Electricity connections and disconnections

and the race between service roll-out and new household formation

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Overview

- Background
- Data
- Cross-sectional analyses
- Thinking about a panel of households

Background

Papers

- Tom Harris “Household electricity access and household access”, Master’s dissertation, UCT 2016
- Harris, Collinson & Wittenberg “Aiming for a Moving Target: The Dynamics of Household Electricity Connections in a Developing Context”, **World Development**, September 2017
- Wittenberg, Collinson & Harris “Decomposing changes in household measures: Household size and services in South Africa 1994-2012”, **Demographic Research**, forthcoming

Overarching questions

- Do different datasets give similar measured outcomes?
- How different is the measure when we use cross-sections versus when we use panel data?

- Substantively: what can we say about the pattern of (lack of) electricity access across time?

Context

- Massive electrification programme since 1994
- Hope (in the early 2000s) that all electricity connection backlogs would be wiped out by 2012
  - Didn’t happen
- But households forming over this period at a rate higher than population growth rate
  - Why are people setting up new households at a time when employment wasn’t growing all that rapidly?

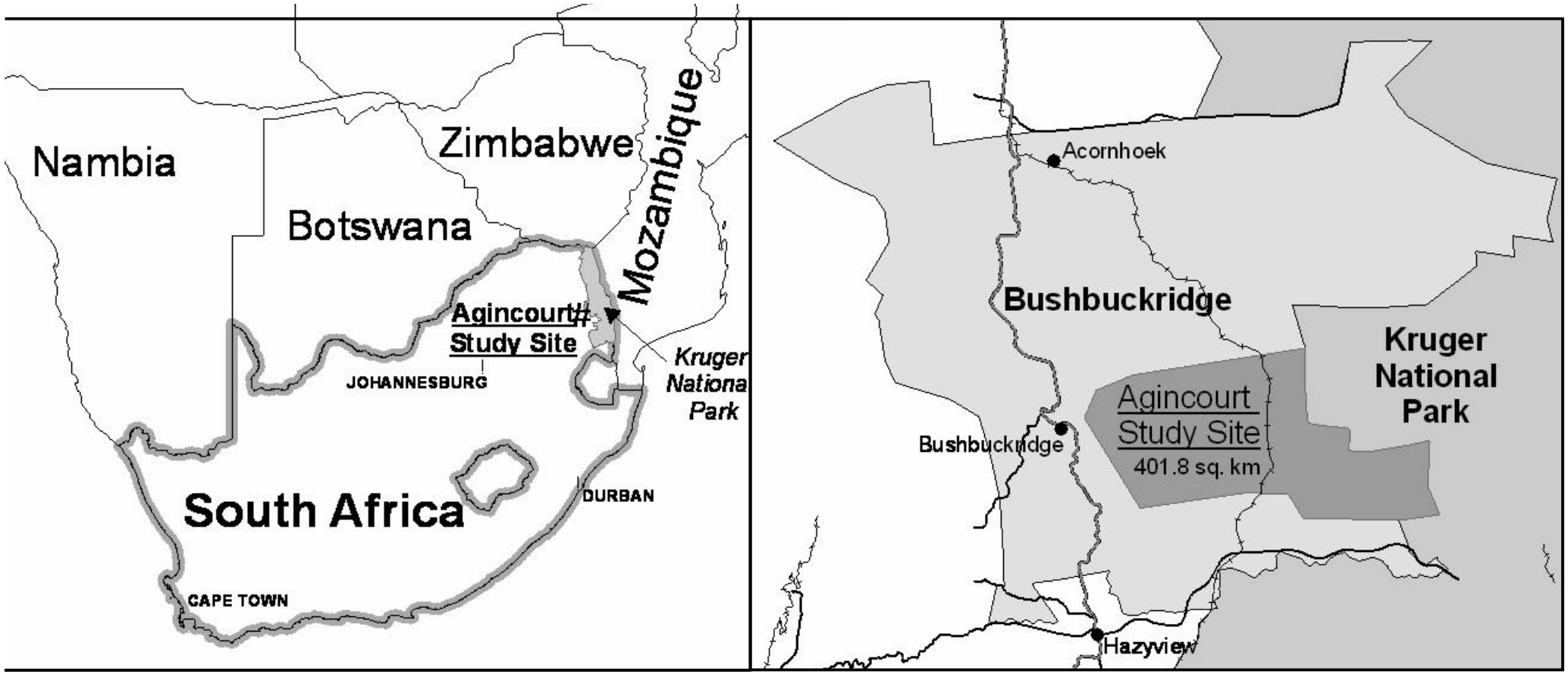
Data

Types of data

- Repeated cross-sections
  - October Household Surveys (1994-1999)
  - General Household Surveys (2002-)
- Panel Data
  - National Income Dynamics Study (2008-)

- Demographic Surveillance Data
  - Agincourt Health and Demographic Surveillance Site (1992-)

