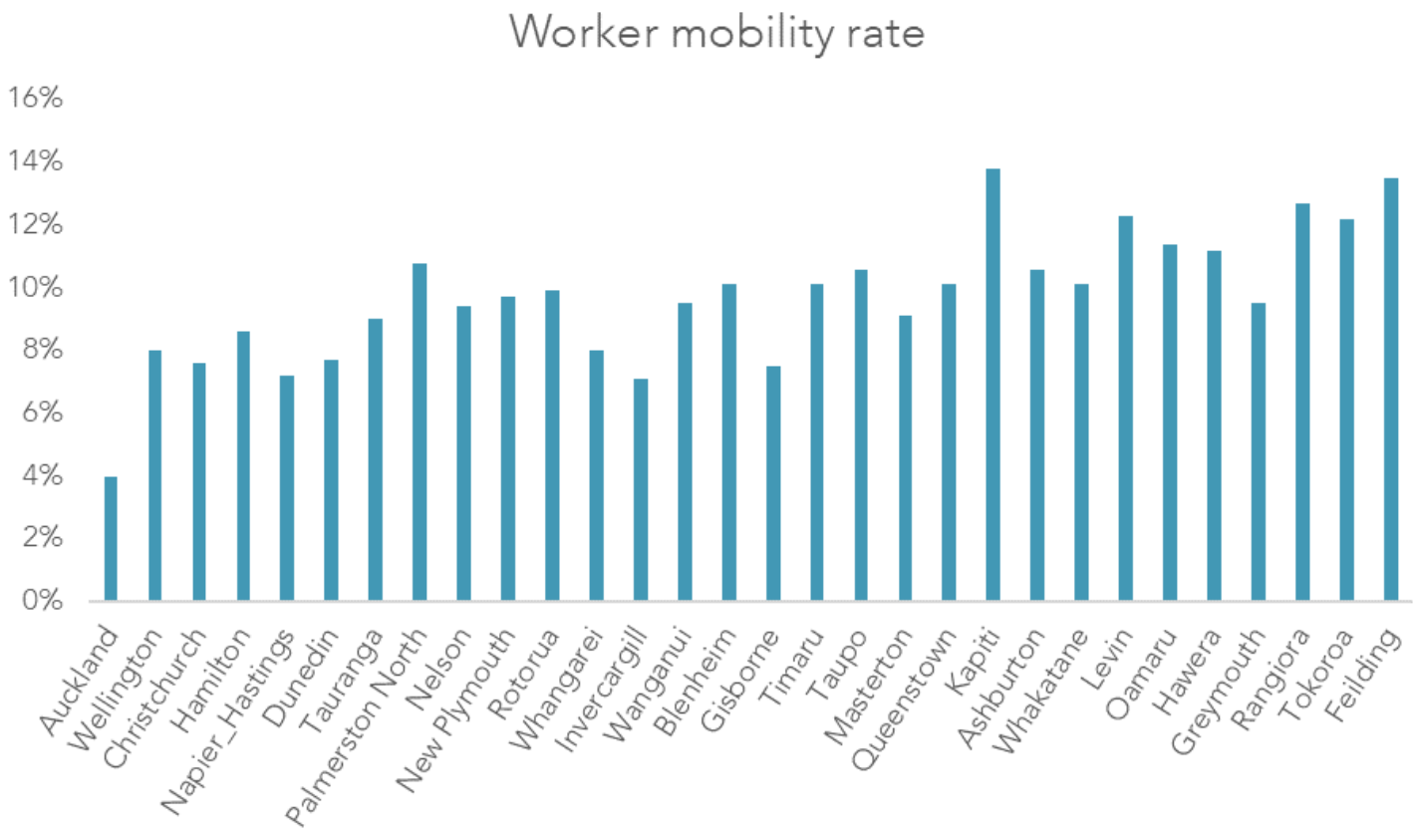
Declining cross-city movements



Data

- A few more restrictions
  - Only workers who made moves among 30 primary and secondary cities
  - Workers at the prime age, 25-54
  - Group person-job data into the origin-destination-industry-year level
    - There are [(30 x 30 – 30) **cities** x 18 **industries** x 17 **years**]= 266,220 cells
    - Cells with no cross-city movements are recorded 0's
- Annual medium house price data from REINZ for 30 cities

