

# Estimating the effects of Labour Market Conditions: The Role of Family Background

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Amelia Guha Thakurta and Dennis Wesselbaum

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## Disclaimer

These results are not official statistics. They have been created for research purposes from the Integrated Data Infrastructure (IDI) which is carefully managed by Stats NZ. For more information about the IDI please visit:

<https://www.stats.govt.nz/integrated-data/>.

The results are based in part on tax data supplied by Inland Revenue to Stats NZ under the Tax Administration Act 1994 for statistical purposes. Any discussion of data limitations or weaknesses is in the context of using the IDI for statistical purposes, and is not related to the data's ability to support Inland Revenue's core operational requirements.

- In each recession, a concern arises that young adult workers in a depressed labour market may bear lasting scars.
- Young entrants are particularly vulnerable as they are in a very productive period in their career.
- Starting out one's career during a recession can affect such unlucky labour market entrants for several years.
- Research on family background documents the importance of family characteristics for children's labour market outcomes.

Addison and Portugal (2002), Loury(2006), Bentolila et al. (2010)

## Research Question

- Does graduating during adverse labour market conditions affect long term earnings of individuals?

- College graduates in U.S. and Canada with even temporary exposure to increased unemployment rates can have long term reduction in their earnings.

(Kahn (2010), Oreopoulos et al. (2012), Schwandt and Von Wachter (2019))

- For a 3-4 points rise in unemployment rates, individuals entering the labour market experience a reduction in earnings of about 10-15 percent initially.

(Von Wachter et. al. (2020))

- This percentage is somewhat smaller for college graduates as compared to high school graduates and is particularly large for non-whites and minorities

## Literature Review contd.

- Some studies also document that adverse labour market entry has effects on health and other factors like marriage, divorce, fertility and mortality in middle age.

(Currie and Schwandt (2014), Maclean and Catherine (2013))

- While most empirical work is based on data from US, studies from other countries is increasing such as Germany, Austria, and Spain for example.

(Umkehrer et.al.(2019), Brunner and Kuhn (2014), Kranz and Planas (2018))

# Hypothesis

- The search theory predicts that worsening of wage offer distribution, even temporarily, can lead workers entering the labour market during a recession to catch up by undertaking extensive search process for higher paying jobs.
- Stigma effect in general suggests that unemployed individuals face lower chances of getting hired as employers interpret their unemployment as a negative indication of their productivity or skill.
- On the other hand, if workers graduating during a bad state of the economy, develop inequality in human capital accumulation, then they will be less productive and may suffer as a consequence.

## Integrated Data Infrastructure(NZ)

- Individual level panel dataset.
- Working Sample: Individuals graduating with an undergraduate degree between 2002-2018.
- Sample is restricted to full time students.
- Sample is restricted to students that have graduated.
- Graduation age restricted to 21-25 years.
- Our main sample consists of males, but we also consider samples of females, different ethnicities, and siblings.
- 501,948 individual level observations.



## Variable Construction

- Our main dependent variable in the panel regression is the inverse hyperbolic sine transformation of real, yearly income adjusted to 2018 prices.
- Most papers in the related literature use log transformation of income.
- However, the advantage of the IHS transformation is that it retains the desirable properties of log transformation while allowing us to keep zero-valued observations.
- we use national unemployment rates at the time of graduation.

## Variable Construction (contd.)

- Past studies use "potential experience", defined as the number of years from graduation.
- This is because in many data sources it is impossible to calculate actual time worked in a given year.
- We improve on this measure by using true experience
- We define true experience as the number of years that an individual has positive labour market earnings.
- Firms pay wages relative to "true experience" and not the "potential experience".
- it ignores labour market discontinuity while being unemployed or underemployed

## Variable Construction (contd1.)

- We add delayed graduation which is a dummy that equals 1 if an individual has taken longer than 3 years to complete graduation since the average time taken to complete an undergraduate degree in our data is 3 years.
- We add mobility which is defined as a dummy that equals 1 if the individual has moved from their region of graduation before job to capture the effects of delaying graduation and mobility on earnings.
- Further, we control for age and square of age.

## Descriptive Statistics: Summary Table

	(Mean)	(SD)	(Data)
Real Income	38,366	29,020	Continuous
National Unemployment Rate	5.03	0.921	Continuous
Potential Experience	3.51	3.31	Continuous
True Experience	3.19	2.30	Continuous
Age at Graduation	22.26	1.26	Continuous
Male	0.34		Dummy
White	0.69		Dummy
Maori	0.07		Dummy
Asian	0.19		Dummy
With Children	0.41		Dummy
Married	0.60		Dummy
Marriage Age	27.49	3.66	Continuous
Delayed Graduation	0.41		Dummy
Moved Before Job	0.22		Dummy
N	428,685		

