International Business Cycles:

Evidence from Capital Coefficient Based Measures of Capacity Utilisation

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Introduction

- The presentation refers to capacity utilisation, applying a short-cut that is sometimes used in business cycle research to yearly GDP and investment data
- The basic idea is that the empirical short-run fluctuations of the capital output ratio *v* are mainly due to cyclical changes in capital utilisation
- Accepting this, the individual HP filtered long-run trend estimate v_t for country *i* can be used to identify the actual deviation of any respective v_t from its 'equilibrium' level, which in turn allows to quantify capital utilisation
- This method is easy to implement and gives an internationally perfectly comparable measure

Data and Procedures

- 22 developed countries, yearly data 1950–2000
- Australia, New Zealand and Switzerland discussed as examples
- Investment rates and GDP from the Penn World Tables 6.1
- Smoothed (HP filter, $\lambda = 120$) to identify starting values for K (assuming a "secular" growth rate of the capital stock g^*)

  $I_0 = d\,K_0 + g^*\,K_0 = (d + g^*)\,K_0.$

  $\Rightarrow K_0 = I_0 / (d + g^*).$
- Capital stock time series 1960–2000: perpetual inventory method ($\delta = 10\%$)

$$K_t = K_0\,(1 - \mathrm{d})^t + \mathrm{S}\; I_i\,(1 - \mathrm{d})^{t-1-i}$$

- Equilibrium series $v*$ by HP filter ($\lambda = 120$)
- Capacity utilisation proxy: CU =: v^*_t/v_t
- For New Zealand and Switzerland: Comparing these capacity utilisation time series to conventional measures (survey data, output gaps) shows high correlations, supporting the view that our measure is a useful proxy for a country's position in the business cycle.

International Business Cycles

- Principal component analysis to extract the common variance of the capacity utilisation series for the 22 countries in the sample
- Resulting in 5 orthogonal factors with eigenvalues > 1.
- These can readily be interpreted as distinct international business cycle country groups.

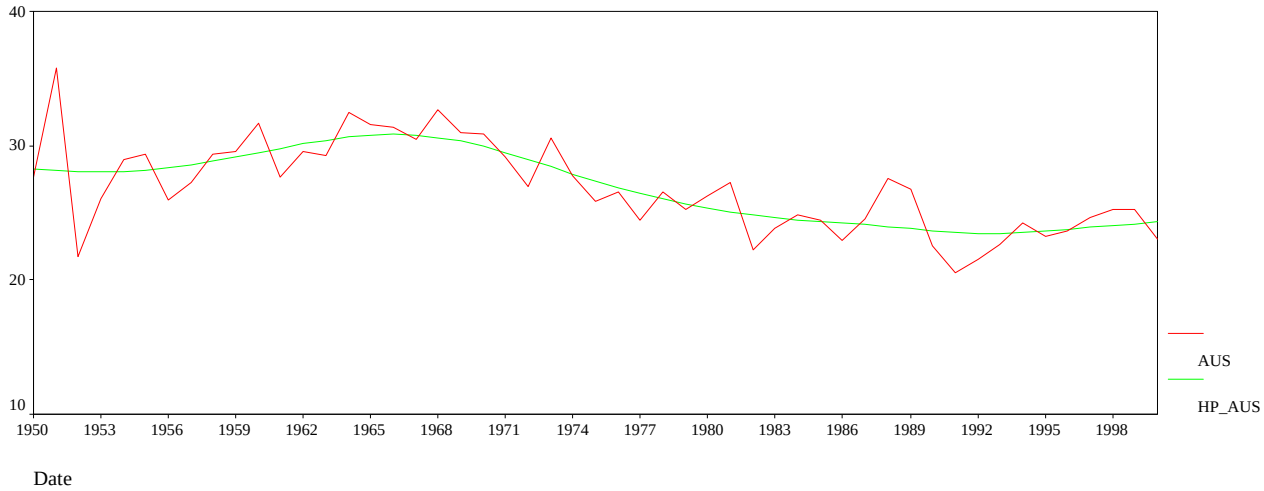
- 1: A European group comprising France, Spain and Sweden
- 2: A group of German speaking countries plus Italy and Japan
- 3: A group of English speaking countries (incl. AUS, but not NZL) plus the Netherlands
- 4a: A Nordic group KV(Norway and Denmark),
  4b: a complementary Western European group (Portugal, Ireland),
- 5: New Zeeland, an isolated Economy.

