Measuring and understanding disadvantage and persistent disadvantage in Aotearoa New Zealand

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Preliminary Findings only

NEW ZEALAND
PRODUCTIVITY COMMISSION
Te Kōmihana Whai Hua o Aotearoa

Disclaimer

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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.

Setting the Stage

- Research to support Inquiry into ***Economic Inclusion and Social Mobility***
- Research questions
  - How to define/measure economic exclusion, disadvantage and persistent disadvantage?
  - What are dynamics and drivers of persistent disadvantage?
  - What is relationship between disadvantage and wellbeing?
- Work in progress
  - Focus on methodology
  - Initial results presented
- Feedback is welcome

Defining Disadvantage

- Poverty – basic and enduring cause of disadvantage
  - Poverty measurement predominantly income based
    - Limitations of measurement and threshold
    - Captures some non-poor and misses some poor
  - Non-monetary deprivation in empirical analysis since ~mid-1970s
    - Material deprivation (MD)
    - Social inclusion/exclusion
- Unidimensional vs. multidimensional poverty measures
  - Many different methods/approaches
  - Evolving area

Selecting Measures of Disadvantage

- Based on review of practices elsewhere
  - Europe at-risk-of-poverty-or-social-exclusion (AROPE) indicator
    - Income poverty
    - Severe material deprivation
      - Distinguish material deprivation (3/9) from severe (4/9)
    - Quasi-joblessness
      - Persons living in households with *very low* work intensity
      - Exclude students (18-24) and retirees
  - Australia (APC, based on work led by Saunders)
    - Income poverty
    - Deprivation
    - Exclusion

Definitions

- Deprivation
  - Enforced lack of *socially perceived* necessities
  - Focuses on lack of resources as underlying cause
- Social Exclusion
  - **Lack of participation in key activities** in the society in which individuals live
    - No medical/dental/mental health treatment or access
  - Focuses on lack of access/opportunity
  - Societal factors like discrimination and crime
  - Multidimensional

Exclusion Measures

- In the literature
  - No consensus on exclusion measures
  - Caution against combining exclusion measures into overall measure or score
  - Our analysis supports this idea
- Our analysis
  - Identifies ‘excluded’ individuals based on overall measure
  - Analysis based on subdomains

Parallel Analysis

- 2 sets of data
  - GSS
  - HES linked to Census 2013/2018
- GSS analysis
  - Better exclusion measures
- HES analysis
  - More extensive deprivation measures
  - Linked to Census to examine persistence

GSS ANALYSIS

Data

- GSS Sample
  - 2014, 2016, 2018
  - ~7-8,000 respondents in each year
  - Sub-samples
    - **2014-2018** (main) vs. 2016-2018
    - Age groups
      - **25-64 (WAP)** – main
      - 18-24
      - 65+
- Treasury Disposable Income Calculation
  - Estimate for 12 months prior to interview month using weighted tax years

Sample Details

- Based on individual respondents – not all individuals in household (HH)
- Drop respondents
  - Respondents in HHs with …
    - unlinked HH members
    - imputed data
    - no adults
    - negative HH income
  - Respondents with missing data

Methods

- Derive thresholds for disadvantage measures
  - At-risk-of …
  - Align with % in poverty
- Principal Components Analysis (PCA)
  - Examine measures to find dimensions
  - Develop uncorrelated measures
- Regression Analysis
  - Logistic regression to examine risk factors for exclusion, deprivation and income poverty
  - Linear regression to examine wellbeing and disadvantage
    - WB: life satisfaction, life worthwhile, family WB

DERIVING THRESHOLDS

Income Poverty Measures

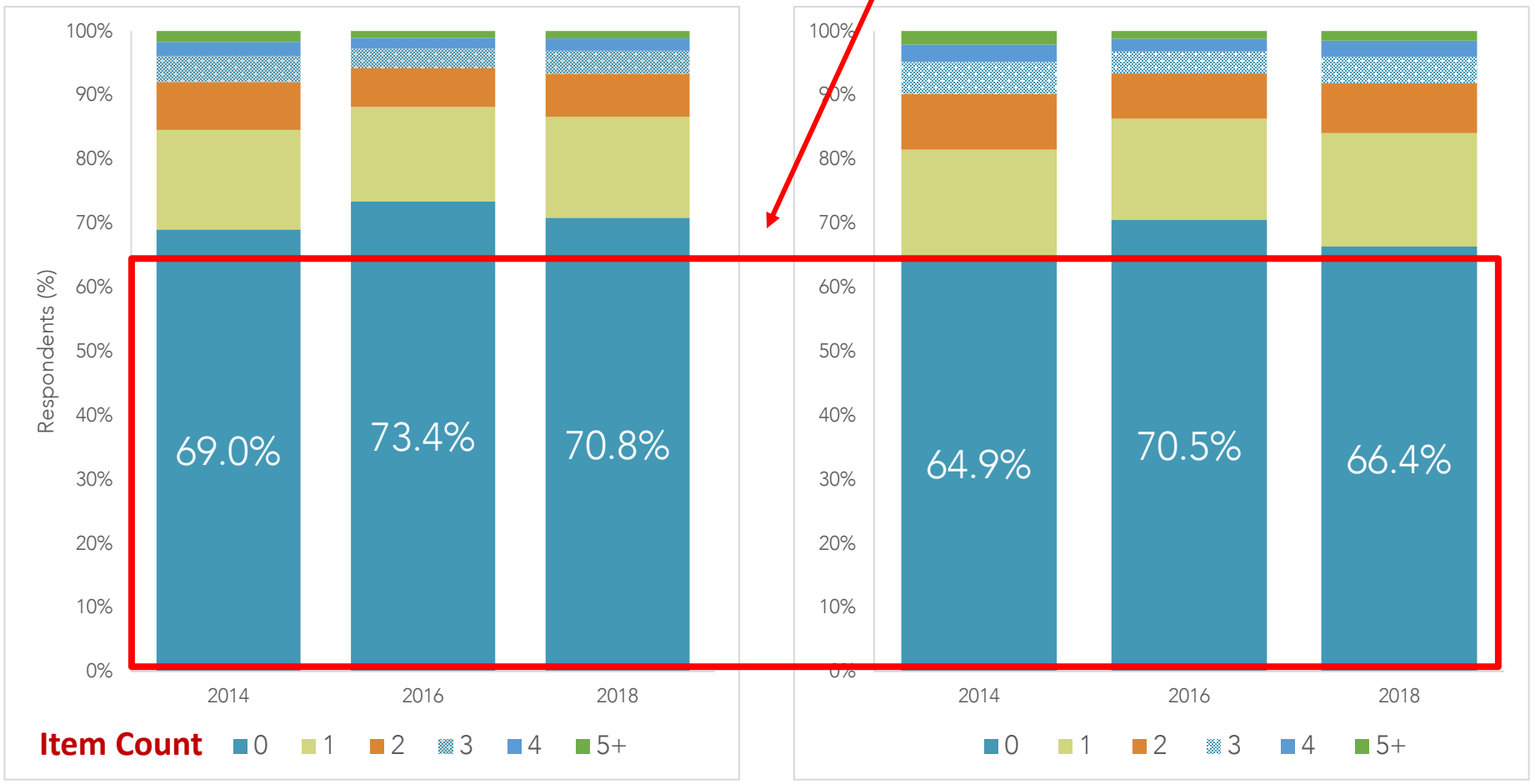
- Household Income Measures
  - Survey report (categorical)
  - Equivalised gross
  - **Equivalised disposable (EDI)**
- Income poverty threshold based on median
  - 50% vs. **60%**
- Income Poverty (60% of Median EDI)