# Descriptive Statistics: Unemployment by year and Region

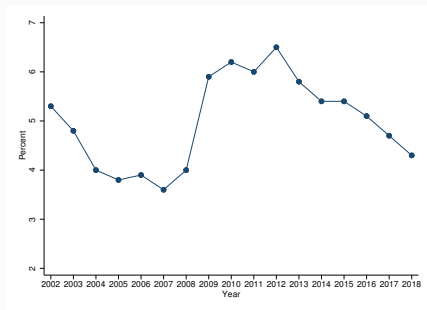


Figure 1:

Unemployment Rates in New Zealand, 2002-2018

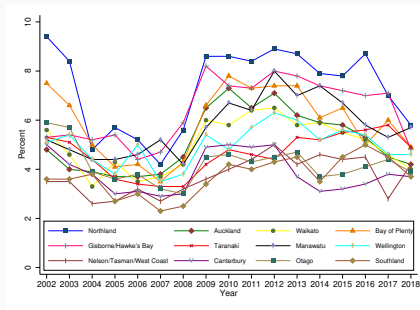
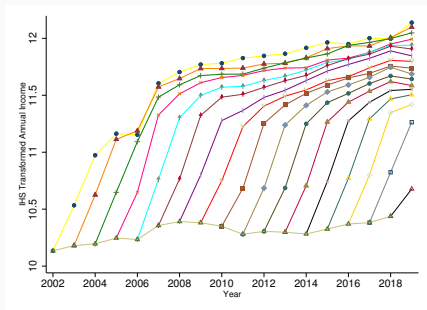


Figure 2:

Unemployment Rates in New Zealand, by Region, 2002-2018

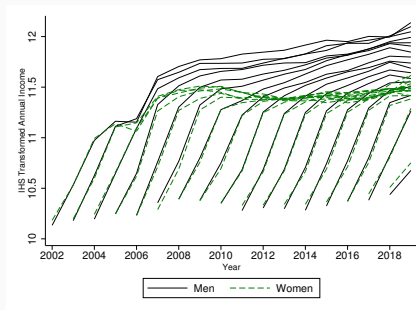
# Descriptive Statistics: Earnings and Experience Profile by Graduation Year



**Figure 3:**

Earnings and Experience Profile by Graduation

Year, 2002-2018



**Figure 4:**

Earnings and Experience Profile by Graduation Year

and Gender, 2002-2018

## Econometric Approach: Cohort Level

Following Oreopoulos et. al. (2012), we collapse the individual level data at the level of graduation cohort (c), region of residence during graduation (r) and calendar year (t).

$$y_{crt} = \alpha + \beta UR_{c0} \star e_{crt} + \eta_e + \delta_t + \gamma_r + \phi_c + \epsilon_{crt} \quad (1)$$

Where

$y_{crt}$  : Mean of IHS transformation of real annual taxable income.

$\beta UR_{c0}$ : National unemployment rate at the time of graduation.

$\eta_e$  : Dummy for potential experience or actual experience.

$\delta_t$  : Fixed effects for calendar year.

$\gamma_r$  : Fixed effects for region of study.

$\phi_c C$  : Fixed effects for year of graduation.

## Econometric Approach: Individual Level

For an individual  $i$  in the year  $t$ ,

$$Y_{it} = \alpha + \beta UR_i + \gamma UR \star e_{it} + \eta UR_{cur_{it}} + \pi_t + \delta e_{it} + \theta e_{it}^2 + \phi X_{it} + \epsilon_{it} \quad (2)$$

Where

$Y_{it}$  : IHS transformation of real annual taxable income.

$\beta UR_i$  : National unemployment rate at the time of graduation.

$UR_{cur_{it}}$  : Regional unemployment rate at the region of residence of  $i$  in time  $t$ .

$\delta e_{it}$  : Potential experience or actual experience.

$\theta e_{it}^2$  : Square of potential experience or actual experience.

$\pi_t$  : Fixed effects for calendar year.

$\phi X_{it}$  : Individual controls such as age and square of age.



## Econometric Approach: Sibling Model

For an individual  $i$  in the year  $t$ , with parents  $j$ ,

$$Y_{i,j,t} = \alpha + \beta UR_{i,j} + \gamma UR_{cur_{i,j,t}} + \eta UR_{cur_{i,j,t}} + \tau_j + \pi_t + \delta e_{i,j,t} + \theta e_{i,j,t}^2 + \phi X_{i,j,t} + \epsilon_{i,j,t} \quad (3)$$

Where

$Y_{i,j,t}$  : IHS transformation of real annual taxable income for each male sibling over time.

$\beta UR_{i,j}$  : National unemployment rate at the time of graduation of sibling.

$UR_{cur_{i,j,t}}$  : Unemployment rate at the region of residence of sibling in year  $t$ .

$\delta e_{i,j,t}$  : Actual experience.

$\theta e_{i,j,t}^2$  : Square of potential experience or actual experience.

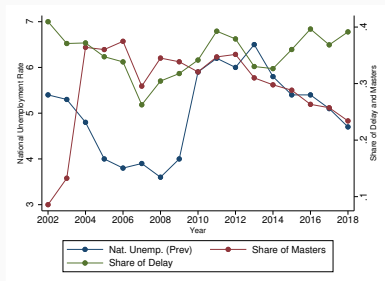
$\pi_t$  : Fixed effects for calendar year.

