Disability and the Economy

Paul Lewis & Karl Schriek

Gen Re Africa

Overview

- Background
- Earlier studies
- Data
- Results, Model
- Predictions

Why are we doing this study?

- Interesting
- Topical
- Effects our pricing and reserving
- Hope it will add value to (South African) Life insurers

Background to disability

- Limited social security
- Lump-sum and Income
- Group and Individual
- Improved claims management from late 90s
- Long period of stable economic growth
- High unemployment

A matter of choice

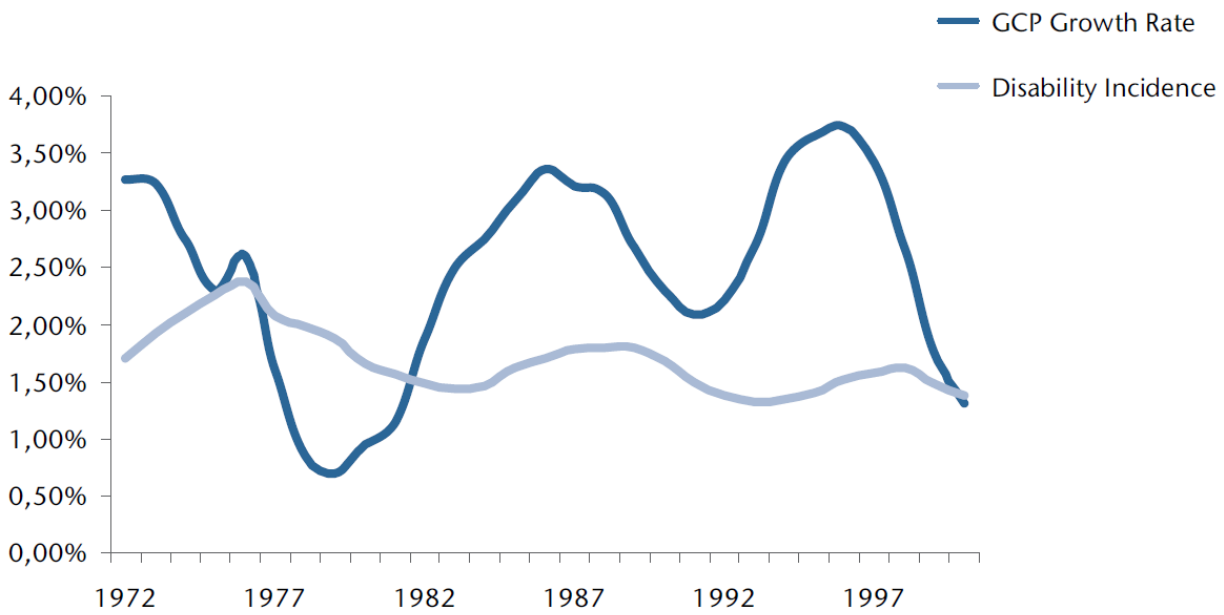
- Claim not something that simply *is*
- Borderline claims:
  - Policyholder: Claim when utility from disability benefits exceeds that of working
  - Employer: Encourage as alternative to retrenchment
  - Insurer / State: Consider reputation vs. claim cost

Earlier Studies

- A number have been done
- Most concluded a link does exist
- Few able to statistically quantify the relationship
- But what is the direction of relationship?

Pro-Cyclical

- Economy up, disability rates up
- Netherlands



Anti-Cyclical

- Economy up, disability rates down
  - The “hidden disabled”
  - Fraudulent claims
  - Minor claims
  - Employer cost control

- USA in the 70’s
- Excellent paper by Donald Doudna (1977)

Interesting impacts in current financial crisis

- Less claims than expected
  - People can't afford to get < 100% of salary
  - People were retrenched too quickly to

- But we still expected to see anti-cyclical pattern in South Africa

Technical Investigation

- 2008/2009 extreme years for economy
- Extreme reaction in disability rates?
  - Increase decrease?
  - 10% / 20% / 30%?
- Set out to
  1. Prove the link exists
  2. Quantify that link
  3. Predict the future