Higher worker mobility in smaller cities



Gravity model on worker mobility

Model specification

$$F_{ijt}^{k} = \alpha_1 P_{it-1} + \alpha_2 P_{jt-1} + \alpha_3 D_{ij} + \alpha_4 S_{ij} + \gamma HP_{ijt-1} + \beta_1 QL_i + \beta_2 QL_j + \beta_3 QB_i + \beta_4 QB_j + \sum \theta X_{ijt-1} + \mu_k + \mu_i + \mu_j + \mu_t + \varepsilon_{ijt}^{k}$$

- F_{ijt}^{k}= the log percentage of local workers in industry k and origin city i moving to destination city j at year t

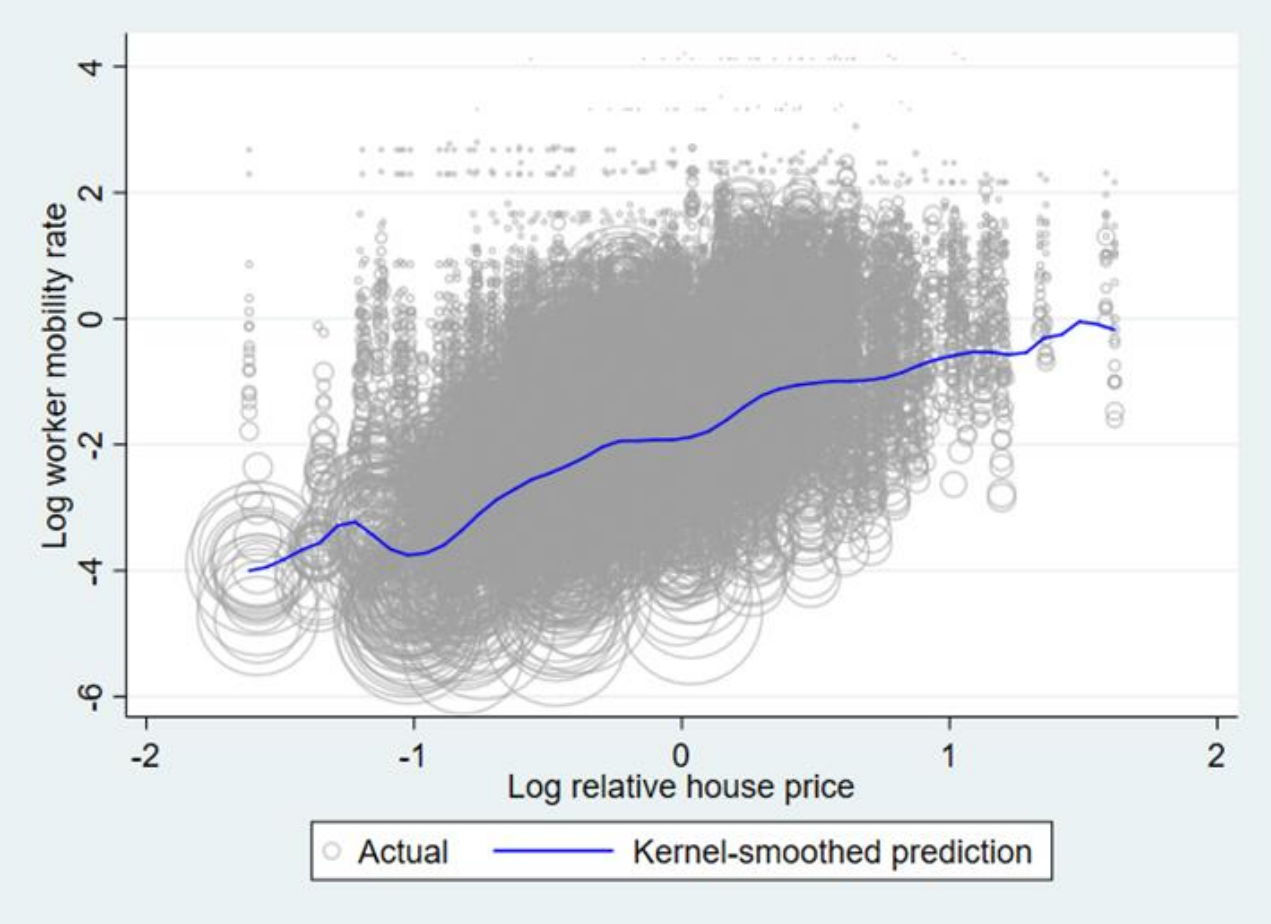
Key variables of interest

- HP_{ijt-1}= the log differences between the origin city i and the destination city j at year t-1
- QL and QB are average quality of life and business from 2001 to 2013 (Grimes et al, 2017)