2014	2016	2018	All Years
21.2%	18.9%	18.2%	19.4%

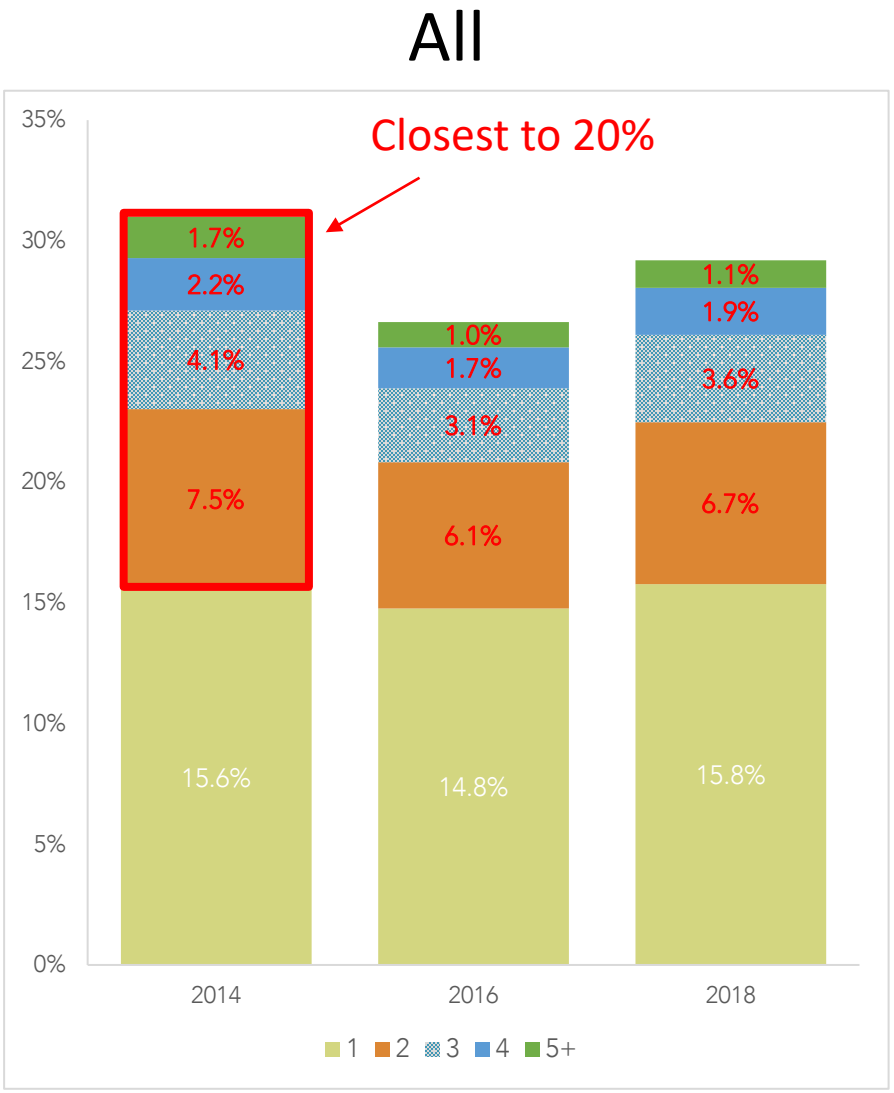
Deprivation Measures

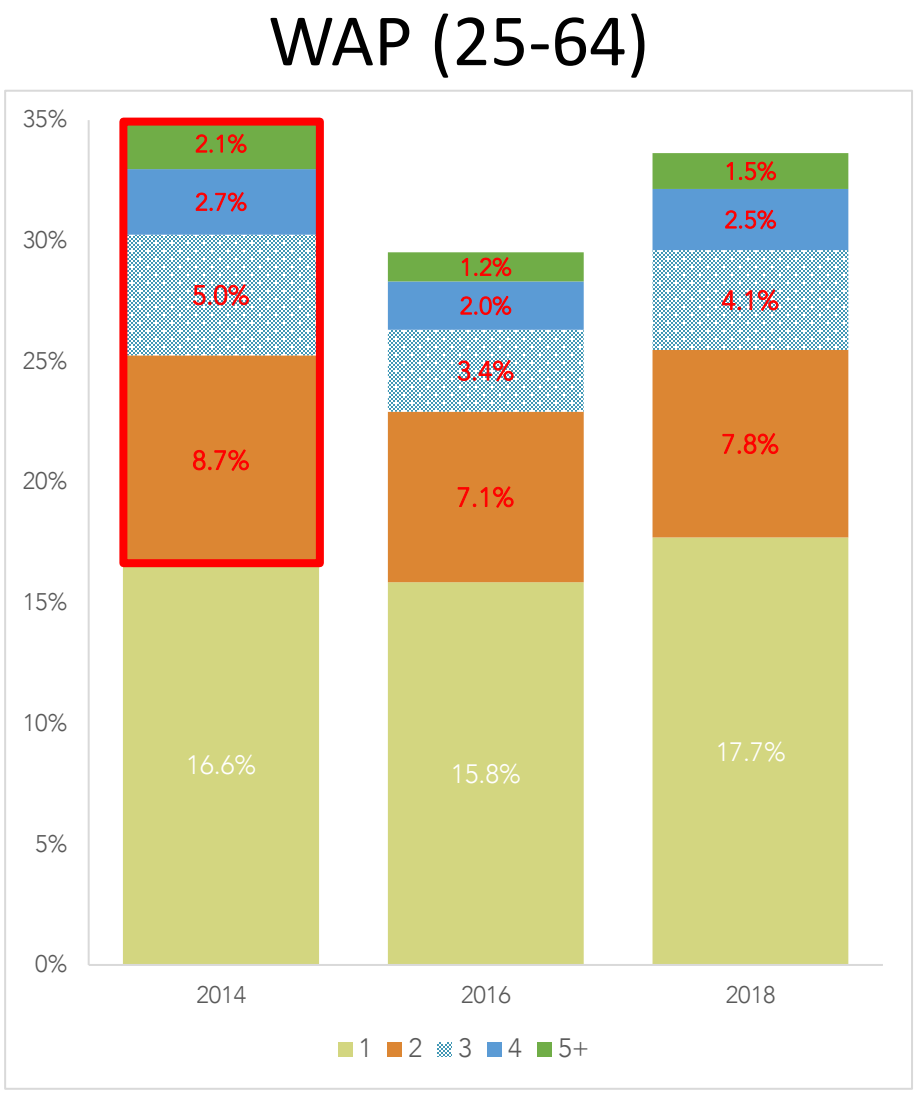
- 7 Items
  - Inadequate Housing (3)
    - Problem keeping the dwelling warm
    - Household is crowded
    - Mould or damp in the house
  - Material Deprivation (4)
    - Go without fresh fruits/vegetables
    - Put up with feeling cold
    - Delayed replacing/repairing appliances
    - Limited ability to buy clothes or shoes
- Sum total number for each respondent (0-7)

Most Respondents No Deprivation



Set ‘Deprived’ Threshold at 2+





Exclusion Measures

Economic Exclusion

No educational qualification
No HH employment income (working age)
Insufficient HH income to meet everyday needs
Unable to pay utilities/rates on time
To keep costs down …
- Postpone doctor
- Cut back on trips to shops/local places