Disability Data

- 1990 – 2008
- 5 contributing insurers
- Both lumpsum and income

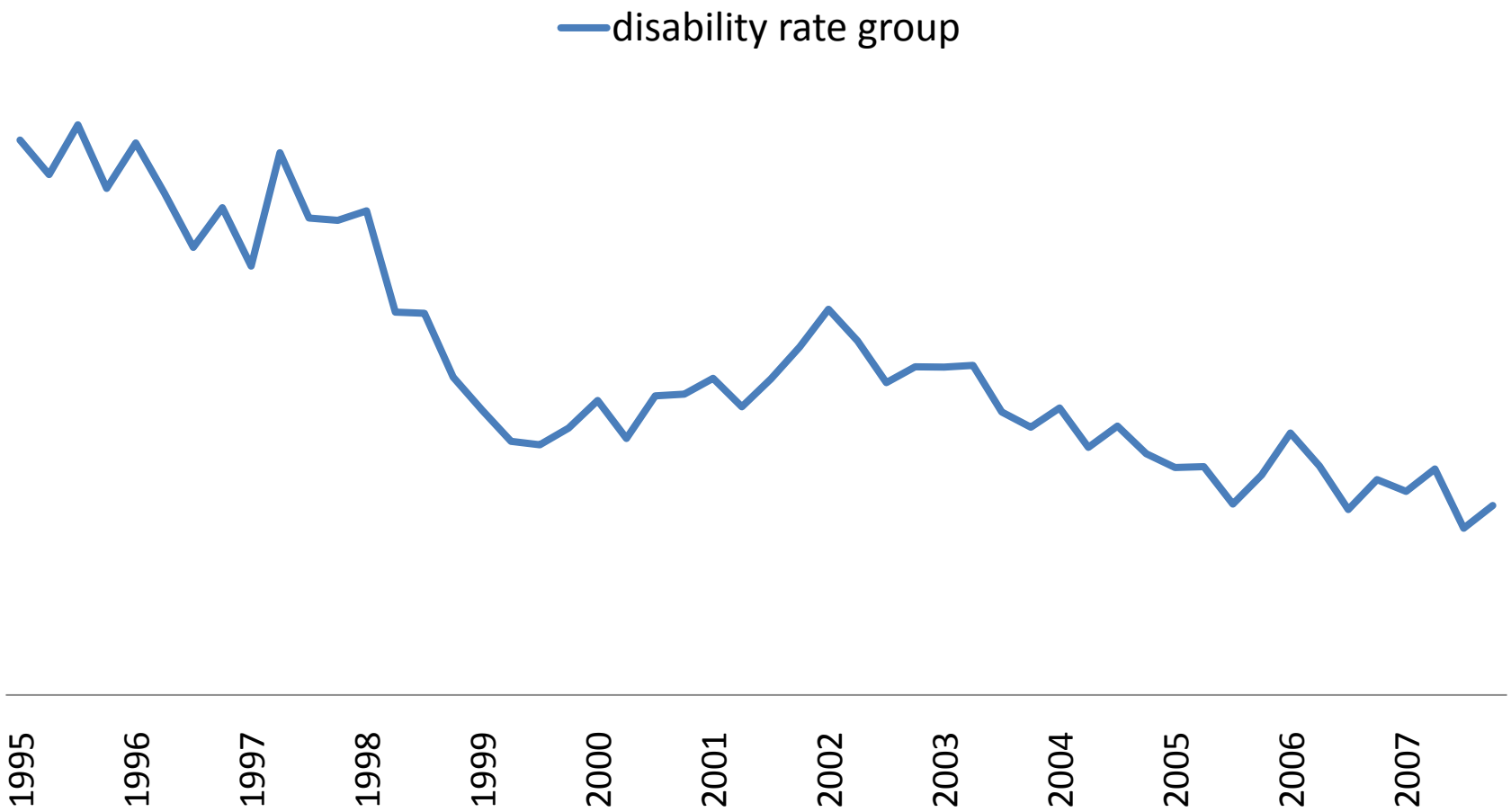
	Period	Life Years	Claims
Individual	1990 - 2008	12,327,727	11,253
Group	1995 - 2008	11,550,626	38,259

