



## 1. Background: Basel gap

Difference between a country's credit-to-GDP ratio and its estimated long-term trend.

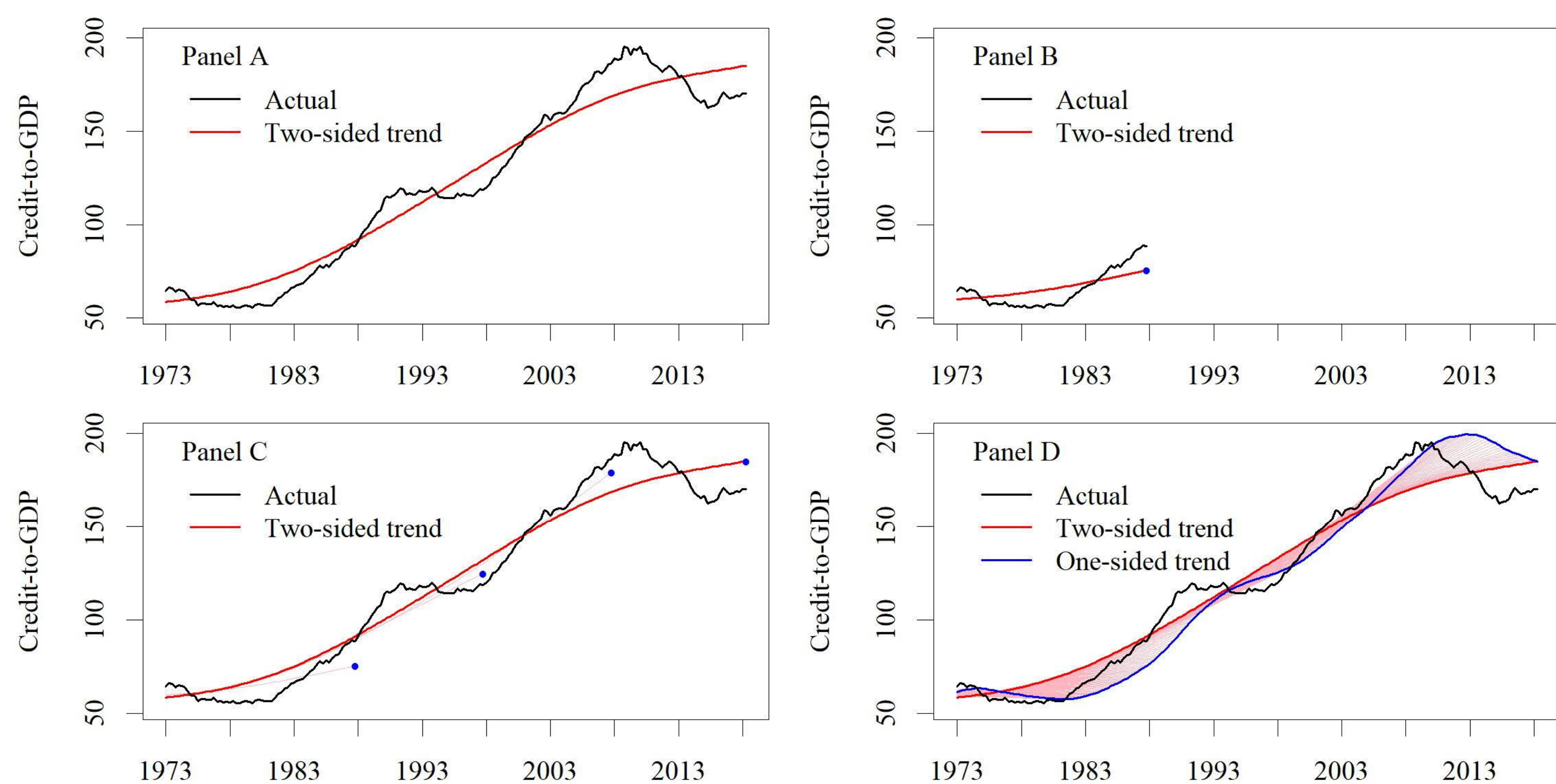
$$\text{Basel Gap} = \text{Credit-to-GDP ratio} - \text{Trend}$$

Used for setting countercyclical regulatory capital buffers under **Basel III**.

## 3. One-sided HP filter

Drehman et al. (2010): trend estimated by applying HP filter ( $\lambda=400,000$ ) to Credit-to-GDP ratio **recursively** and connect the endpoints:

Illustration: UK data (1973-2018)



The **recursively estimated one-sided trend** is visibly lagging the **Credit-to-GDP ratio**.