Agincourt study site

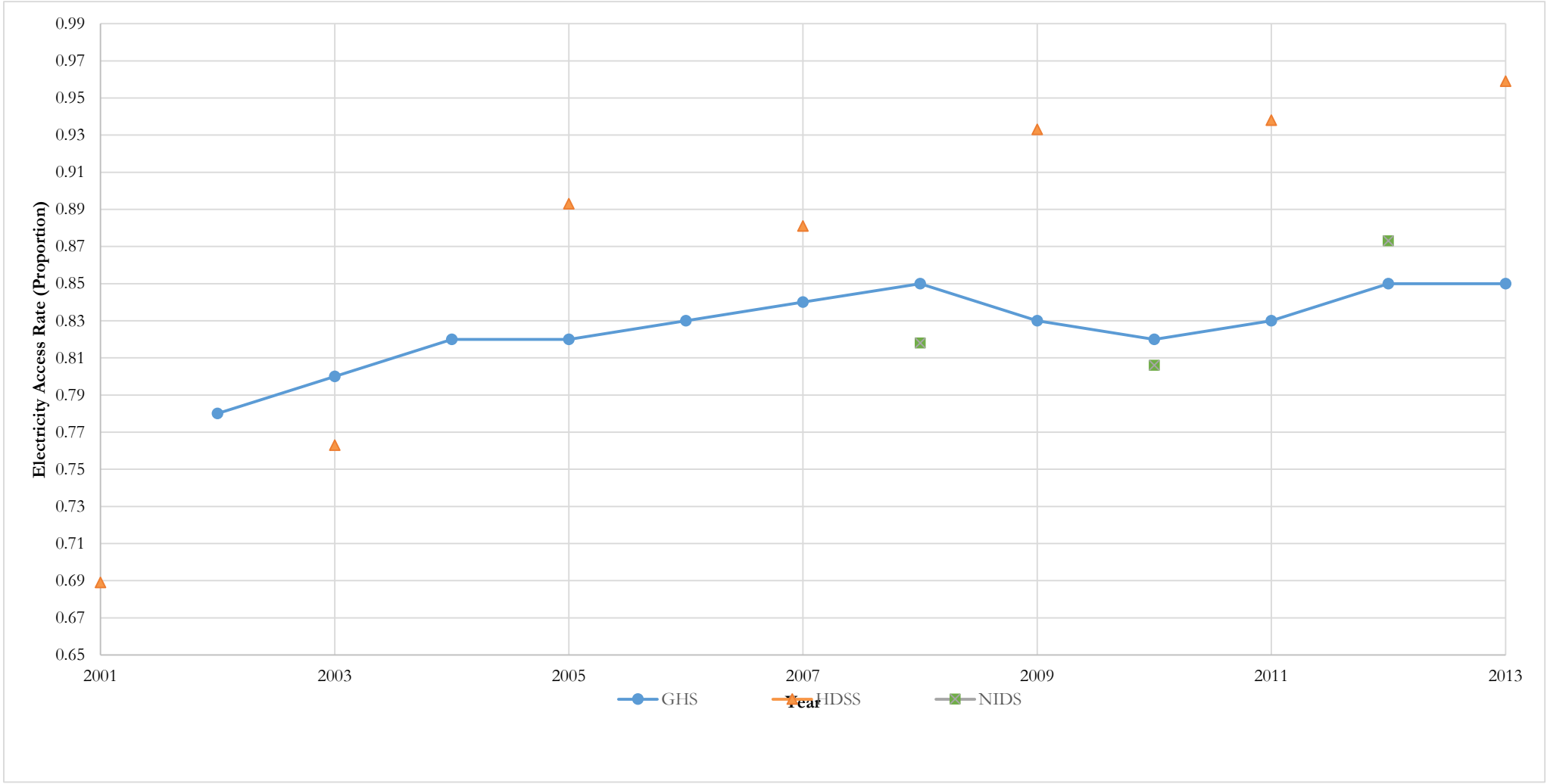


Health and Demographic Surveillance Data

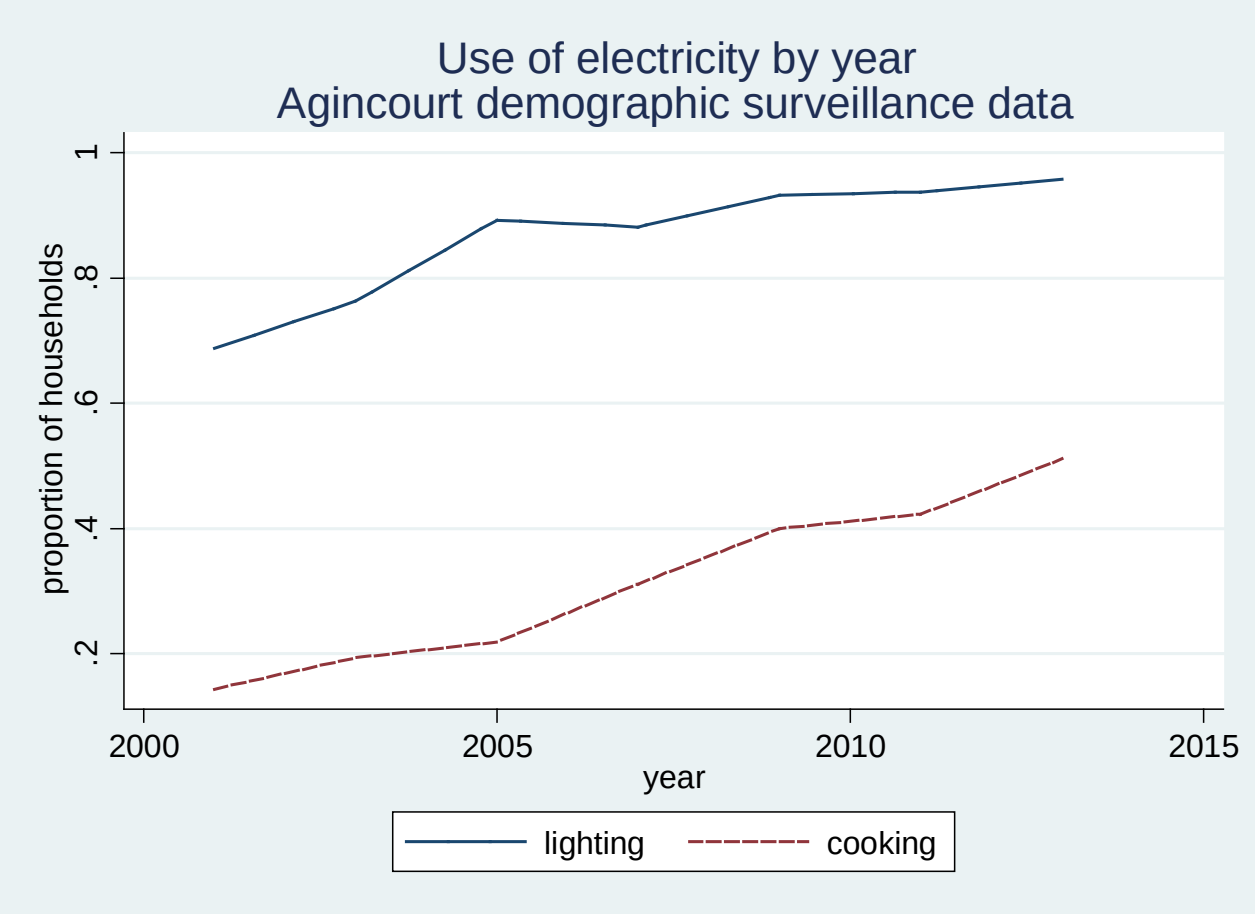
- Annual census rounds
  - Births, deaths, inmigration, outmigration
- Since 2000 special modules
  - e.g. Labour, Access to grants, education
  - Every second year since 2001: asset data
  - Includes measure whether household uses electricity for lighting, cooking