- About 1.4m life years per year

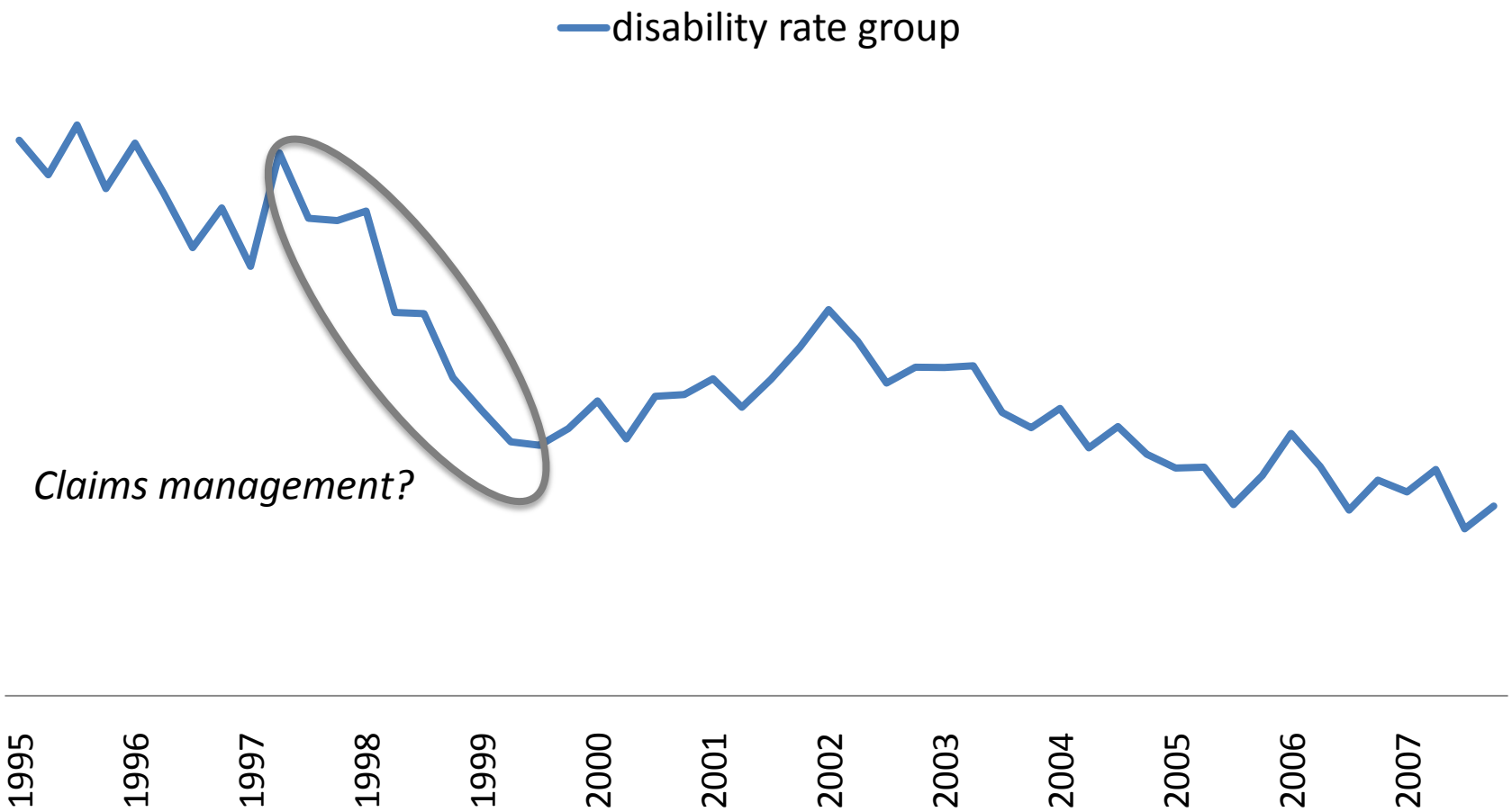
Results

- Considered group and individual separately
- Group
  - Some interesting observations, no modelling
- Individual
  - Detailed modelling results produced