Social Exclusion

Societal
- Difficulty being themselves
- Experienced discrimination in last 12 months

Social Connection
- Feel lonely in last 4 weeks
- *Satisfaction with contact … (2016/2018 only)*
  - *Family*
  - *Friends*
- *Difficult to … (2016/2018 only)*
  - *Talk with someone if depressed*
  - *Stay with someone in emergency*

Lack of Safety

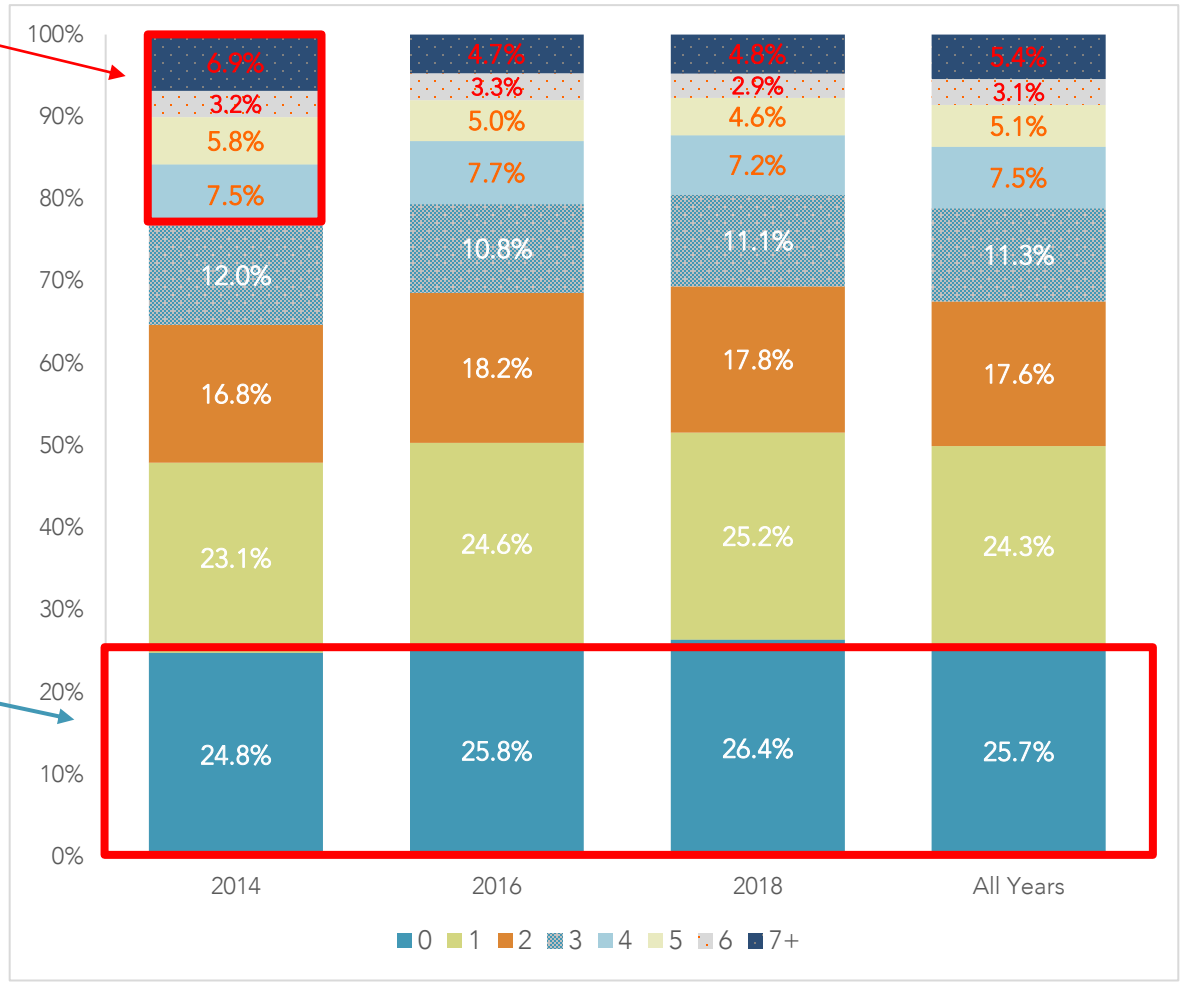
Neighbourhood Problems
- Noise/vandalism
- Burglary
- Assaults
- Harassment
- Drugs

Personal Safety
- Victim of crime (last 12 months)
- Feel safe …
  - Home alone at night
  - Walk alone in neighbourhood after dark
  - Waiting for public transport at night