Estimation Method

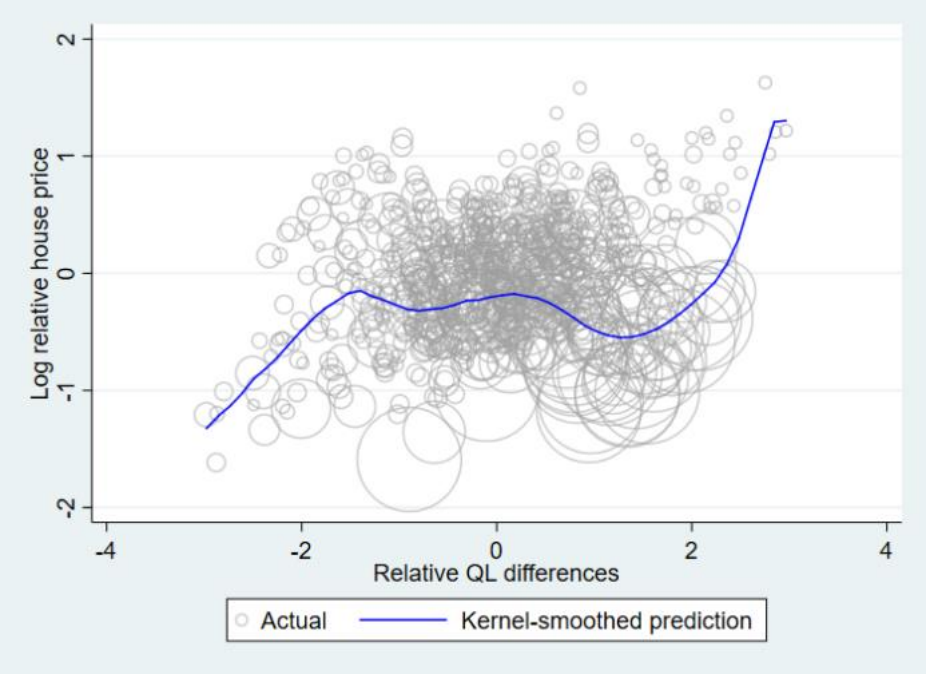
- Weighted Least Square
- Corrections on serial correlation in the error term (Prais-Winsten)

Surprised!?