Group Disability Rates



Group Disability Rates



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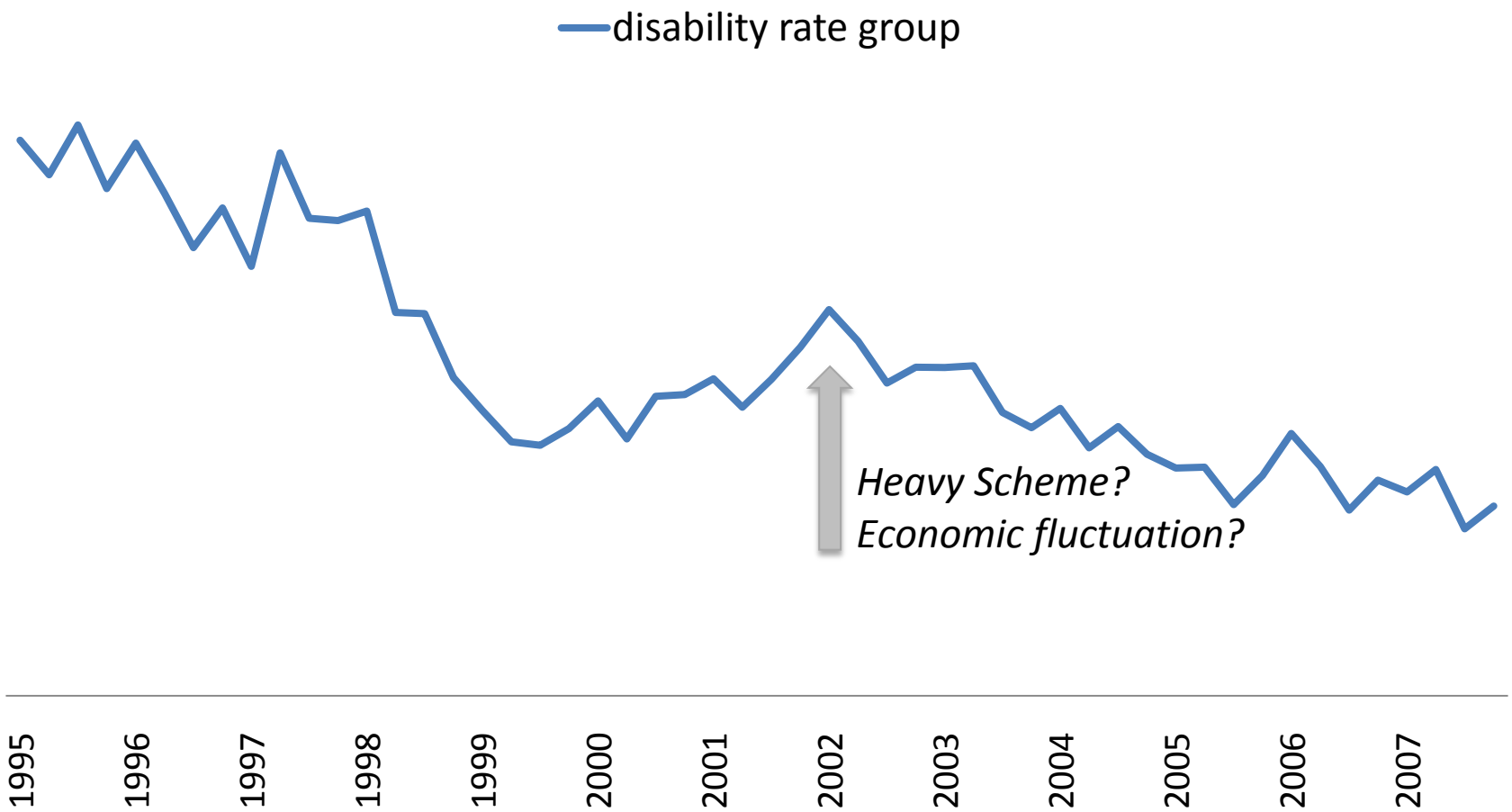
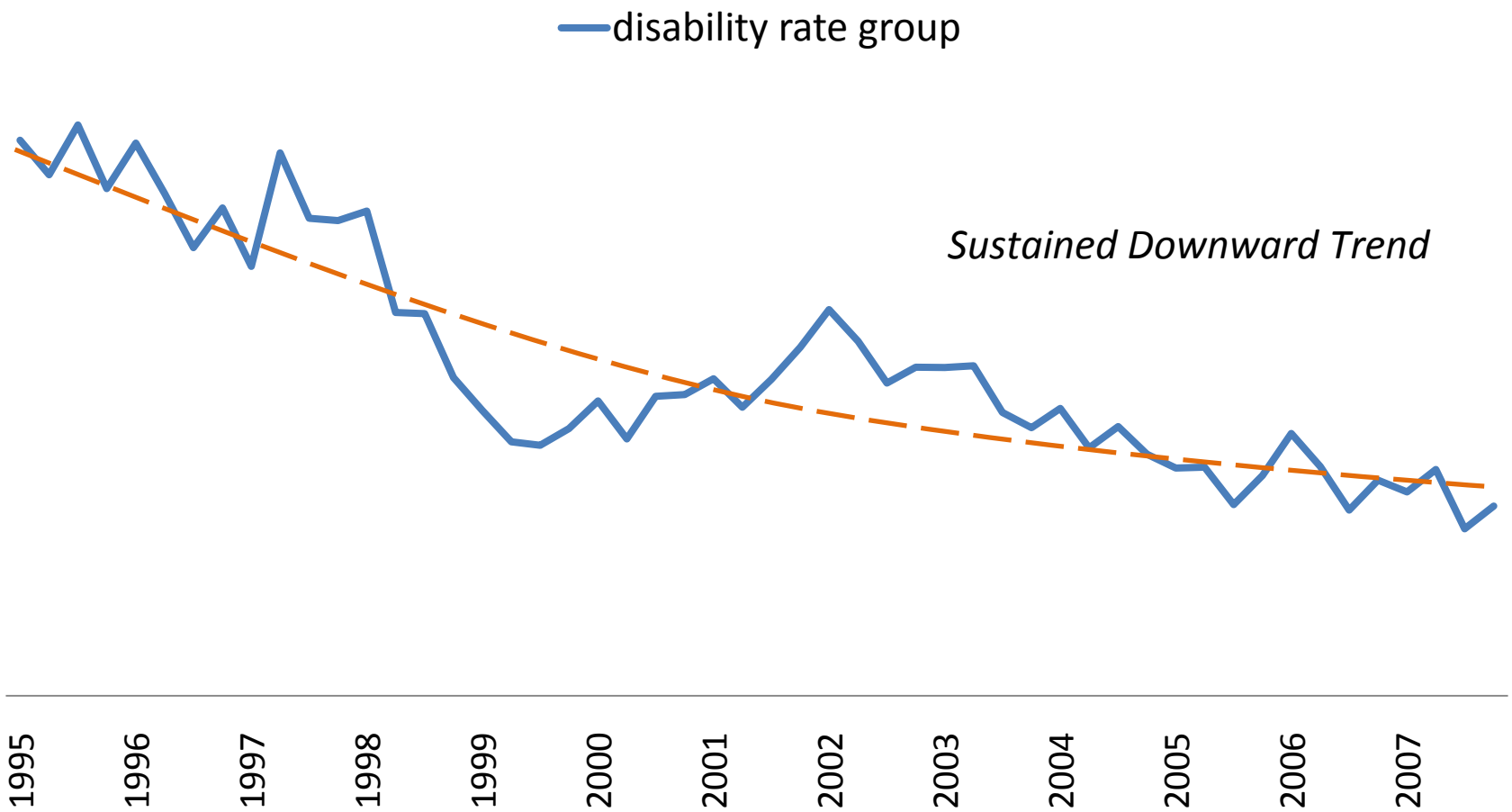