- Procedure is different from prevailing studies in that it refers to one variable only – a capacity utilisation proxy – which is conceptually stationary, so that simple techniques (designed for cross sectional analyses) can be applied
- Notwithstanding its simplicity, the method produces intuitively appealing results

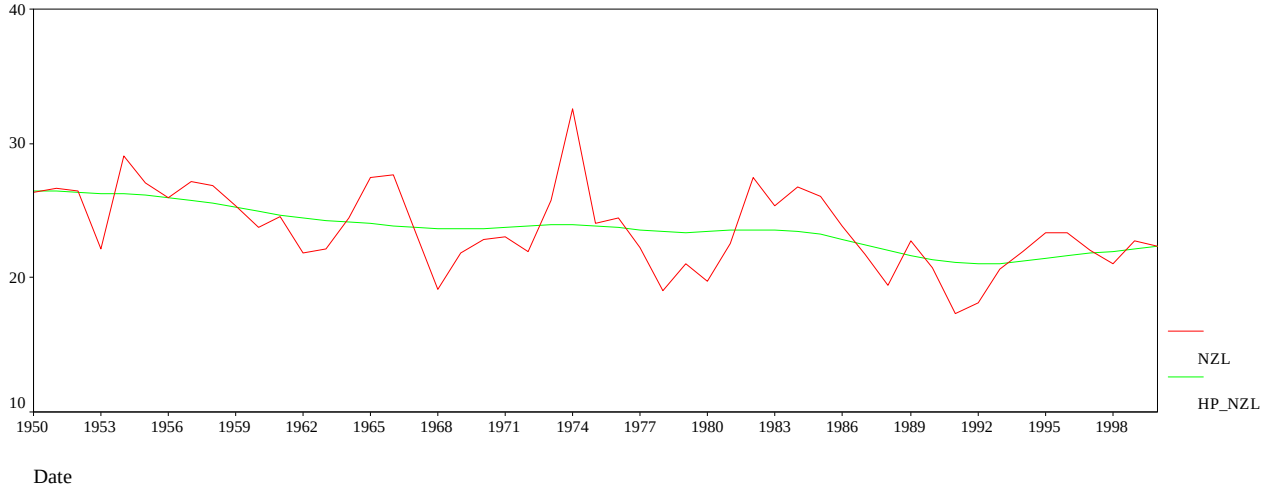
Details of Computation I

Starting point capital stocks: initial "equilibrium" investment: *i** (HP filtered)