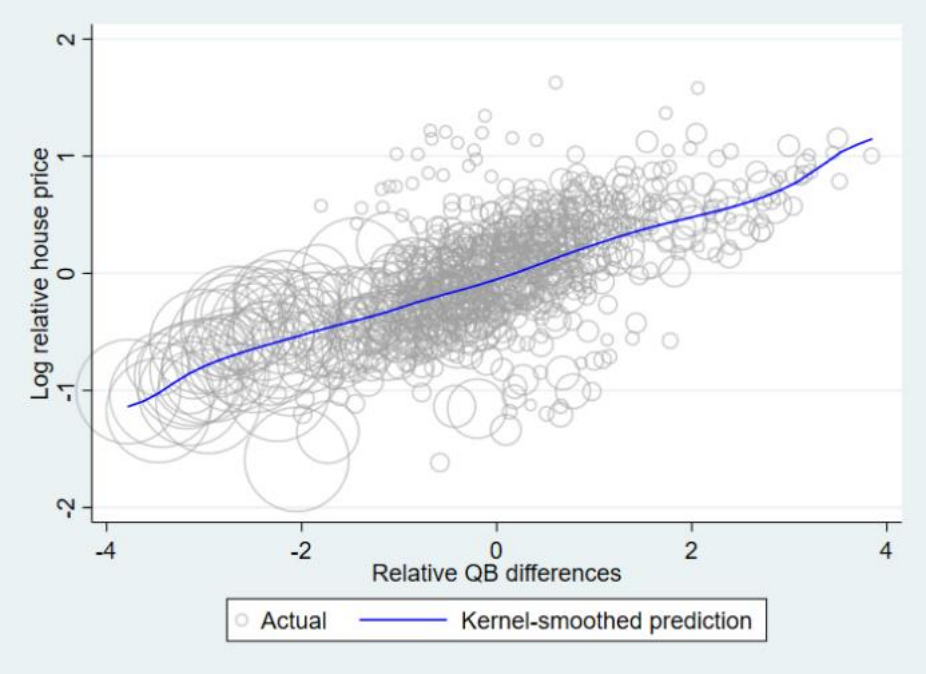

Log worker mobility rate
4
2
0
-2
-4
-6
-2
-1
0
1
2
Log relative house price
Actual
Kernel-smoothed prediction

Cities with high house prices are associated with better consumption amenities and/or business environment

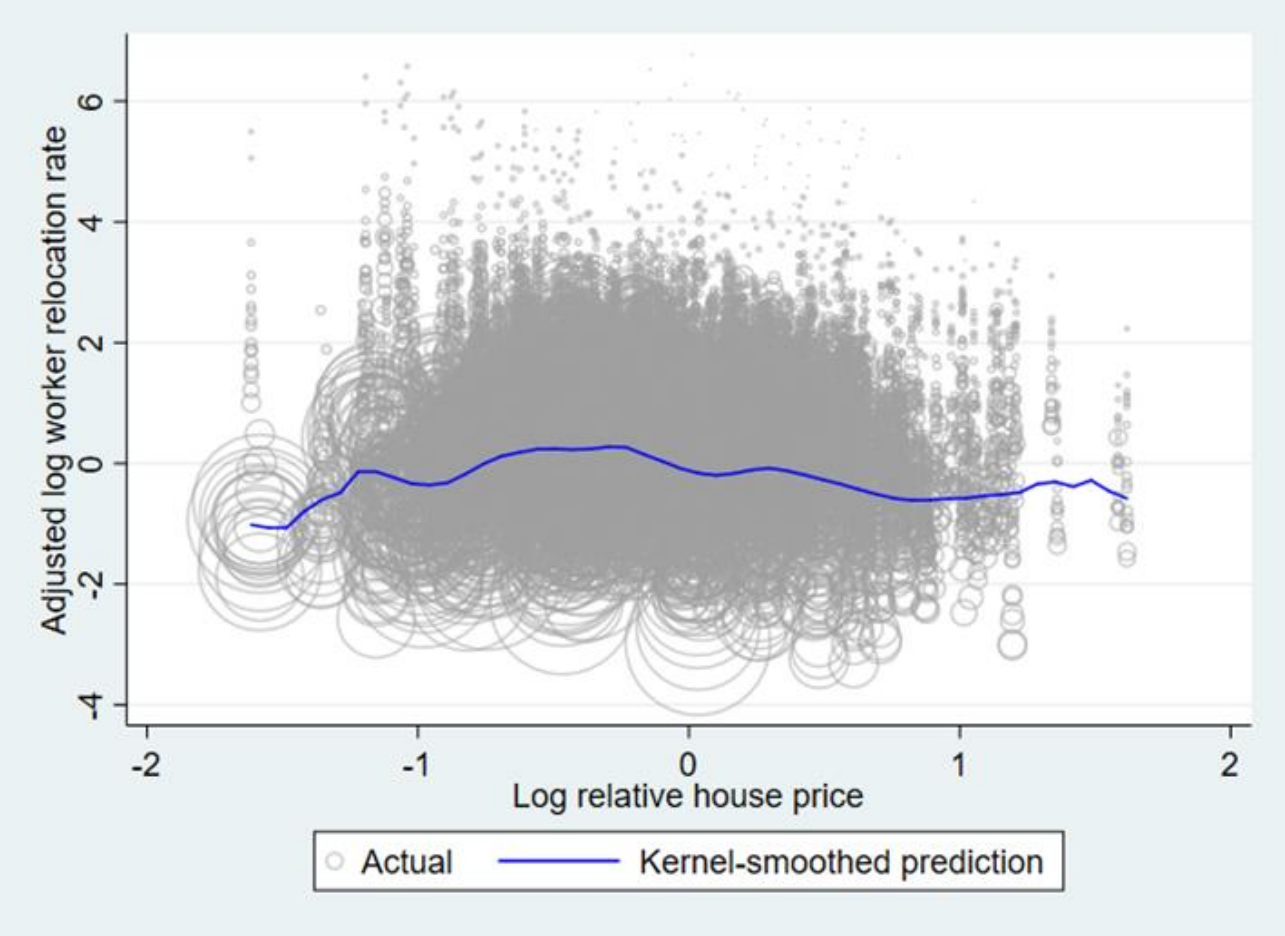
Relationship between house prices and quality of life