Group Disability Rates



StatsSA Household Survey

- Employment 1995 – 2008

	1995	2008	Growth
Agriculture	1.30m	0.80m	-38%
Mining	0.45m	0.35m	-22%
Financial	0.65m	1.70m	162%
Retail	1.75m	3.00m	71%

- Changes underlying risk pool
- More white collar = fewer claims

Group Salary Progression

	Average Age	% Male	Average Real Salary
2000	40	63%	86,123
2002	40	63%	90,530
2004	40	68%	94,345
2006	41	68%	107,945
2008	41	66%	112,073

- 30% increase in *real* salaries since 2000
- Might reflect movement to financial services

Group Portfolio – Expected Rate Change

	Blue collar : White collar	Average Salary	Rate	Expected rate
2000	60 : 40	86,123	3.1	3.3
2008	40 : 60	112,073	2.2	2.3
%change		*30%*	*-29%*	*-26%*

- Decrease in rate consistent with expected

Group Disability - Summary

- Downward trend caused by change in portfolio
- …driven by structural changes in the economy

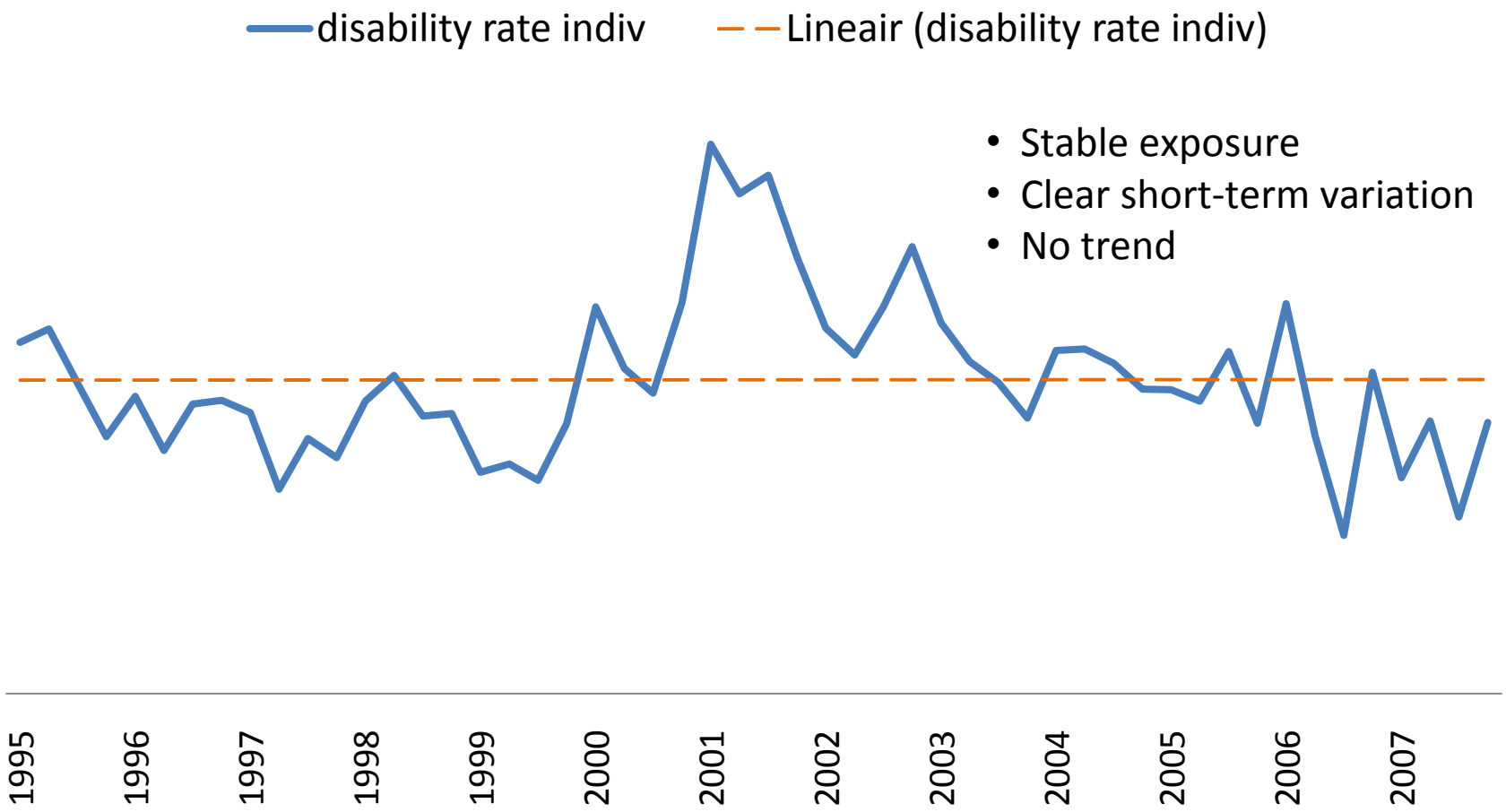
- Next step to do more complex modelling