$\tau_j$  : Sibling fixed effect.

$\phi X_{it}$  : Individual controls such as age and square of age.

- Timing of graduation may be endogenous with current labour market conditions.
- Unemployment rate may also affect individual's decision to relocate to a different regional labour market.

# Caveats Cont.



**Figure 5:** Share of Delayed Graduations by Year

	(Delay)		(Masters)		(Mobility)	
	(Male)	(Female)	(Male)	(Female)	(Male)	(Female)
$UR_{prev}$	0.075	0.108	0.045	0.122	-0.007	-0.037
	(0.026)	(0.026)	(0.026)	(0.024)	(0.026)	(0.026)

Standard errors in parentheses.

Controls for ethnicity, graduation age, parent's income and school outcome.

# Results: Cohort Level (Equation 1)

Table 1: Effect of UR at the time of Graduation on Mean Income

Dependent Variable: Mean IHS (Real Income)				
(Interaction)	(Pot.Exp.)	(Actual Exp.)	(Mobility)	(Delay)
	(1)	(2)	(3)	(4)
UR*Exp=0	0.012 (0.057)	-0.077* (0.034)	-0.078* (0.032)	-0.077* (0.032)
UR*Exp=5	0.155** (0.044)	-0.008 (0.015)	-0.009 (0.014)	-0.007 (0.014)
UR*Exp=10	0.096*** (0.020)	-0.017*** (0.010)	-0.018 (0.009)	-0.016 (0.010)
UR*Exp=15	0.049*** (0.006)	-0.065 (0.033)	-0.066 (0.032)	-0.066* (0.031)
ShareMove			-0.027 (0.087)	-0.047 (0.087)
ShareDelay				0.011 (0.166)
N	1,578	1,578	1,578	1,578
R2	0.68	0.63	0.63	0.63

Sample includes male students graduating with an undergraduate degree between 2002 and 2018. Standard errors are clustered at the level of graduation cohort.

Standard errors in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

# Results: Individual Level (Equation 2)

Table 2: Effect of UR at the time of Graduation on Income

	(Male)			(Female)	(White)	(Nonwhite)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A : Regression coefficients for linear experience							
UR	-0.032 (0.059)	-0.091** (0.031)	-0.091** (0.031)	-0.088* (0.031)	-0.041 (0.041)	-0.102*** (0.027)	-0.043 (0.045)
UR*pot.exp.	-0.013 (0.018)						
UR>true.exp.	0.000 (0.011)		0.000 (0.011)	0.000 (0.011)	0.000 (0.009)	0.005 (0.010)	-0.010 (0.015)
Mobility			0.050*** (0.045)	0.049*** (0.046)	0.040*** (0.031)	0.374*** (0.042)	0.653*** (0.065)
Delay				0.059** (0.019)	0.173*** (0.025)	0.007 (0.021)	0.154*** (0.023)
Panel B : Fitted effects for selected years of experience							
Years of exp.							
1	-0.139* (0.054)	-0.125*** (0.037)	-0.126*** (0.037)	-0.122*** (0.037)	-0.203*** (0.058)	-0.164*** (0.032)	-0.070 (0.083)
5	-0.059** (0.022)	-0.020 (0.048)	-0.020 (0.048)	-0.190 (0.050)	-0.050 (0.051)	-0.037 (0.045)	0.038 (0.067)
10	-0.325*** (0.059)	-0.062 (0.062)	-0.062 (0.049)	-0.064 (0.064)	0.107* (0.051)	0.030 (0.066)	0.148 (0.084)
15	0.301*** (0.095)	-0.154 (0.091)	-0.154 (0.090)	-0.153 (0.090)	0.078* (0.108)	-0.137 (0.083)	-0.418 (0.209)
N	149,073	149,073	149,073	149,073	286,767	100,452	48,621

Sample includes students graduating with an undergraduate degree between 2002 and 2018. Standard errors are clustered at the level of graduation cohort. Controls include age and  $age^2$ . Standard errors in parentheses.

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## Results: Sibling Sample (Equation 3)

- Sample includes male siblings graduating with an undergraduate degree between 2002 and 2018.

Table 3: Effect of UR at the time of Graduation on Income (Sibling Sample)

	(1)	(2)	(3)	(4)
UR	-***	-*	-	-
UR*true.exp.	+	+*	+*	+*
Age	No	Yes	Yes	Yes
Age <sup>2</sup>	No	Yes	Yes	Yes
Ethnicity	No	Yes	Yes	Yes
Mobility	No	Yes	No	Yes
Delay	No	Yes	No	Yes
Fixed Effects				
Year	Yes	Yes	Yes	Yes
Sibling	No	No	Yes	Yes

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

- In line with the literature, we see negative effects on earnings during the initial year of labour market entry.
- The effect becomes insignificant after the first year.
- Once we control for family background heterogeneity, labour market conditions do not matter for earnings.
- These results suggest that for a small country like New Zealand, networking and family connections can act as an insurance during economic shocks.