Relationship between house prices and quality of business



After corrections, worker mobility appears to have no relationship with house prices



Gravity model estimates

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
HP_{ijt-1}	0.143***	-0.086***	-0.055**	-0.049*	-0.038	-0.031
QL_i		0.043*	-0.228**	-0.184*	-0.174	-0.006
QL_j		0.147***	0.213**	0.217**	0.134	0.122***
QB_i		-0.013	-0.374***	-0.283***	-.274*	-0.04**
QB_j		0.17***	0.091	0.107	-0.014	0.077***
N	266,220	266,220	266,220	266,220	107,311	266,220
Adj R2	.763	.767	.785	.785	.826	.505
City FE	No	No	Yes	Yes	Yes	Yes
Serial correlation	No	No	No	No	No	Yes
Additional explanatory variables	No	No	No	Yes	Yes	Yes

High house prices hurt particular types of workers

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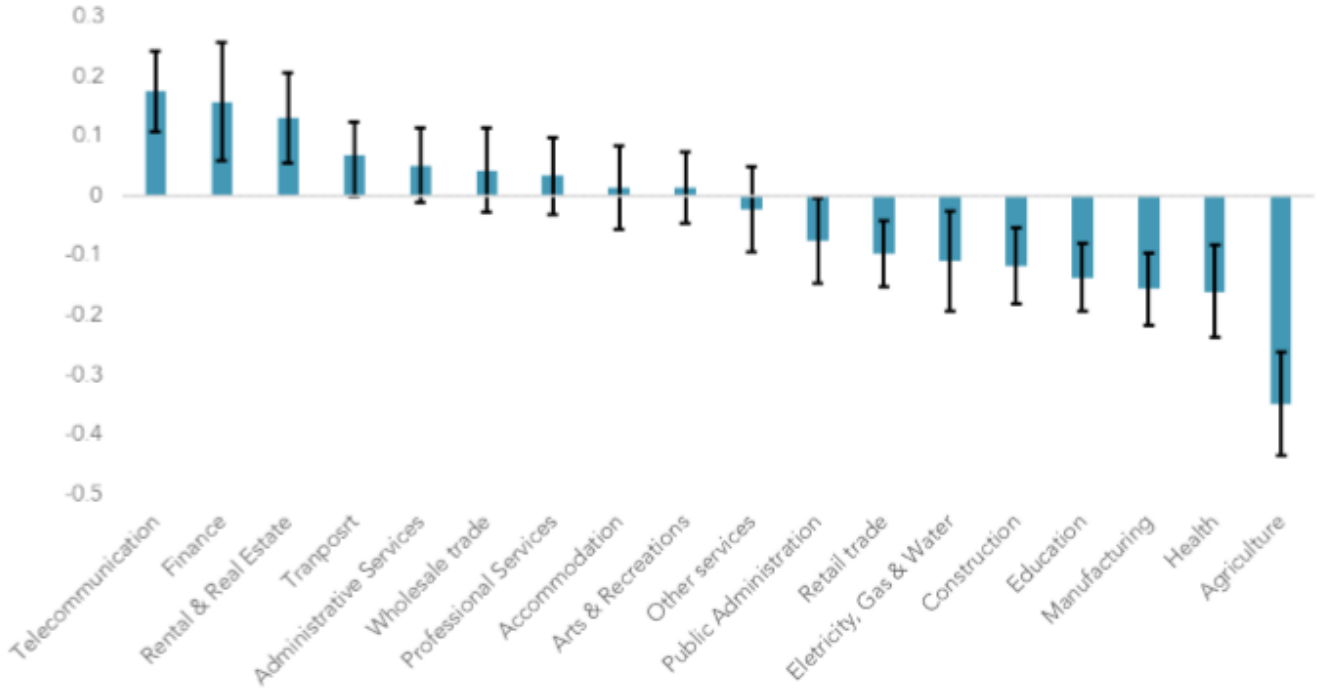
Figure 10 **Marginal changes on worker mobility rates by one-digit industries, if relative house prices increase by 1%**