Cross-sectional analyses

Pattern in the national data



Pattern in the Agincourt data



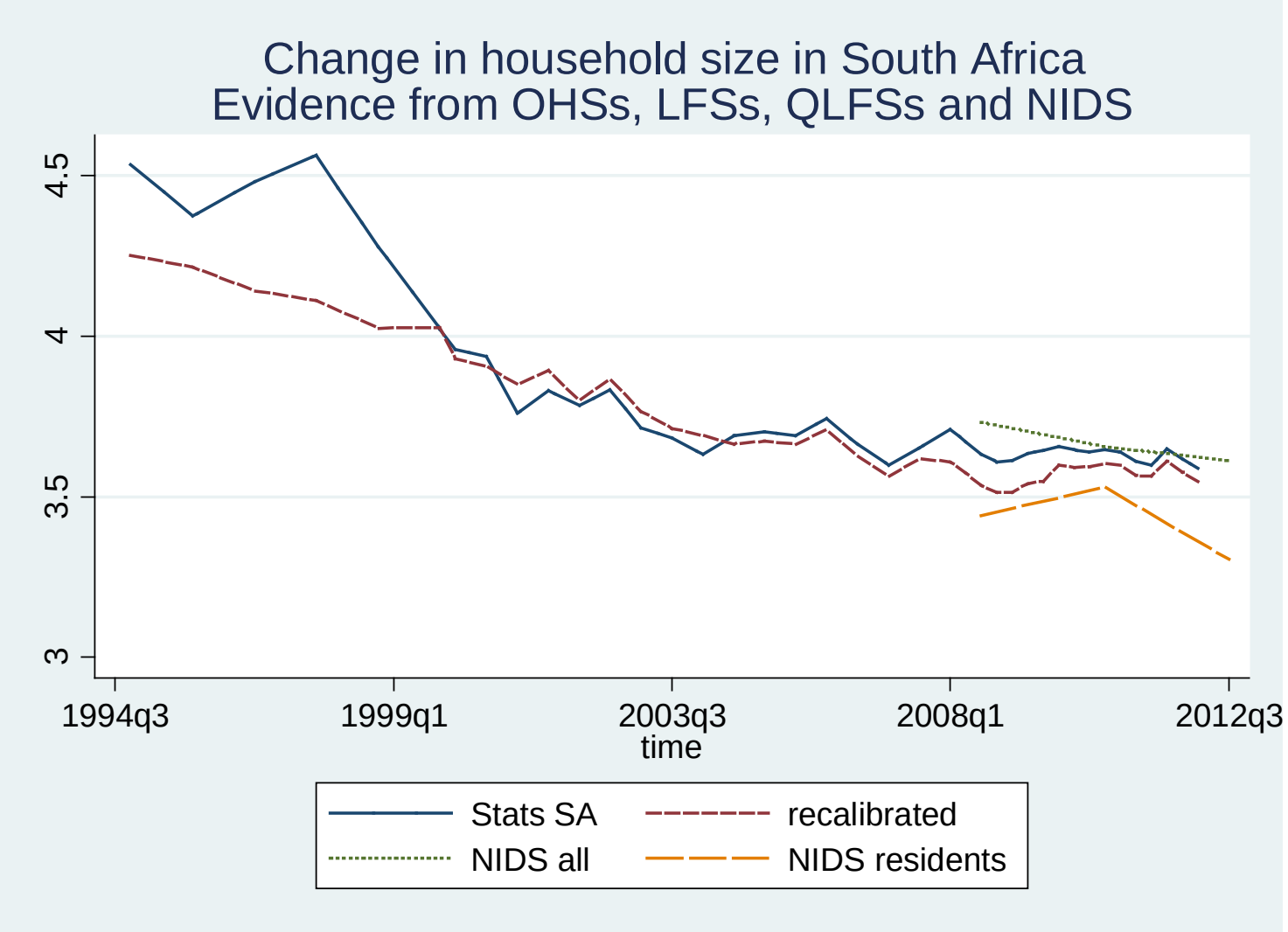
Thinking about electricity connections and household formation