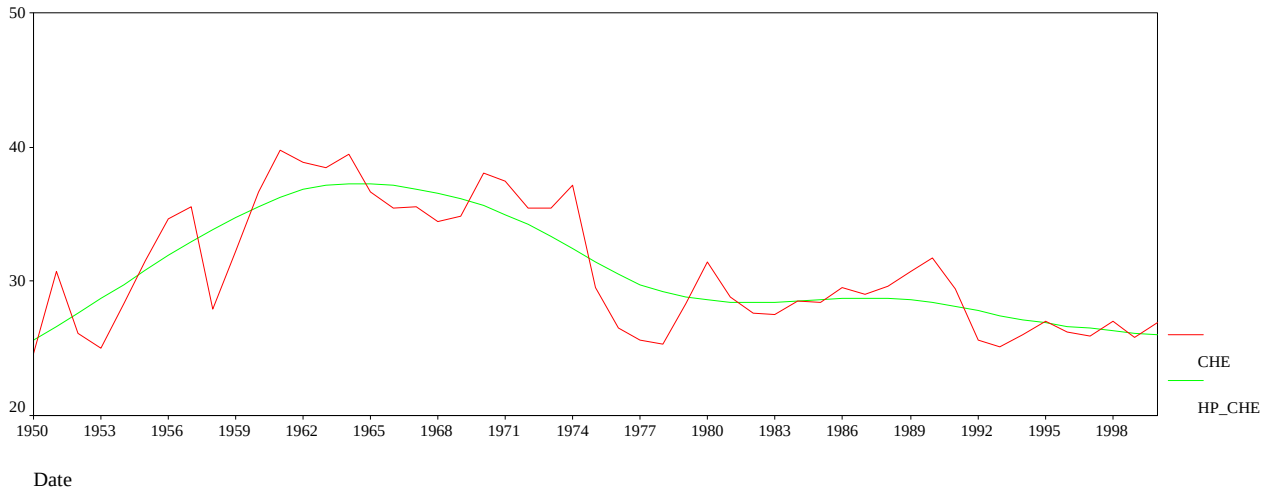
Australia



New Zealand



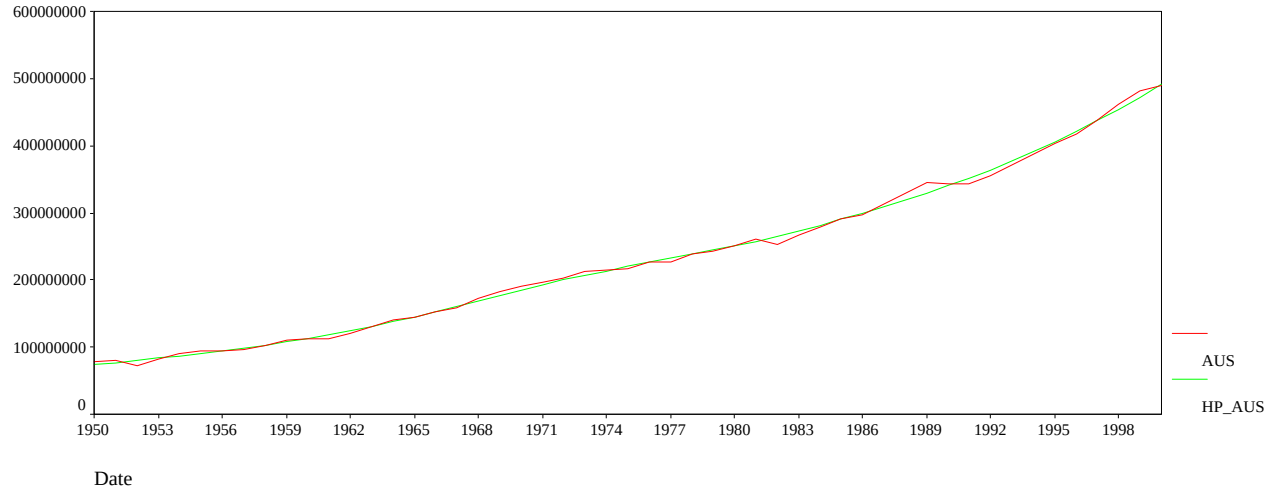
Switzerland



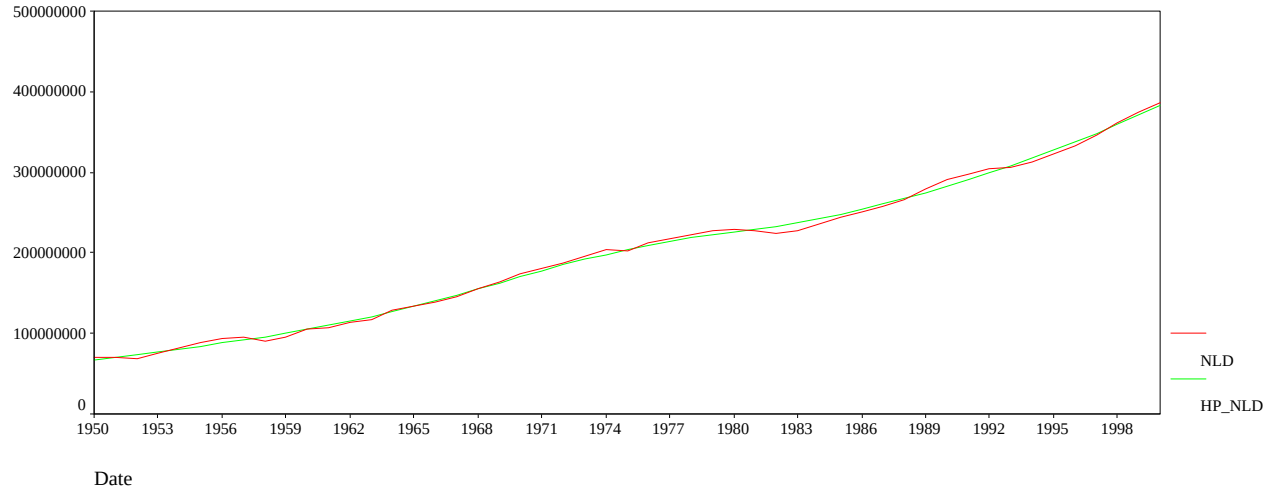
Details of Computation II

Starting point Y: initial "equilibrium" Y* (ln *Y* HP filtered and de-logged)