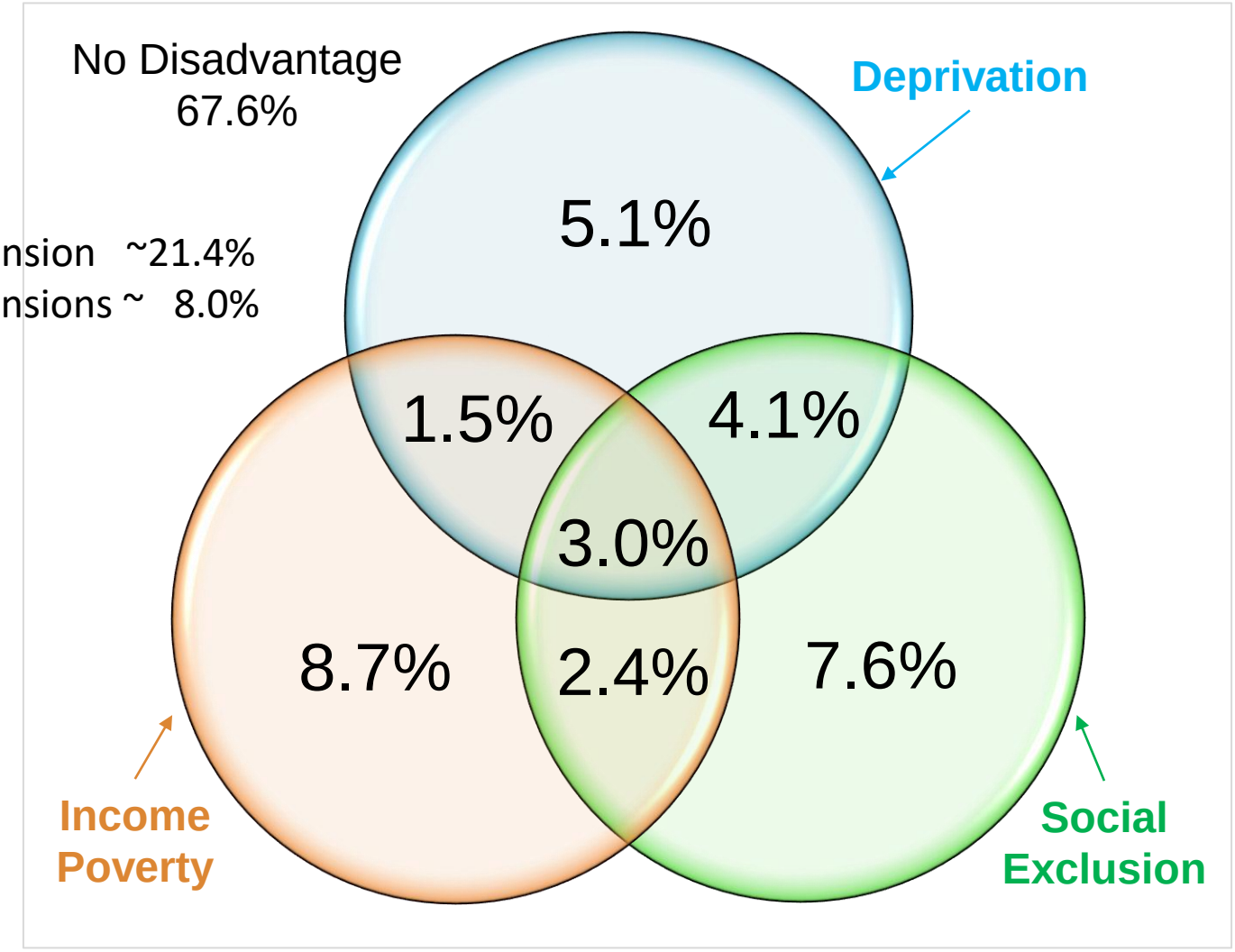
Set “Excluded” at 4+

Closest to 20%

No Exclusion Factors



Multidimensional Disadvantage



Principal Components Analysis

- Purpose
  - Examine clustering of measures
  - Develop uncorrelated variables for regression
- Methods
  - Select components w/eigenvalues > 1
  - Varimax Rotation
- Results indicate that measures do not always line up as we expected

Loadings guide interpretation of component.

PCA – Deprivation (2014-2018)

Deprivation	Component 1	Component 2
Problem keeping the dwelling warm	0.11460	0.77561
Household is crowded	0.13752	0.29476
Problem with damp/mould	0.03213	0.78501
Go without fresh fruits/vegetables, cost	0.69889	0.03308
Put up with feeling cold, cost	0.53952	0.35238
Delayed replacing/repairing appliances, cost	0.73634	0.10956
Limited ability to buy clothes or shoes, cost	0.70503	0.15551

Material Deprivation

Housing

PCA – Exclusion 2014-2018

Exclusion (18a)	Component 1 (Economic)	Component 2 (Nhood Safety)	Component 3 (Personal Safety)	Component 4 (Social)	Component 5 (Crime)
Cultural Identity	0.04240	0.02542	0.03895	0.70006	-0.01035
Discrimination	0.17455	0.08061	0.08332	0.47485	0.33692
No Qualification in HH	0.32563	0.15636	0.01797	-0.00766	-0.41369
No Doctor Visit, Cost	0.61826	0.06025	0.02973	0.13645	0.14242
Insufficient HH Income	0.64148	0.03606	0.03524	0.06716	-0.12031
Reduce shop trips, Cost	0.67864	0.02163	0.06776	0.05217	0.04420
Unable to pay bills on time, Cost	0.65475	0.04609	0.02365	-0.04216	0.02424
No HH employment income	0.37473	0.10538	0.03967	0.14466	-0.39023
Nghbrhd noise/vandalism	0.01125	0.58892	0.06232	-0.03075	0.13635
Nghbrhd burglary	0.07896	0.44982	0.12818	-0.09406	0.44945
Nghbrhd assault	0.07006	0.71175	0.01714	0.04579	-0.01344
Nghbrhd harassment	0.03935	0.62813	0.02449	0.11253	0.00064
Nghbrhd drugs	0.07603	0.68508	0.06157	0.03292	-0.04909
Victim of crime	0.18543	0.18876	0.01474	0.07566	0.67167
Feel unsafe, at home at night	0.04948	0.08049	0.58291	0.17528	0.04327
Feel unsafe, in nghbrhd at night	0.04625	0.09951	0.82712	0.00285	-0.02307
Feel unsafe, pub transport at night	0.05343	0.00783	0.78269	-0.05445	0.02245
Feel lonely	0.04526	0.02748	0.02284	0.63231	-0.09250

PCA – Disadvantage 2014-2018

Disadvantage (18a)	Economic	Nhood Safety	Personal Safety	Housing	Income	Social
Cultural Identity	0.08330	0.00881	0.03747	-0.01482	0.02931	0.68503
Discrimination	0.16185	0.11685	0.08321	0.09330	-0.04708	0.48961
No Qualification in HH (WAP)	0.19012	0.15136	0.00562	0.05752	0.11403	0.03269
No Doctor Visit, Cost	0.60424	0.08189	0.02457	0.04006	-0.04426	0.15773
Insufficient HH Income	0.50591	0.04454	0.02666	0.12803	0.25482	0.04300
Reduce shop trips, Cost	0.70998	0.03351	0.06292	-0.02179	0.01642	0.03553
Unable to pay bills, Cost	0.53244	0.08486	0.01990	0.16174	0.03949	-0.03520
No HH employment income	0.20380	0.03827	0.01818	0.02329	0.74621	0.05827
Nghbrhd noise/vandalism	0.02928	0.59250	0.06162	0.01317	0.00162	-0.03213
Nghbrhd burglary	0.06282	0.47325	0.12750	0.10167	-0.02924	-0.08443
Nghbrhd assault	0.08545	0.70544	0.01197	0.01060	-0.00877	0.05127
Nghbrhd harassment	0.05314	0.61644	0.01869	0.00932	0.06092	0.10600
Nghbrhd drugs	0.07547	0.68347	0.05916	0.01787	0.00206	0.04206
Victim of crime	0.11082	0.23636	0.01436	0.15495	0.03718	0.08977
Feel safe, at home	0.03803	0.07655	0.57461	0.10846	0.04451	0.16601
Feel safe, nghbrhd	0.05967	0.09849	0.82637	-0.00030	0.03307	0.00648
Feel safe, pub transport	0.06765	0.01745	0.78325	0.00368	-0.01971	-0.04117
Feel lonely	0.03447	0.02246	0.01625	0.04249	0.05814	0.63839
Prob keeping dwelling warm	0.16272	0.00517	0.06460	0.75818	0.05282	0.05661
Household is crowded	0.12969	0.09326	0.03104	0.24266	-0.02791	0.00401
Problem with damp/mould	0.13387	0.04437	0.04244	0.74603	-0.00858	0.02608
No fresh fruits/vegetables, cost	0.64081	0.01801	-0.01094	-0.02667	0.05866	0.10916
Put up with feeling cold, cost	0.46476	0.03040	0.01372	0.33706	0.09004	0.09038
Delay replace/repair appliances	0.66989	0.05269	0.02868	0.07483	0.00639	-0.01243
Limit ability to buy clothes/shoes	0.65444	0.04710	0.08706	0.09294	0.09950	0.03641
Income Poverty	0.05467	-0.00040	0.03441	0.02356	0.80830	-0.00089

Logistic Regression

- Examine likelihood of disadvantage domains (excluded, deprived, in income poverty)
  - As a function of other domains (and subdomains)

    EX: $P(exc = 1) = f(dep_{pc1}, dep_{pc2}, ipov)$
  - As a function of demographics
  - As a function of both (endogeneity)

Explanatory Variables

- Family Type
- One-Family HH
- Housing Tenure
- Ethnicity
- Female
- Health Status
- Disabled (2016-2018)
- Highest Qualification
- Survey Year

Income Poverty (EDI60)