Individual Disability

- Largely self-employed, high net worth individuals
- Fewer problems with data
- More stable exposure

- Able to do more complex modelling

Individual Disability Rates

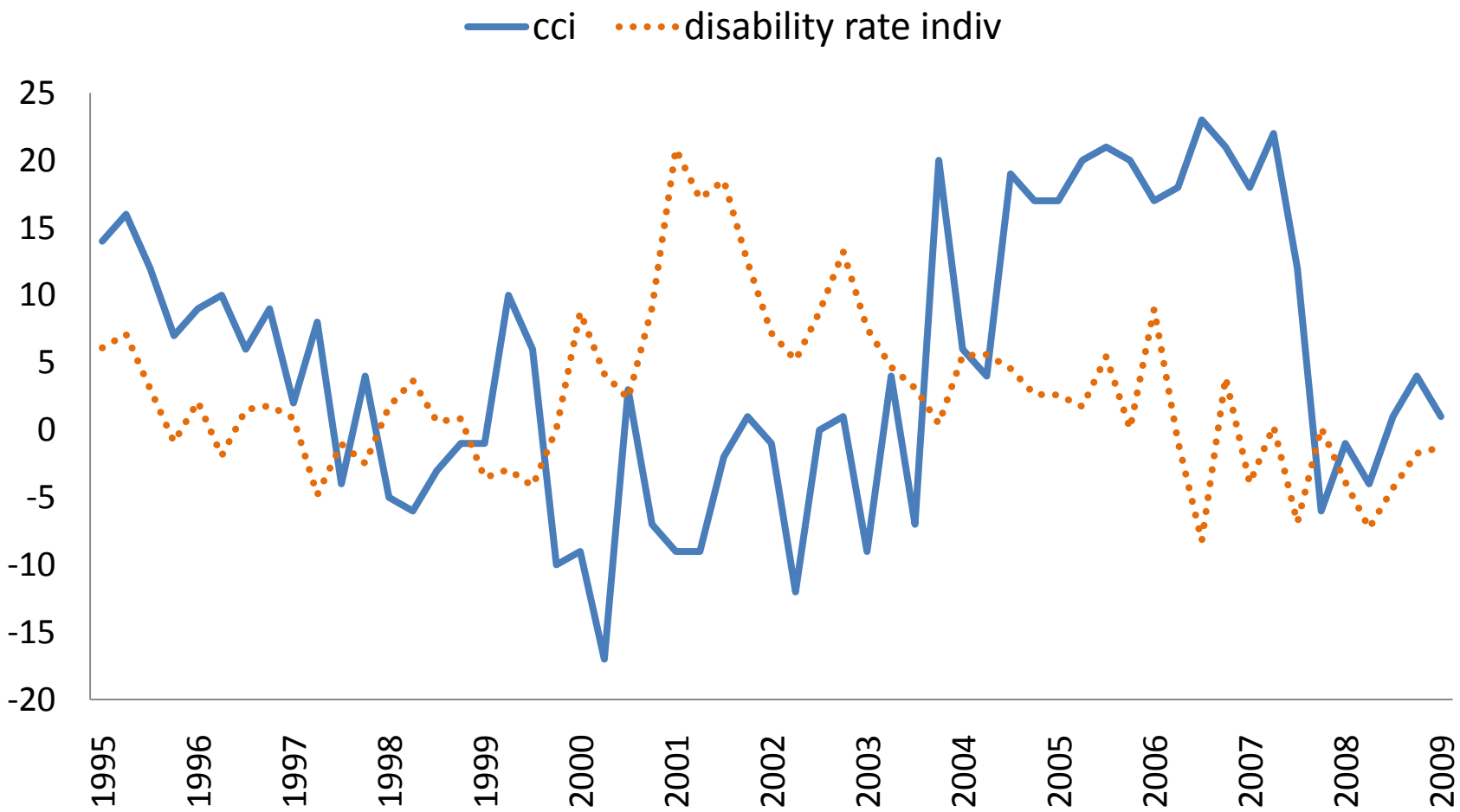


Economic Data

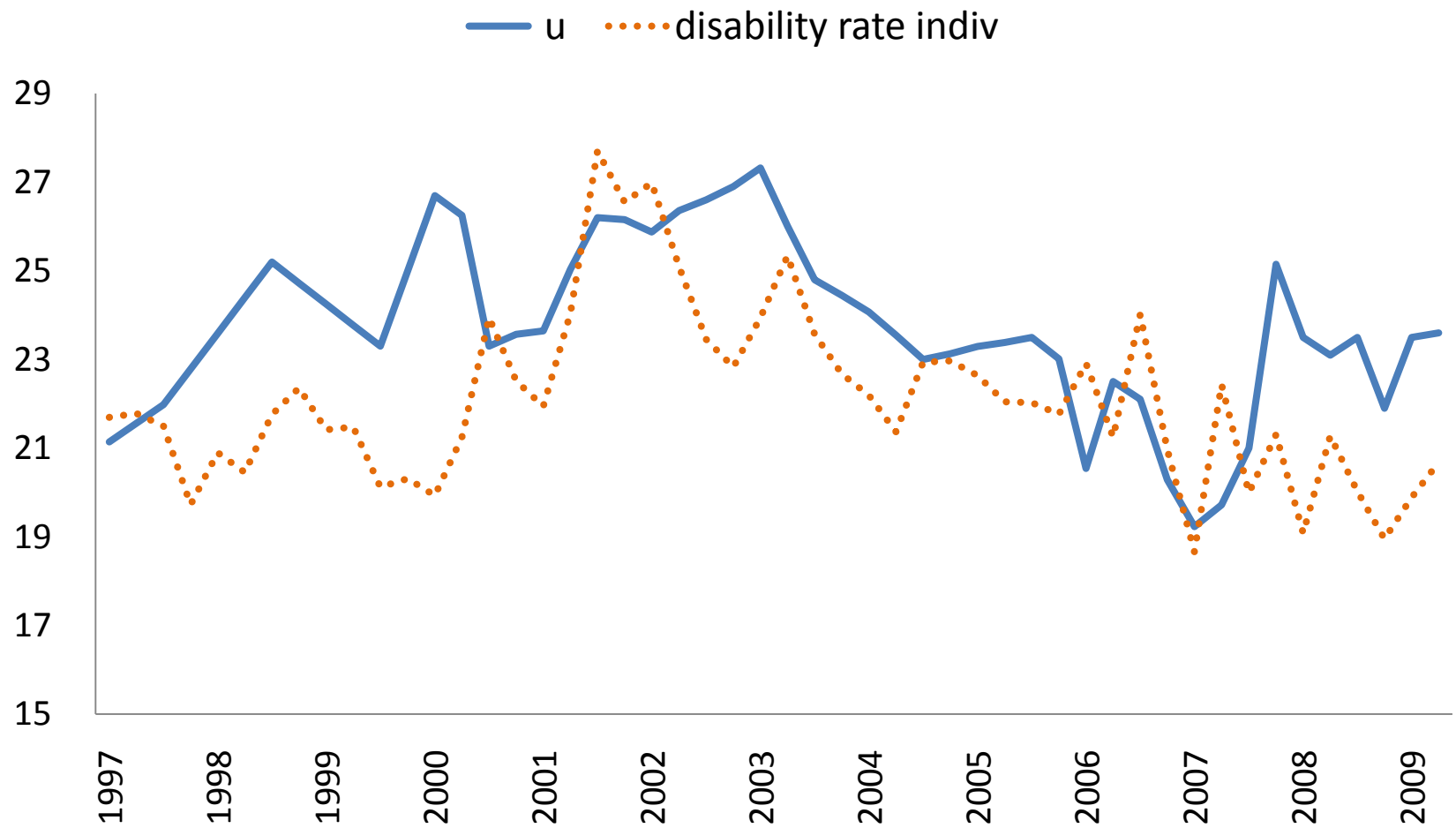
- Economic indices criterion
  - Publicly available
  - Frequently published
  - Available over long enough time period