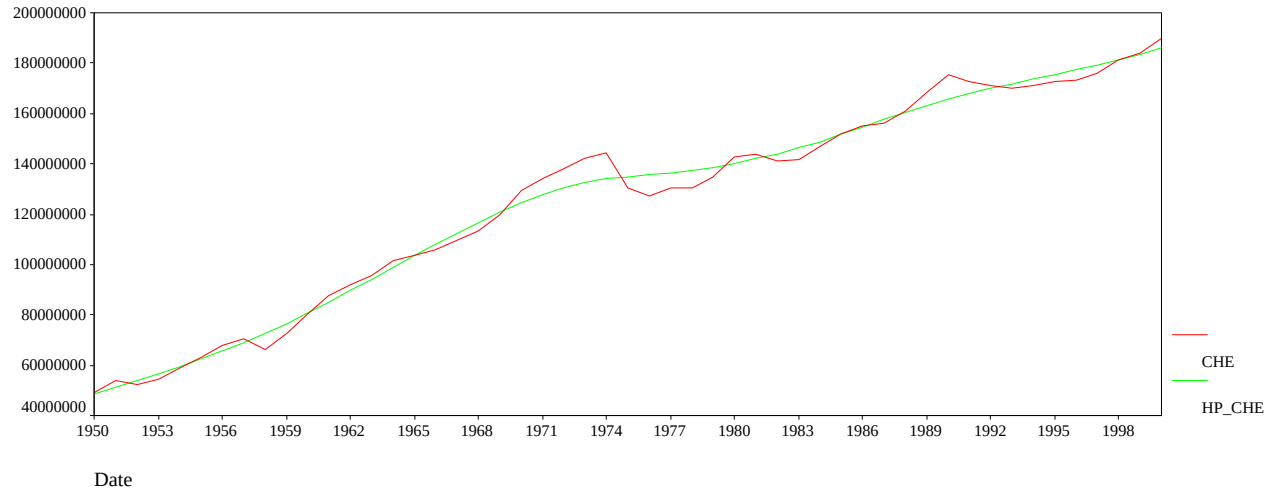
Australia



New Zealand



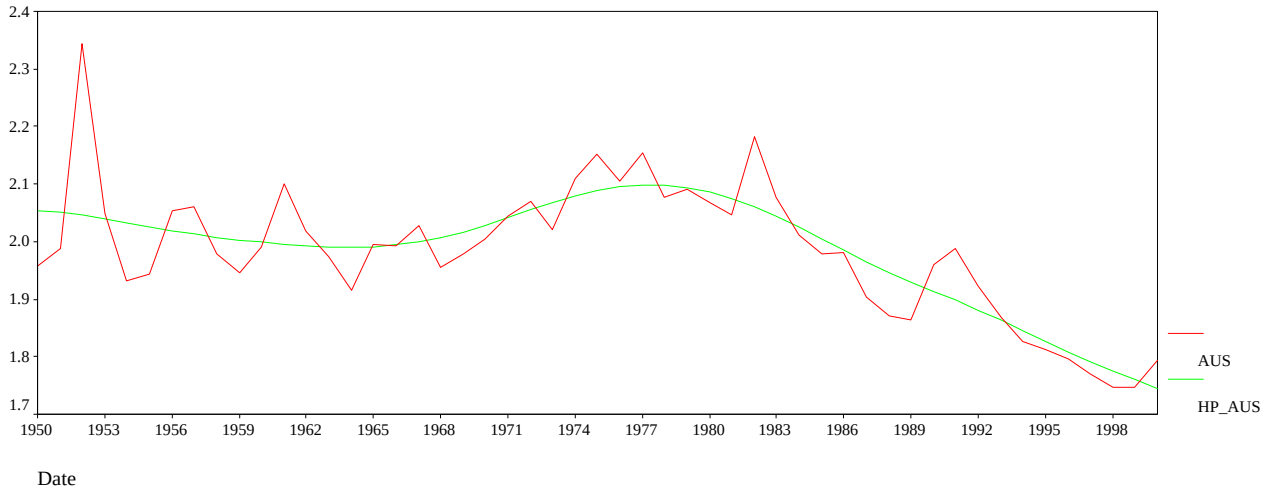
Switzerland



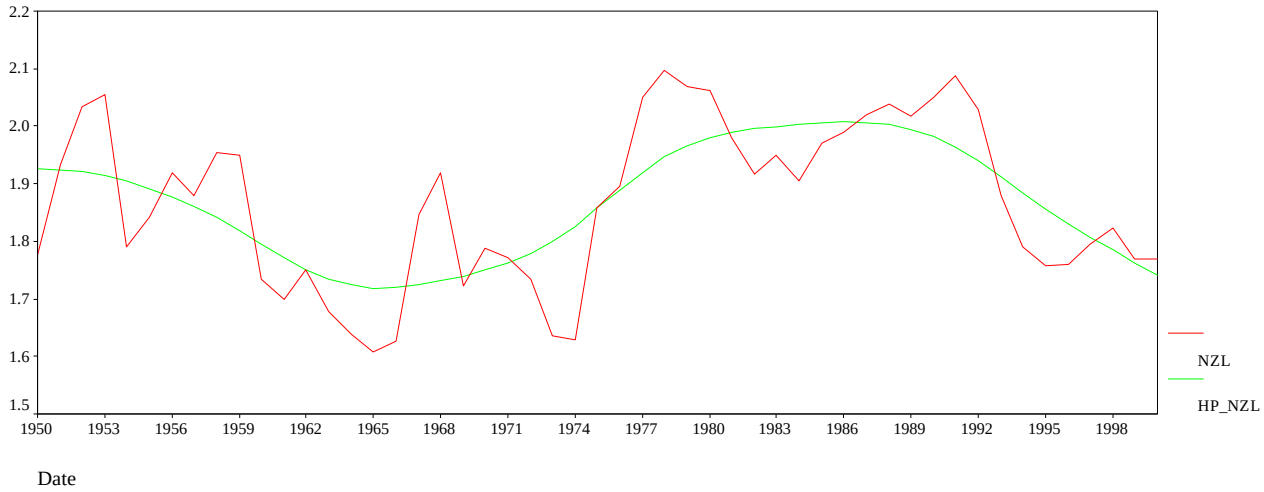