- A simple way of thinking about the connections:

$$H_{0,t} + (H_{t+1} - H_t) - \left(H_{1,t+1} - H_{1,t}\right) = H_{0,t+1}$$

- Backlog at time t + net new households – net new connections is new backlog
  - H_t number of households at time t
  - $H_{0,t}$ number of unserviced households at time t
  - $H_{1,t}$ number of serviced households at time t

Household size is going down, i.e. numbers are increasing faster than population

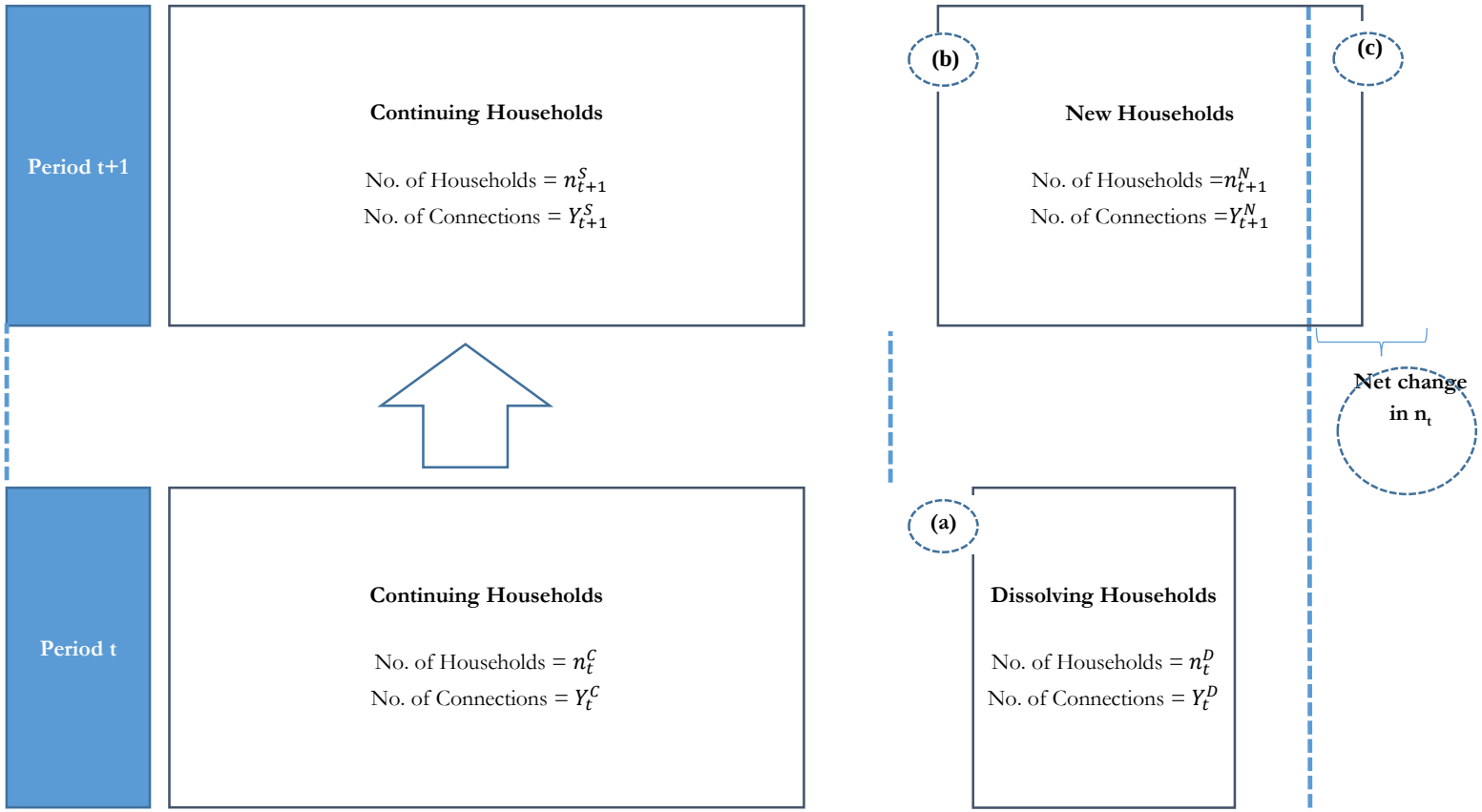


Race between connections and household formation