- Use to model disability rates

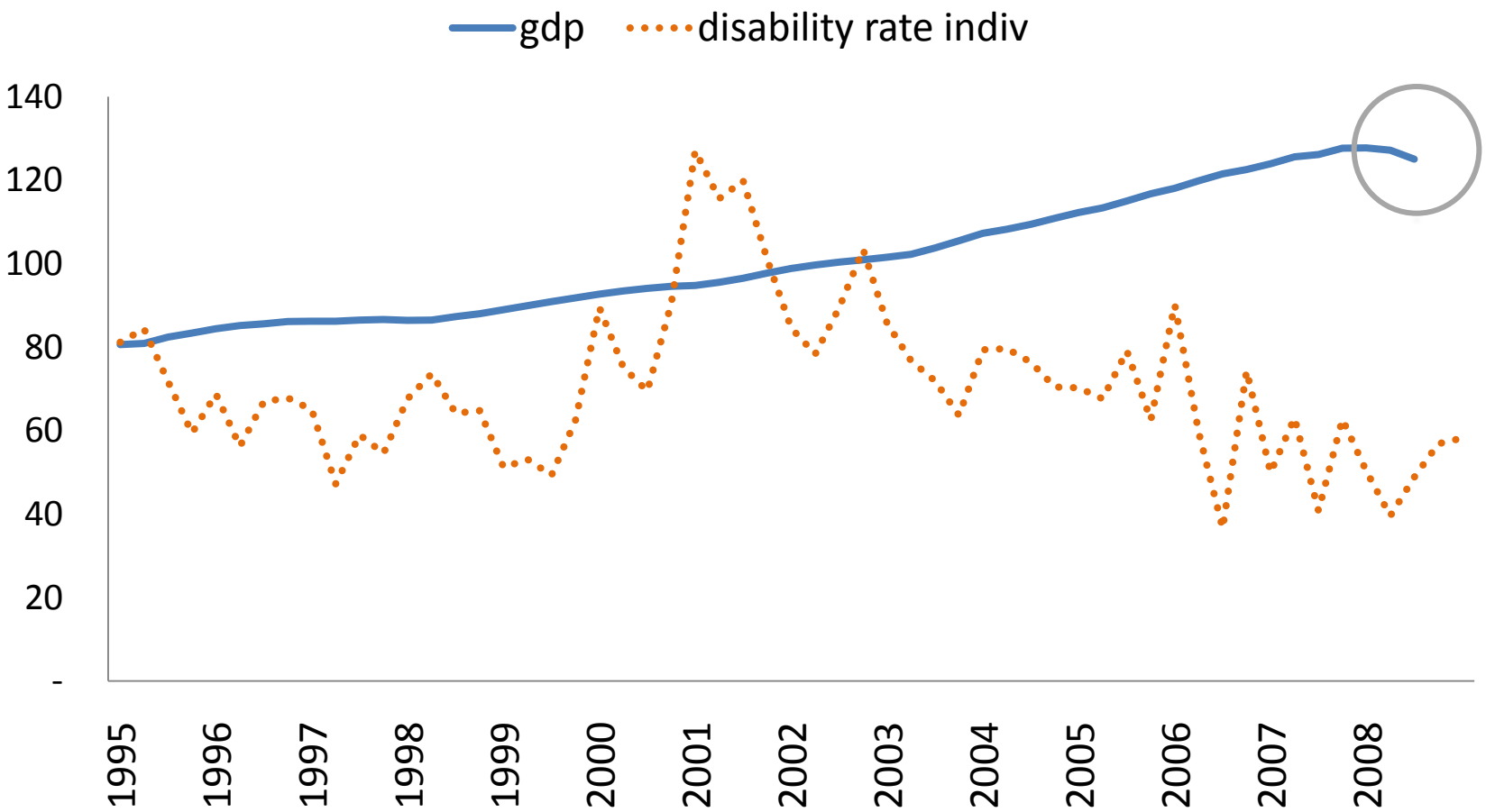
Disability and Consumer Confidence



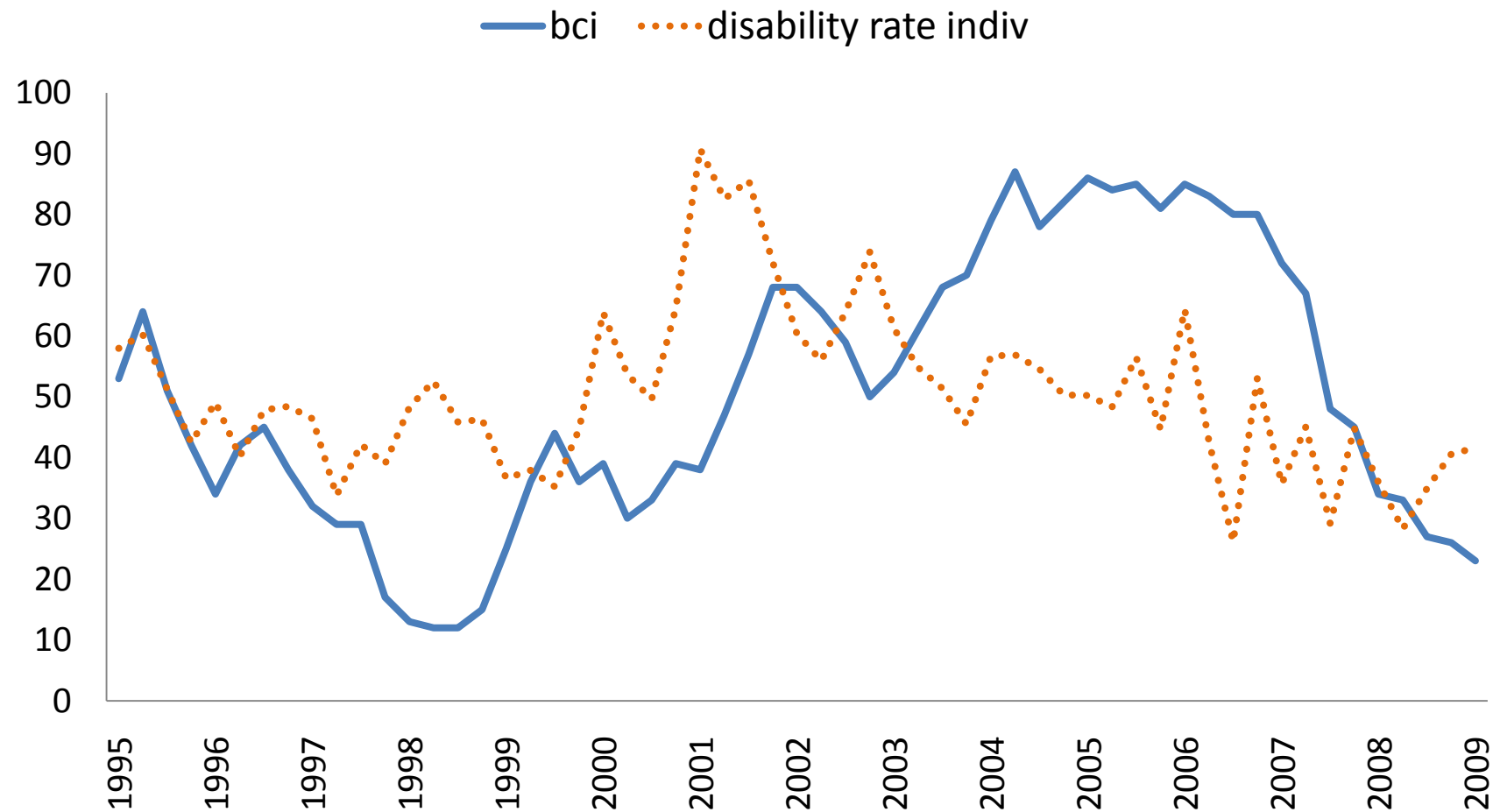
Disability and Unemployment



Disability and GDP



Disability and Business Confidence



Univariate Modelling

- Disability a function of one indicator
- Identify strongest indicators
  - Unemployment and Consumer Confidence
- Determine appropriate lags
  - Disability rates do not react immediately