Details of Computation III

Capital coefficients $v = K/Y$, observed v and HP filtered v^*

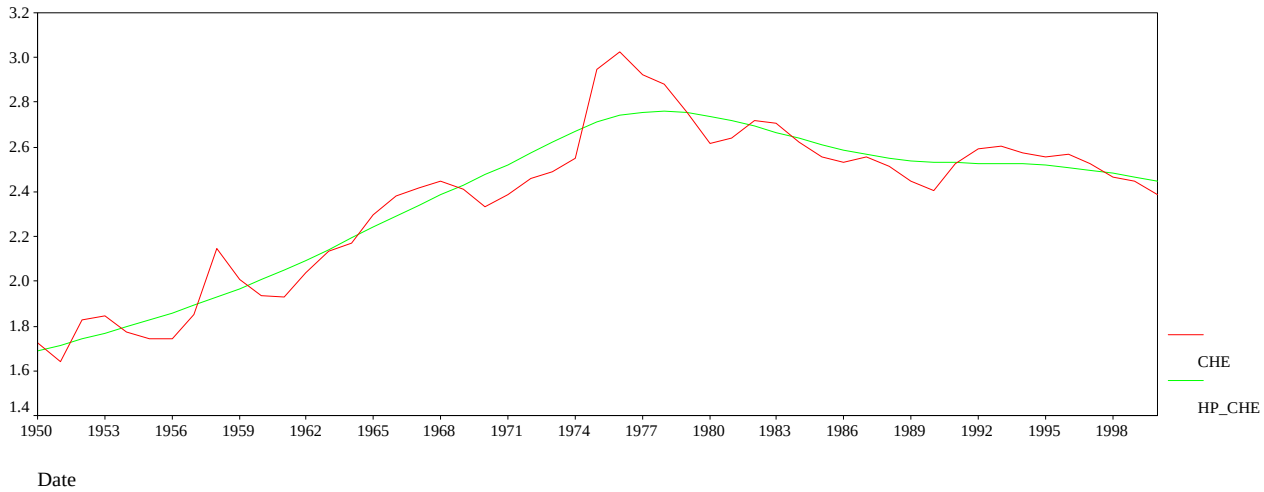
Australia



New Zealand



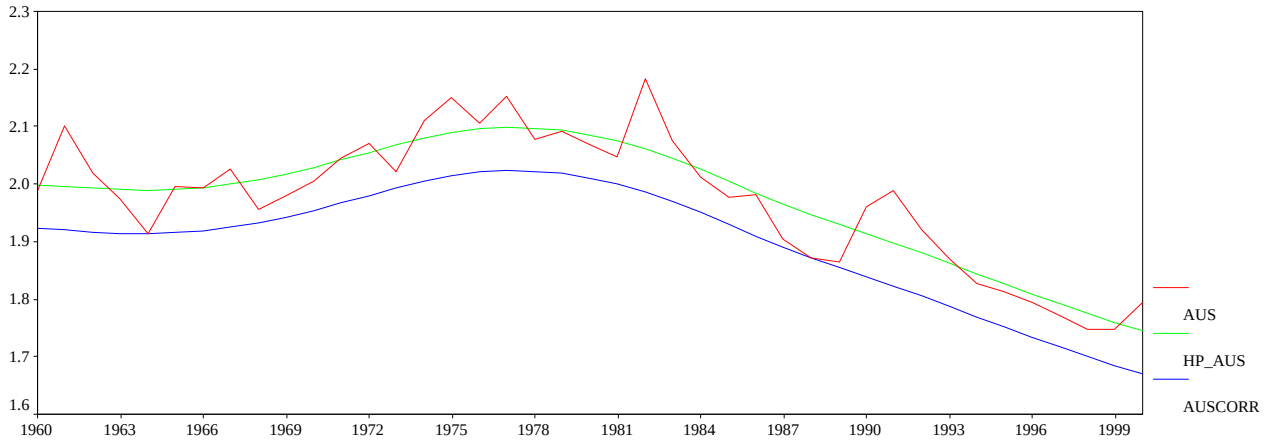