Source: Authors' calculations based on Stats NZ's Linked Employer-Employee Database and housing data from REINZ

Notes:

1. Black vertical bars are 95% confident intervals of industry-specific estimates on house prices

Workers from small cities are more sensitive to house prices in bigger places

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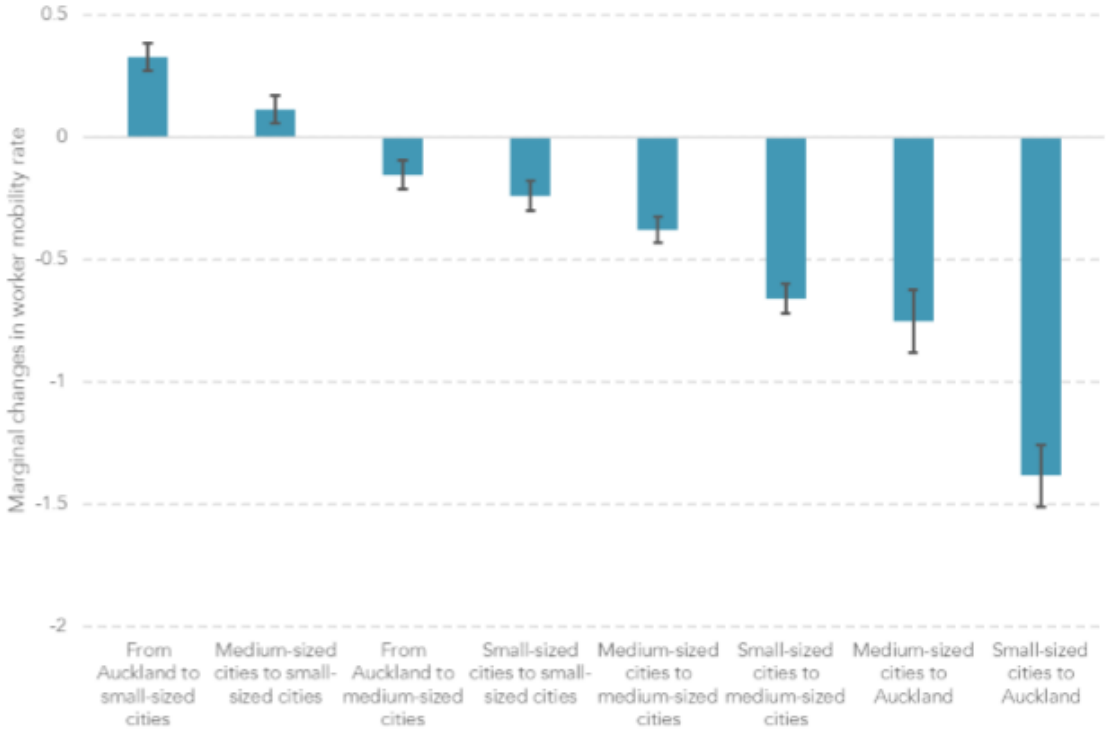
Figure 9 **Marginal changes of worker mobility rates by cross-city moves, if relative house prices increase by 1%**



Source: Authors' calculations based on Stats NZ's Linked Employer-Employee Database and housing data from REINZ

Notes:

1. Black vertical bars are 95% confident intervals of cross-city estimates on house prices

Summary

- Job-to-job transitions lead to higher wage growth
  - Particularly strong for workers who change industries
- Moderate wage premiums associated with larger cities
- High house prices in cities with good amenities hurt worker mobility.