	Indices			Demographics		
	Odds Ratio	95% Wald Confidence Interval		Odds Ratio	95% Wald Confidence Interval	
Deprivation/Exclusion Indices						
Economic	1.521	1.519	1.524			
Nhood Safety	1.102	1.100	1.105			
Psnal Safety	1.086	1.083	1.088			
Housing	1.095	1.093	1.097			
Social Exclusion	1.263	1.261	1.266			
Income	1.711	1.707	1.714			
One-family HH				0.924	0.915	0.932
Family Types (Ref=Couples)						
Coupled parents				1.399	1.390	1.409
Sole_parent				6.642	6.583	6.701
Adult children only				0.848	0.840	0.856
No family in HH				2.486	2.460	2.512
Ethnicity (Ref=European)						
Maori				1.192	1.184	1.199
Pacific				1.287	1.276	1.298
Asian				2.508	2.492	2.524
Other				1.230	1.212	1.248
Highest Qualification (Ref=No qualification)						
Secondary				0.602	0.598	0.606
Post-secondary				0.499	0.495	0.503
University				0.378	0.375	0.380
Urban/Rural (Ref=Major/Large Urban Area)						
Medium/Small Urban Area				1.150	1.142	1.157
Rural				1.063	1.055	1.071
Survey Year Controls		Y			Y	
Region Controls		N			Y	
Age		N			Y	

Wellbeing and Disadvantage

	WAP (2014-2018)	Life Satisfaction		Life Worthwhile	
		Mean	Std Dev	Mean	Std Dev
0	Not Disadvantaged	7.96	1.45	8.26	1.38
	Income Poverty (EDI60) Only	7.83	1.70	8.17	1.60
1	Deprived Only	7.24	1.86	7.75	1.69
	Excluded Only	7.13	1.87	7.88	1.74
	Deprived and Income Poverty	6.99	1.81	7.75	1.79
2	Excluded and Income Poverty	6.69	2.21	7.68	2.08
	Excluded and Deprived	6.41	2.21	7.46	2.11
3	Excluded, Deprived, & Income Poverty	6.02	2.33	7.00	2.43

Wellbeing Linear Regression (2014-2018)

Scale of 0-10

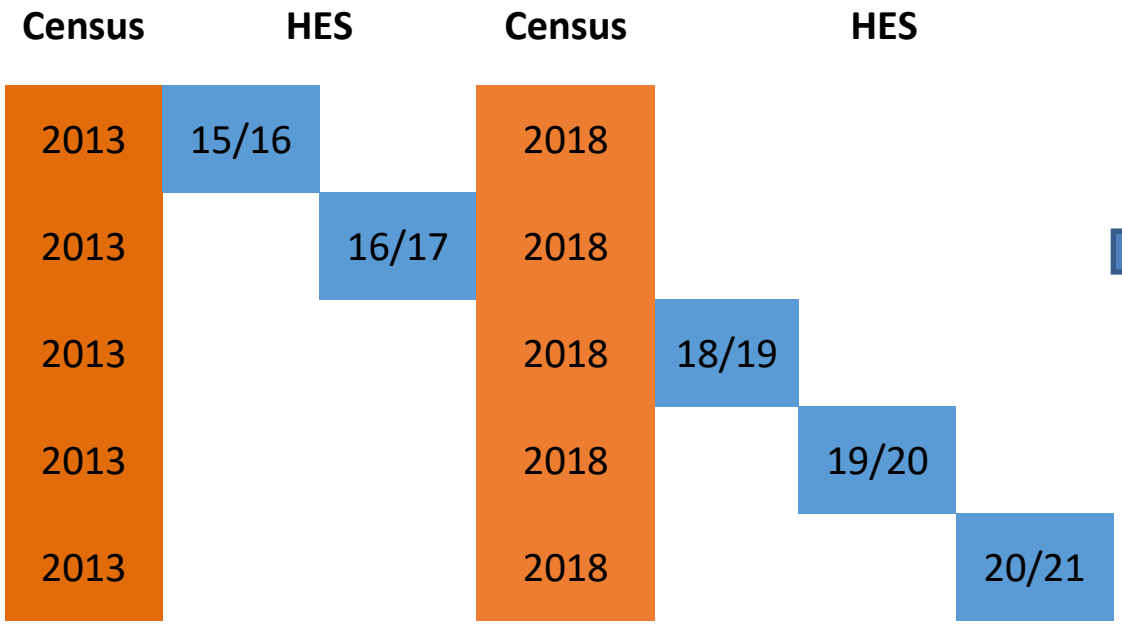
Variable	Life Satisfaction		Life Worthwhile	
	WAP	WAP - Most Excluded	WAP	WAP - Most Excluded
	β SE	β SE	β SE	B SE
Intercept	**7.4636** 0.0710	**7.8407** 0.1942	**7.7781** 0.0681	**7.9495** 0.1898
Disadvantage, Economic	**-0.4438** 0.0126	**-0.3726** 0.0238	**-0.2562** 0.0121	**-0.2550** 0.0232
Disadvantage, Neighbourhood Safety	**-0.1220** 0.0129	**-0.0736** 0.0231	**-0.0643** 0.0124	**-0.0636** 0.0226
Disadvantage, Personal Safety	**-0.1260** 0.0130	**-0.0753** 0.0268	**-0.0284** 0.0125	-0.0371 0.0262
Disadvantage, Housing	**-0.1300** 0.0125	**-0.0481** 0.0225	**-0.0868** 0.0120	**-0.0481** 0.0220
Disadvantage, Income	**-0.1437** 0.0135	**-0.1489** 0.0246	**-0.1256** 0.0129	**-0.1738** 0.0240
Disadvantage, Social	**-0.2868** 0.0130	**-0.2766** 0.0206	**-0.2092** 0.0125	**-0.1989** 0.0202
Age	0.0002 0.0012	**-0.0122** 0.0032	**0.0049** 0.0012	0.0019 0.0032
Adults in HH (#)	**0.0691** 0.0157	-0.0205 0.0399	0.0060 0.0151	-0.0477 0.0390
Children in HH (#)	**0.0802** 0.0117	**0.1174** 0.0278	**0.1231** 0.0112	**0.2077** 0.0272
Māori	**0.1210** 0.0357	**0.2915** 0.0800	**0.1359** 0.0343	**0.3420** 0.0782
Pacific	**0.1160** 0.0508	0.1712 0.1115	0.0393 0.0488	-0.0304 0.1091
Asian	**0.0752** 0.0373	0.1106 0.1167	-0.0417 0.0358	-0.0894 0.1141
Other Ethnicity	**-0.2241** 0.0863	-0.2494 0.2098	**-0.1639** 0.0829	0.0288 0.2055
Year Controls	Y	Y	Y	Y
Adj R-Sq	0.1311	0.1422	0.0642	0.0960

More research to follow …

- Honing key measures
- 2-stage analysis

HES-CENSUS LINKED DATA ANALYSIS

Linking HES to Census 2013 & 2018



- 5 HES cohorts
- 3 points in time each
- N ~ 59,000

Sample Detail

- Based on individuals in HH (similar to SOFIE)
  - Supported by PCA results
  - HH-level Variables: family type, tenure, qualification, region
  - Person-level Variables: age, gender, ethnicity, disability
  - Main sample: Working-age HH
- Drop:
  - Census 2018: No individual forms, not on HH listing, potential errors (10%)
  - Non-positive income (3%)
  - No adults
  - # missings (disadvantage variables) >= thresholds
- Retention rate ~55% & higher dropout in:
  - Lower income and more material hardship
  - Children and Younger, Māori, Pacific (similar to SOFIE)
- Adjust weights to reflect population

Defining Persistent Disadvantage

- Mostly focus on Poverty Persistence
- Count the # of times having disadvantage:
  - **EU:** poor in a given year and in at least **2/3** preceding years
  - **OECD**: always poor in three consecutive years.
  - Period-to-period transition.
- Debate on censoring
  - Spells start before and/or finish after
  - Using various cohorts

Determining Persistent Disadvantage

- Main definition:
  - Being in disadvantage in *at least one domain* ***at least 2 out of 3 points in time*** that are at least *24 months apart*
- Alternative: Using a higher threshold ***three points in time***.