Switzerland



Details of Computation IV

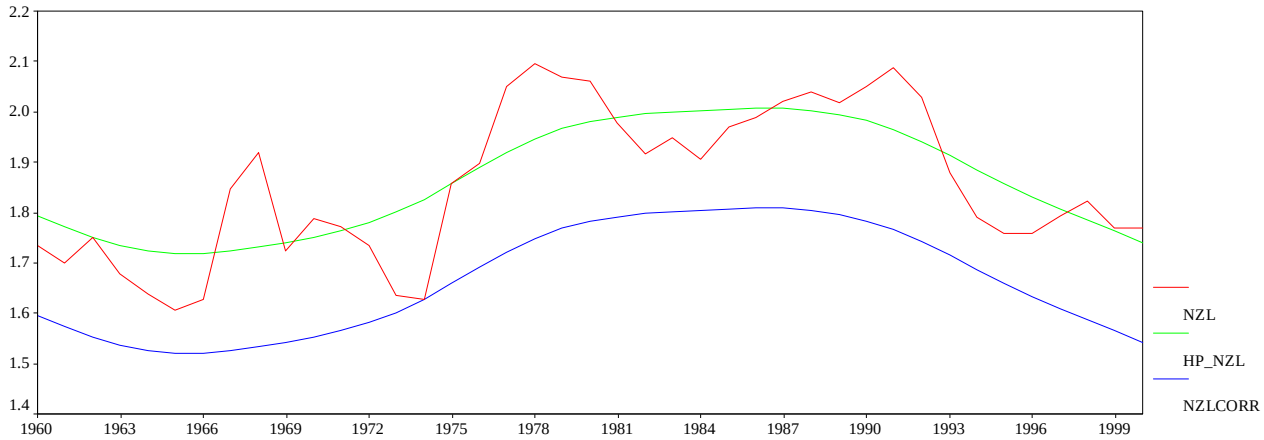
Capital coefficients 1960–2000: observed *v*, HP filtered *v** and minimum v^{min}