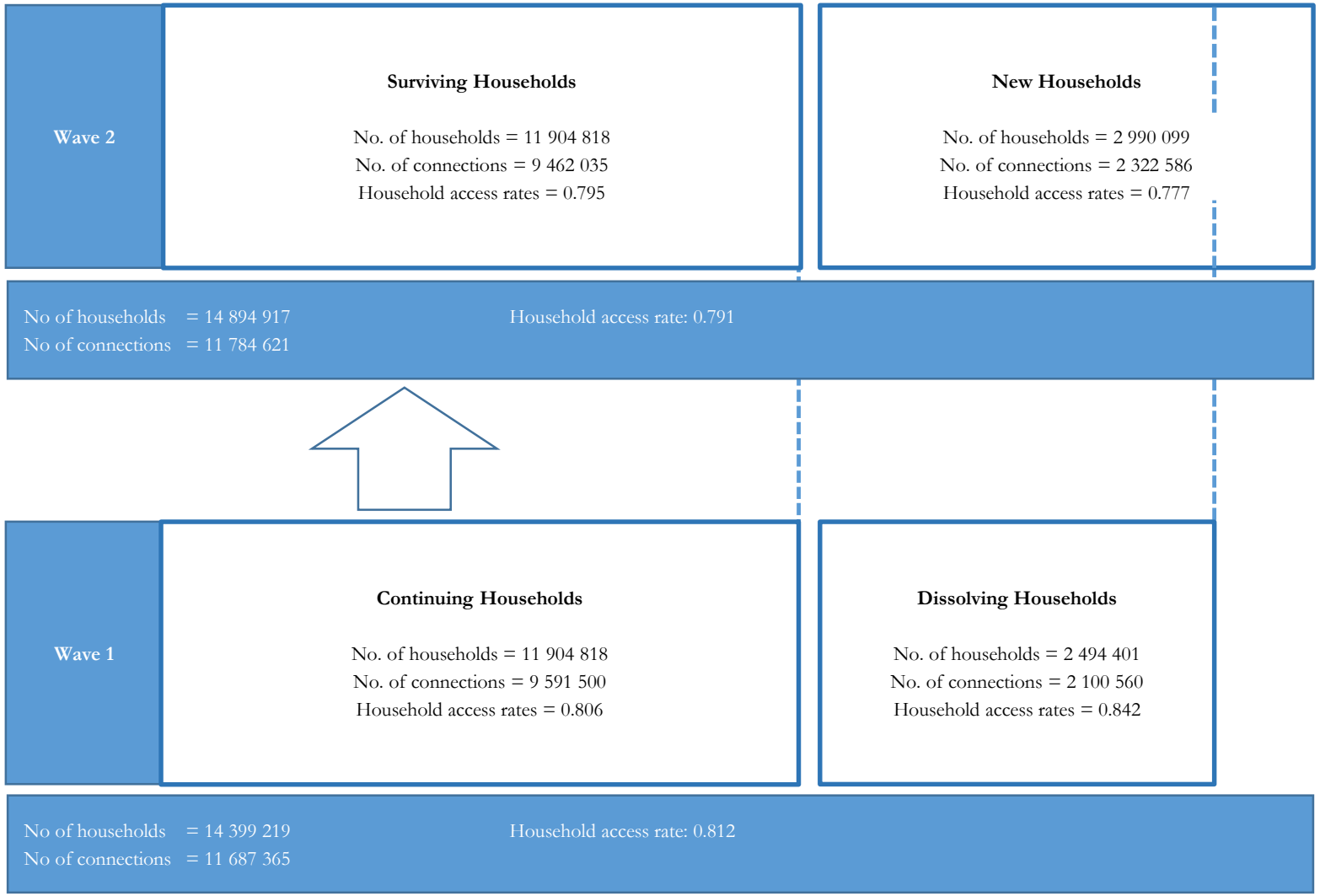
	Agincourt 2001–2011	OHS/GHS recalibrated 1994–2012	OHS/GHS original 1994–2012	NIDS 2008–2012
Growth in connections (%)	72.2	156.9	169.3	18.2
Annual growth rate in connections (%)	5.58	5.38	5.66	3.57
Population growth (%)	12.21	25.95	25.96	5.48
Change in backlog				
Backlog at start (%)	31.21	47.68	46.92	18.21
Household formation rate (%)	26.33	51.03	59.18	9.86
New connection rate (%)	-49.65	-82.07	-89.88	-18.71
Backlog at end (%)	6.24	11.02	10.19	12.67