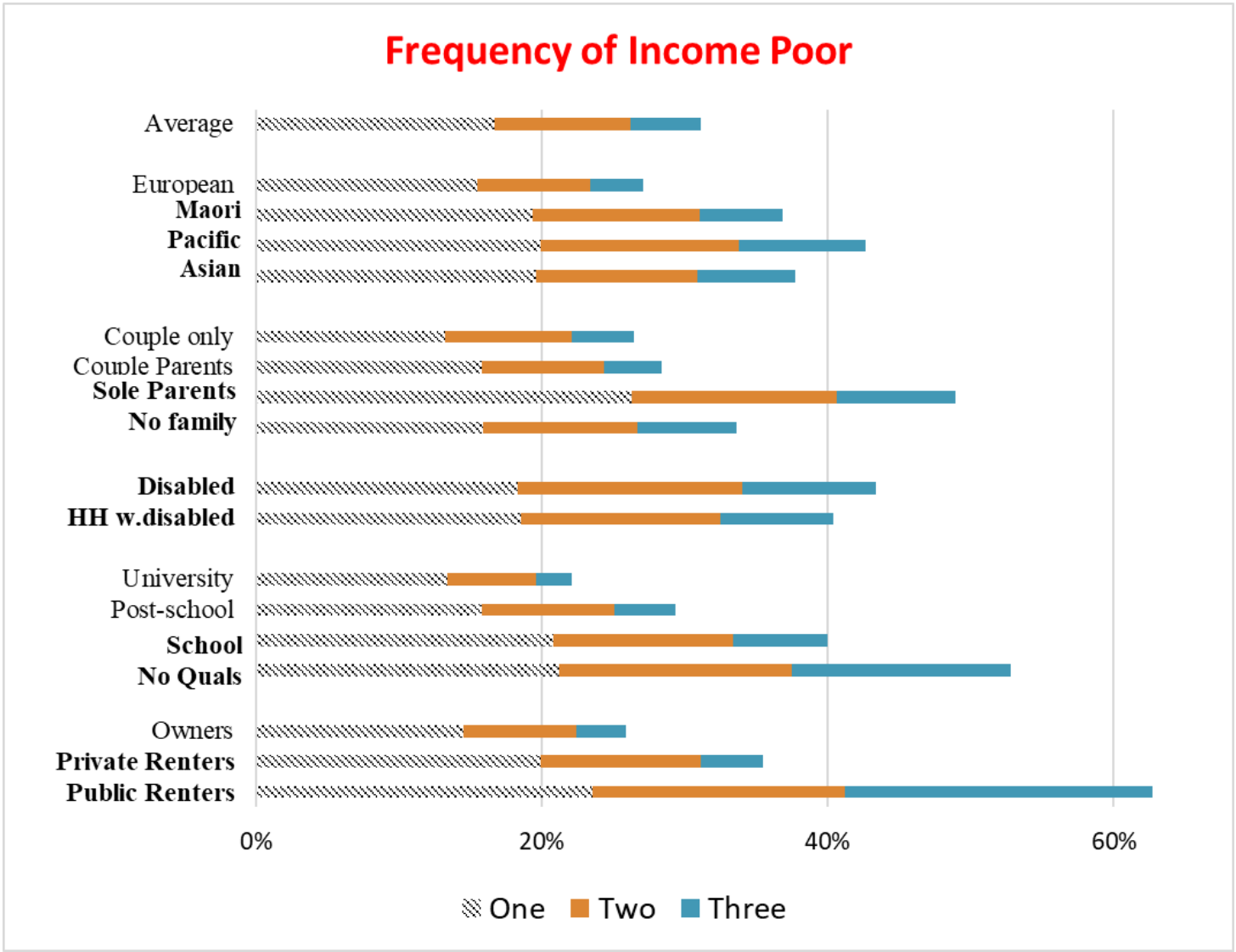
Limitations

- No up-to-date longitudinal data to better measure persistent disadvantage
- Missing data in some years in between
- Attrition bias as in any longitudinal studies
- More limited variables in both censuses
- Not fully measure poverty (e.g. no consumption and wealth, or housing cost)