Lag determination

- Lag with highest R-square for U and CCI
- Assumption for BCI and GDP

	R-square			
Quarters Lag	**CCI**	**U**	**BCI**	**GDP**
0	12%	22%	2%	6%
1	12%	***25%***	0%	***6%***
2	14%	24%	***0%***	6%
3	21%	19%	1%	7%
4	***27%***	15%	2%	7%

Multivariate Modelling

- Disability a function of multiple indicators
- Used lags already identified

Indicators used	R-square
U + CCI + BCI + GDP	52%
U + CCI + BCI	50%
U + CCI	33%

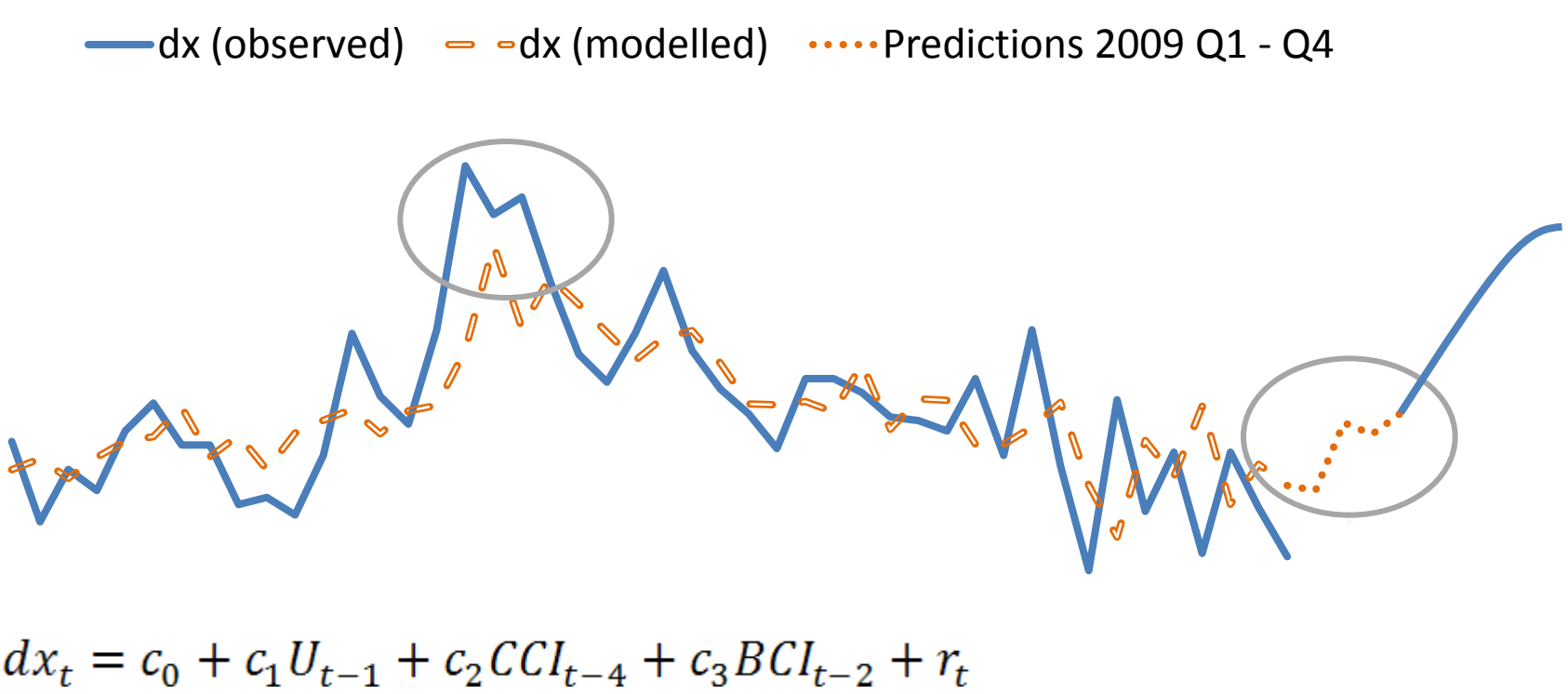
- GDP offers no useful information
- …but BCI does

Final Model

- Final model a function of:
  - U at lag 1
  - CCI at lag 4
  - BCI at lag 2
- …and
  - Disability rate in previous period

- R-square of 49.89%
  - What about the remaining 50%?

Model vs Observed



$$dx_t = c_0 + c_1 U_{t-1} + c_2 CCI_{t-4} + c_3 BCI_{t-2} + r_t$$

Predictions

	Observed rate	Modelled rate	
2002	1.24	1.22	
2003	1.14	1.11	
2004	0.95	0.94	
2005	0.92	0.97	
2006	0.94	0.87	
2007	0.72	0.72	
2008	0.62	0.77	+7%
2009	?	0.84	+11%

- Observed rates have declined in 2008
  - IBNR?
  - First sign that expected effect not occurring?

Conclusion

- Statistical evidence that the link does exist
- Model suggests 7% and 11% increase in 2008 and 2009

- What actually happened?
  - Re-evaluate model in 2010/2011

- Will we be ready next time around?

Cape Town Afrique du Sud

ICA 2010 CIA

Questions?

Contact Details

- Paul Lewis
  - plewis@genre.com
  - +27 21 412 7710

- Karl Schriek
  - karl.schriek@genre.com
  - +27 21 412 7716