Australia



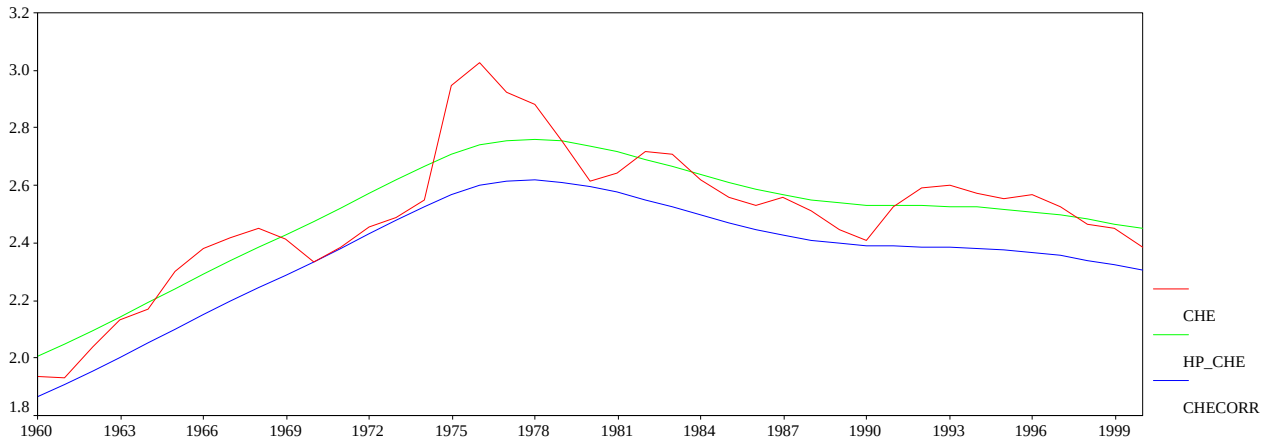
YEAR, not periodic

New Zealand



YEAR, not periodic

Switzerland

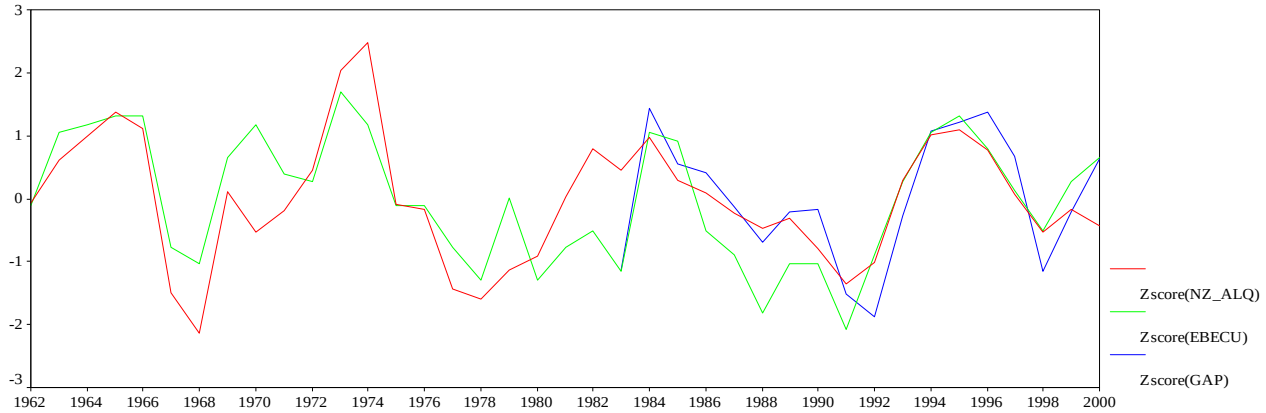


YEAR, not periodic

Details of Computation V

CU proxy compared with other key series for business cycle

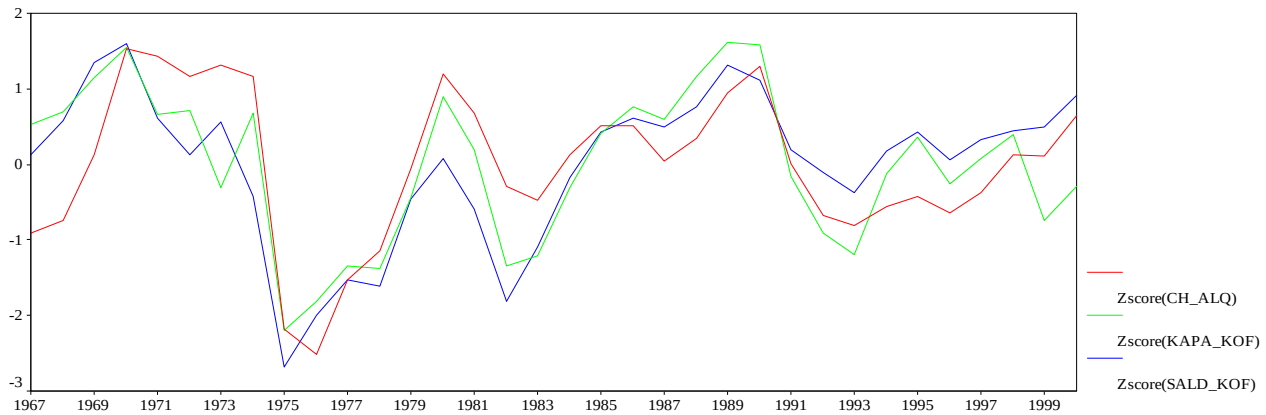
New Zealand: CU, capacity utilization (survey) and RBNZ MV filter output gap