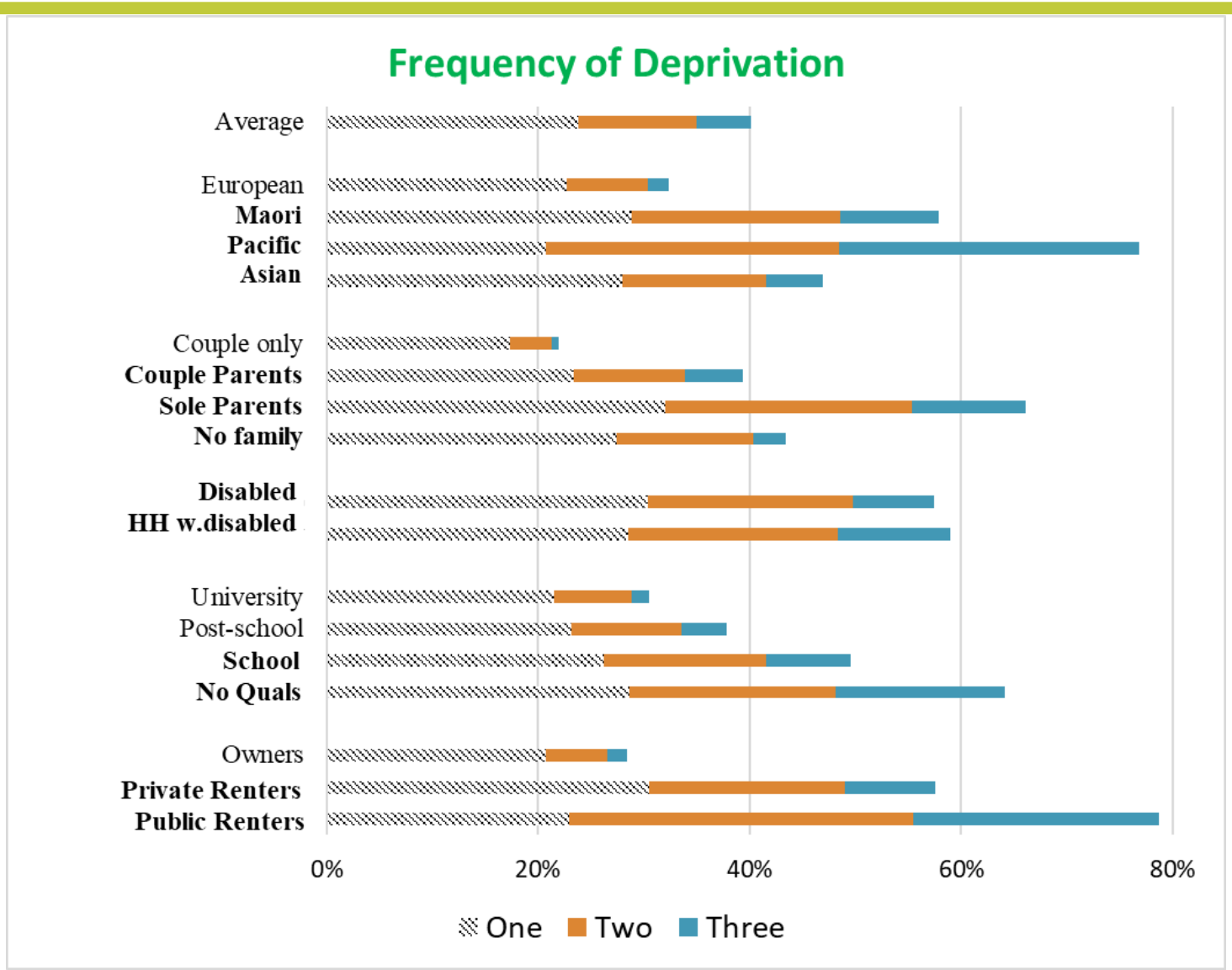
Methods

- Analyse disadvantage measures using **PCA**
- Regression Analysis
  - (Ordered) Logit regression to examine **risk factors** for persistent disadvantage by domain
  - Linear regression to examine **wellbeing** (life satisfaction) and disadvantage persistence
  - Logit regression to examine the probability of **entering and exiting** disadvantage

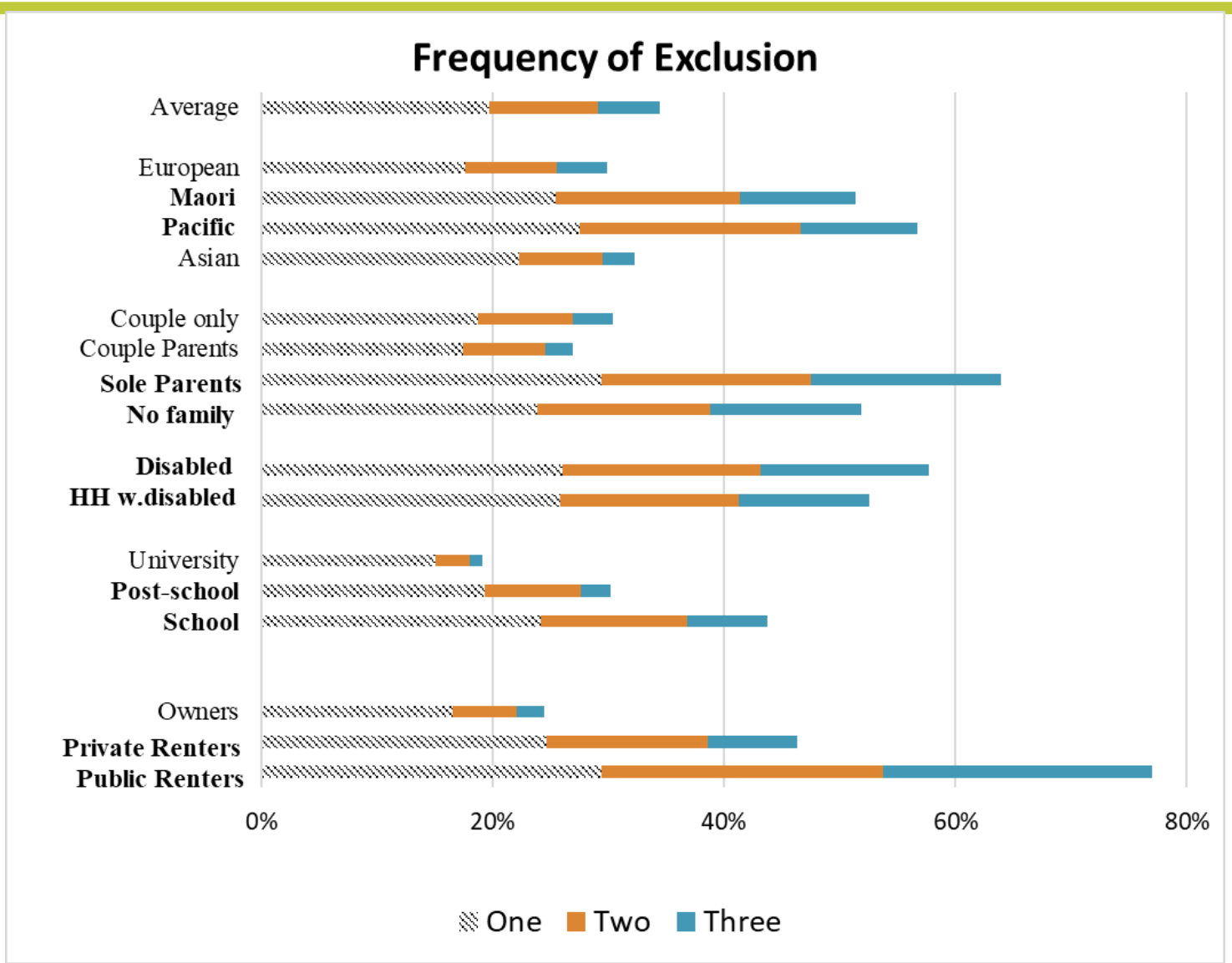
Some Groups (Sole Parents, Disabled, Renters, etc) more likely to be Persistently Poor



Similar Groups more likely to have Persistent Deprivation



Similar Patterns for Exclusion



(O)Logit Regression

- Examine the likelihood of persistent disadvantage by domain (excluded, deprived, income poor)
  - As a function of demographics
  - As a function of other domains (and subdomains)

$$P(per\_exc = 1) = f(dep_{pc1}, dep_{pc2}, ipov)$$

- Ologit: Y= Number of times in each domain (0 – 3)
- Logit: Y = Persistent Disadvantage (Dummy)

Regression Results Confirm some Identified Groups more likely to have Persistent Disadvantage

OLogit	Depvar = Number of times in			
	Poverty	**Deprivation**	**Exclusion**	**Disadvantage**
Ethnicity (Ref=European)				
Māori	**0.298**	**0.771**	**0.752**	**0.664**
Pacific	**0.542**	**2.072**	**0.957**	**1.603**
Asian	**0.501**	**0.635**	0.098	**0.514**
Other eth.	**0.764**	**0.635**	**0.594**	**0.661**
Family type (Ref=Couple)				
Couple Parents	0.07	**0.761**	**-0.198**	**0.153**
Sole Parents	**0.804**	**1.646**	**1.217**	**1.384**
Not in nuclear	**0.352**	**0.957**	**1.021**	**0.875**
Disabled	**0.521**	**0.7**	**0.849**	**0.803**
Age_head	**-2.204**	**-3.167**	**-5.136**	**-4.251**
(Age_head)^2	**3.223**	**2.387**	**5.568**	**5.01**
Mixed HH	-0.105	0.062	**0.312**	0.097
/cut1	**0.94**	**0.719**	-0.019	**-0.535**
/cut2	**1.96**	**2.164**	**1.242**	**0.582**
/cut3	**3.161**	**3.636**	**2.462**	**1.699**
R2_pseudo	0.025	0.090	0.075	0.063
N= 52,365	Year dummies = YES			

PCA Components Explain Persistent Disadvantage

- **Likelihood of one type of disadvantage positively (and significantly) correlated with all other aspects of persistent disadvantage:**
- Persistent Poverty – increased risk associated with
  - Economic (1) => Marginal (2) => Material (3)
- Persistent Deprivation & Exclusion – higher risk associated with
  - Income poverty
  - Material component: most relevant
- **Consistent findings using:**
  - OLogit or Logit
  - 2-stage estimation