Further researches

- Reasons on declining job-to-job transition
  - Aging worker population
  - Declining population of new and young firms
- Who moves up the job ladder
- Resource reallocation (labour)

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Thank you

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Extra stuff

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Job-to-job transition rates by industries

Table 5 Job-to-job transition rates by industry (national averages, 2000- 2018)

Industry	Stay	Same industry			Different industry			Exit	Entry	Number of Jobs
		Same region	Different region	Total	Same region	Different region	Total			
Agriculture	46.6%	6.9%	2.7%	9.5%	6.4%	9.0%	15.4%	28.5%	31.6%	1,599,900
Mining	65.8%	2.4%	3.9%	6.2%	4.3%	10.2%	14.5%	13.5%	12.5%	88,200
Manufacturing	68.3%	2.1%	3.4%	5.6%	6.7%	6.1%	12.8%	13.3%	13.1%	3,849,900
Utility	66.8%	2.1%	4.1%	6.2%	6.9%	7.4%	14.3%	12.7%	12.9%	196,500
Construction	63.5%	3.6%	4.0%	7.6%	6.1%	6.1%	12.3%	16.6%	18.8%	1,873,400
Wholesale trade	66.9%	2.1%	3.1%	5.2%	7.8%	6.6%	14.3%	13.6%	13.8%	1,651,500
Retail trade and Accommodation	52.5%	5.6%	3.9%	9.5%	8.7%	6.3%	15.0%	23.0%	28.7%	4,846,700
Transport and warehousing	64.6%	3.7%	5.1%	8.7%	6.2%	5.9%	12.1%	14.6%	14.4%	1,330,600
Telecommunication	63.7%	4.2%	4.0%	8.2%	8.2%	4.6%	12.8%	15.2%	14.8%	612,600
Bank and Finance	66.0%	5.7%	6.2%	11.8%	5.6%	3.9%	9.5%	12.7%	11.6%	865,000
Rental and Real Estate services	56.8%	3.1%	2.6%	5.7%	9.5%	7.0%	16.5%	20.9%	23.1%	419,200
Professional, science, computing	56.2%	3.7%	3.2%	6.9%	9.3%	6.6%	15.9%	21.0%	24.6%	3,938,800
Central and local government	68.9%	5.2%	6.3%	11.5%	4.9%	4.0%	8.9%	10.7%	10.9%	1,632,600
Education	66.7%	7.3%	5.7%	13.0%	3.1%	2.5%	5.6%	14.7%	15.7%	2,913,800
Health	68.0%	6.5%	5.2%	11.7%	2.9%	2.2%	5.1%	15.2%	16.2%	3,165,800
Recreational and other services	62.8%	3.4%	2.2%	5.6%	7.6%	4.9%	12.5%	19.2%	21.3%	1,544,100
New Zealand	61.4%	4.6%	4.1%	8.7%	6.5%	5.6%	12.1%	17.8%	19.8%	30,528,600

Source: Authors' calculations based on Stats NZ's Linked Employer-Employee Database

Job-to-job transition rates by previous employment status

Table 7 Job-to-job transition rates by previous employment status (national averages, 2000- 2018)

Previous employment status	Stayers	Mover (same industry, same location)	Mover (same industry, different location)	Mover (different industry, same location)	Mover (different industry, different location)	Exiters	Number of jobs
Stayers	72.50%	3.90%	3.40%	4.80%	3.70%	11.70%	17,652,300
Mover (same industry, same location)	53.90%	15.10%	4.50%	7.30%	3.40%	15.80%	1,323,200
Mover (same industry, different location)	52.40%	4.90%	17.00%	3.30%	7.80%	14.60%	1,163,300
Mover (different industry, same location)	51.90%	5.20%	2.30%	17.30%	6.20%	17.10%	1,882,000
Mover (different industry, different location)	45.90%	2.80%	6.10%	7.20%	19.40%	18.60%	1,583,200
Entrants	38.60%	4.50%	3.60%	8.30%	7.40%	37.40%	5,694,900
New Zealand	61.50%	4.60%	4.10%	6.50%	5.60%	17.70%	29,298,900

Source: Authors' calculations based on Stats NZ's Linked Employer-Employee Database