Thinking about a panel of households

A diagram


Period t+1
Continuing Households
No. of Households = n_{t+1}^{S}
No. of Connections = Y_{t+1}^{S}
(b)
New Households
No. of Households = n_{t+1}^{N}
No. of Connections = Y_{t+1}^{N}
(c)
Net change in n_t
Period t
Continuing Households
No. of Households = n_t^C
No. of Connections = Y_t^C
(a)
Dissolving Households
No. of Households = n_t^D
No. of Connections = Y_t^D

Pattern in NIDS



A Panel approach

		Wave 2		
		No Access	Access	Total
Wave 1	No Access	1 608 484 (0.694)	705 834 (0.306)	2 313 318 (1.000)
	Access	836 298 (0.087)	8 755 202 (0.913)	9 591 500 (1.000)

Wave 3				
		No Access	Access	Total
Wave 2	No Access	1 526 349 (0.477)	1 676 184 (0.523)	3 202 533 (1.00)
	Access	606 997 (0.052)	11 085 387 (0.948)	11 692 384 (1.000)

Agincourt

		2007		
		No Access	Access	Total
2005	No Access	756 (0.709)	310 (0.291)	1 066 (1.000)
	Access	337 (0.035)	9 268 (0.965)	9 605 (1.000)

		2009		
		No Access	Access	Total
2007	No Access	417 (0.298)	981 (0.702)	1 398 (1.000)
	Access	141 (0.013)	10 913 (0.987)	11 054 (1.000)

Conclusion

Implications

- Look at disconnections as well as connections
- To what extent are these just measurement changes?
- Different datasets do show similar patterns

More interesting

- To what extent is new household formation linked to availability of housing (RDP) and services?