Correlations (listwise N=18**)**

		EBECU	GAP
NZ_ALQ	Pearson Correlation	.774	.783
	Sig. (2-tailed)	.000	.000

Switzerland: CU, capacity utilization (KOF survey, percentage and balance indicator)



Correlations

		% Survey	Balance
CH_ALQ	Pearson Correlation	.750	-.705
	Sig. (2-tailed)	.000	.000

Details of Computation VI

Rotated Loading Matrix (coefficients < 0.5 suppressed)

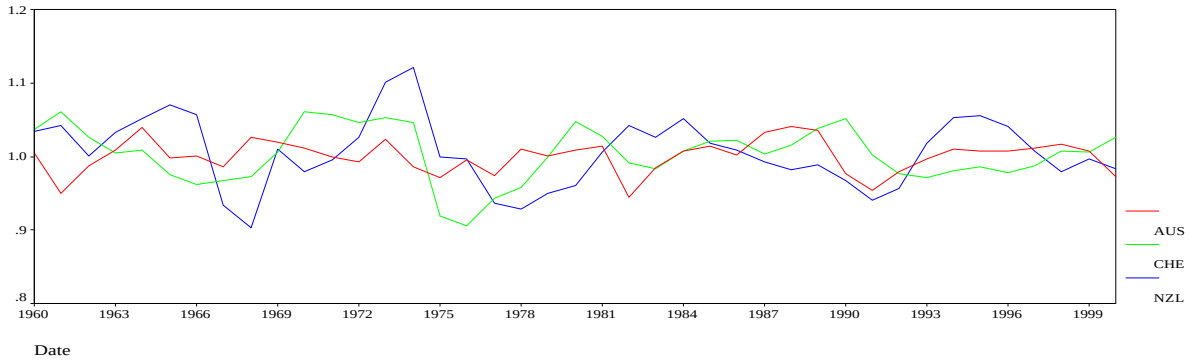
	Business Cycle Country Group				
	1	2	3	4	5
FIN	0.89				
SWE	0.83				
FRA	0.79				
ESP	0.69				
BEL	0.61				
TUR	0.55				
GER		0.89			
GRC		0.79			
AUT		0.78			
JPN		0.74			
CHE	0.57	0.66			
ITA		0.53			
USA			.89		
CAN			.78		
AUS			.74		
GBR			.72		
NLD			.58		
NOR				–0.75	
DNK				–0.53	
IRL				0.72	
PRT		0.55		0.69	
NZL					0.67

The identification of these clusters is suggested as a starting point for further explorations into the regularities as well as the causes of international cyclical co-movement (or the lack of it)

Details of Computation VII

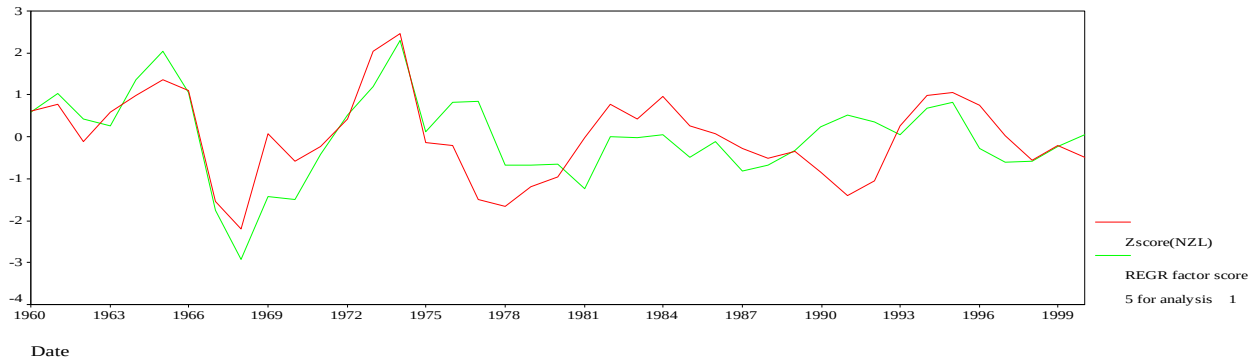
Capacity utilisation and common factors

CU: Australia, New Zealand and Switzerland: anything in common?



Australia: CU and factor 3

New Zealand: CU and factor 5



Switzerland: CU and factor 2