Stay Longer in Disadvantage = Lower Life Satisfaction

	Mean Difference in Life Satisfaction (a 5 Likert scale)			
Number of times in	**Poverty**	**Deprivation**	**Exclusion**	**Disadvantage**
Reference = *No time*				
One	**-0.171**	**-0.337**	**-0.355**	**-0.194**
Two	***-0.362***	**-0.516**	**-0.525**	**-0.342**
Three	***-0.352***	**-0.631**	**-0.769**	**-0.592**

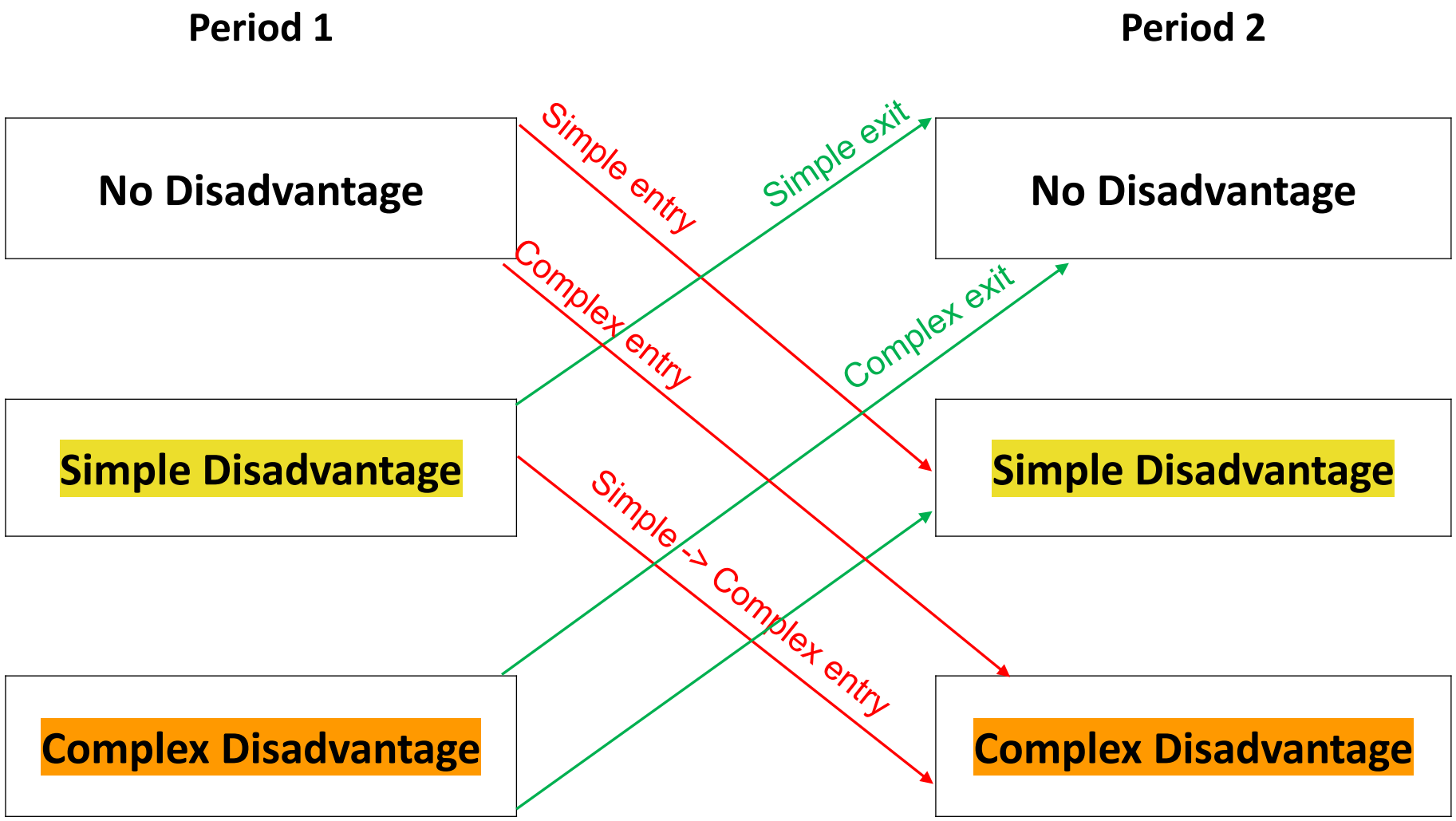
Notes: **1. Mean Satisfaction: 4**
2. Control for demographics (age, family type, ethnicity, disability)

Disadvantage Entry & Exit: *HES-Census 2018*

Each Period

1. No Disadvantage	
2. Simple Disadvantage: *One domain only (e.g. Poor)*	
3. Complex Disadvantage: *2+ domains (Both poor & deprived)*	

Disadvantage Entry & Exit: *HES-Census 2018*



Disadvantage Entry & Exit: *HES-Census 2018*

Type	Simple Entry - Exit		Simple <=> Complex		Complex Entry - Exit	
VARIABLES	(1) Entry	(2) Exit	(3) Entry	(4) Exit	(5) Entry	(6) Exit
Ethnicity (Ref=European)						
Māori	**0.184**	0.016	**0.46**	**-0.43**	**0.564**	**-0.254**
Pacific	**0.546**	**-0.793**	**0.594**	**-0.48**	**0.794**	**-0.958**
Asian	**0.254**	-0.174	0.223	**0.602**	0.19	0.017
Other eth.	-0.015	-0.118	0.353	**-0.78**	**0.58**	0.072
Family type (Ref=Couple)						
Couple Parents	0.041	-0.129	0.141	-0.16	0.211	-0.319
Sole Parents	**0.868**	**-0.489**	**1.057**	**-0.75**	**1.536**	**-0.668**
Not in nuclear	**0.626**	**-0.24**	**0.708**	**-0.73**	**0.982**	**-0.594**
Disabled	**0.445**	-0.174	**0.807**	-0.12	**0.604**	**-0.497**
Age_head	0.02	**-1.663**	0.255	0.168	0.863	**-1.314**
Mixed HH	**0.294**	-0.036	0.215	**0.437**	-0.058	0.121
Constant	**-2.322**	**1.747**	**-2.124**	-0.233	**-3.662**	-0.029
Year dummies	Y	Y	Y	Y	Y	Y
Observations	41,283	13,194	16,539	6,984	43,731	9,114
R2_pseudo	0.026	0.038	0.058	0.075	0.067	0.039

Entry & Exit: *to be continued*

- Incorporate **life events**
  - Logit Model to examine for:
    - *Entire sample*
    - *Sub-sample*: Couple families, Sole Parent families
  - **E.g**: evidence from HLFS linked to census
    - *Divorce:* more likely to enter and less likely to exit low income
    - *Joining labour force*: less likely to enter and more likely to exit
- Use initial **PCA components** as explanatory variables:
  - Economic (1) => Marginal (2): most relevant
  - Other components: more relevant to exit

Summary

- Multidimensionality of disadvantage
- Disadvantage associated with lower wellbeing
  - More periods in disadvantage – even larger effects on wellbeing
- Some groups have increased risk of disadvantage
  - More likely to enter and less likely to exit
  - Increased risk of persistent disadvantage
  - Groups:
    - Sole parents
    - Disabled
    - Māori and Pacific peoples

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