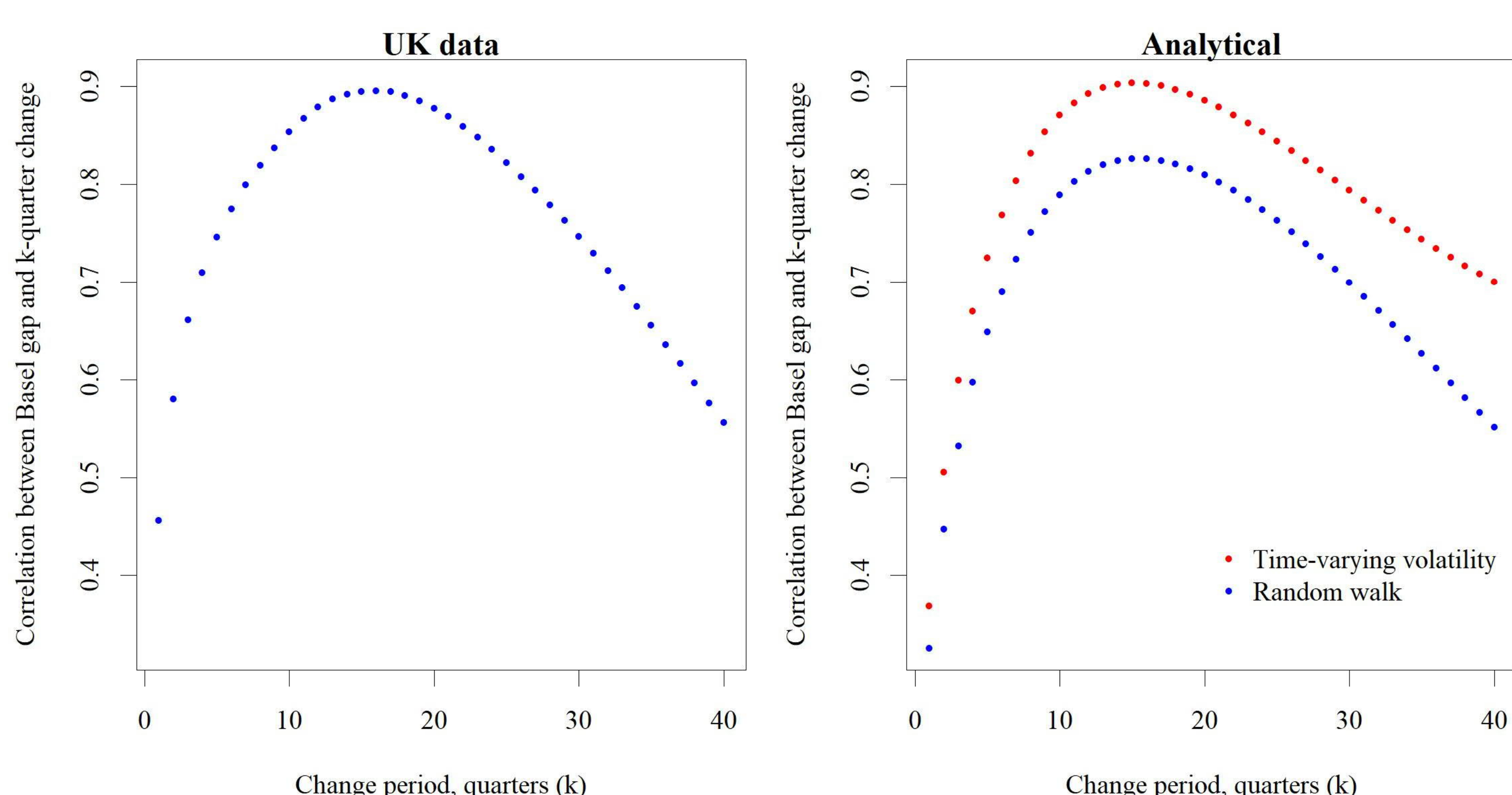
## 5. Analytical results

Correlation between deviation from trend and k-quarter difference maximized at  $k=16$ .

Left: UK data (1973-2018).

Right: analytical solution relying on Cornea-Madeira (2017), assuming underlying  $I(1)$  process (**random walk** or **random walk with time-varying volatility**).

Correlation breaks down when underlying process is  $I(2)$ .



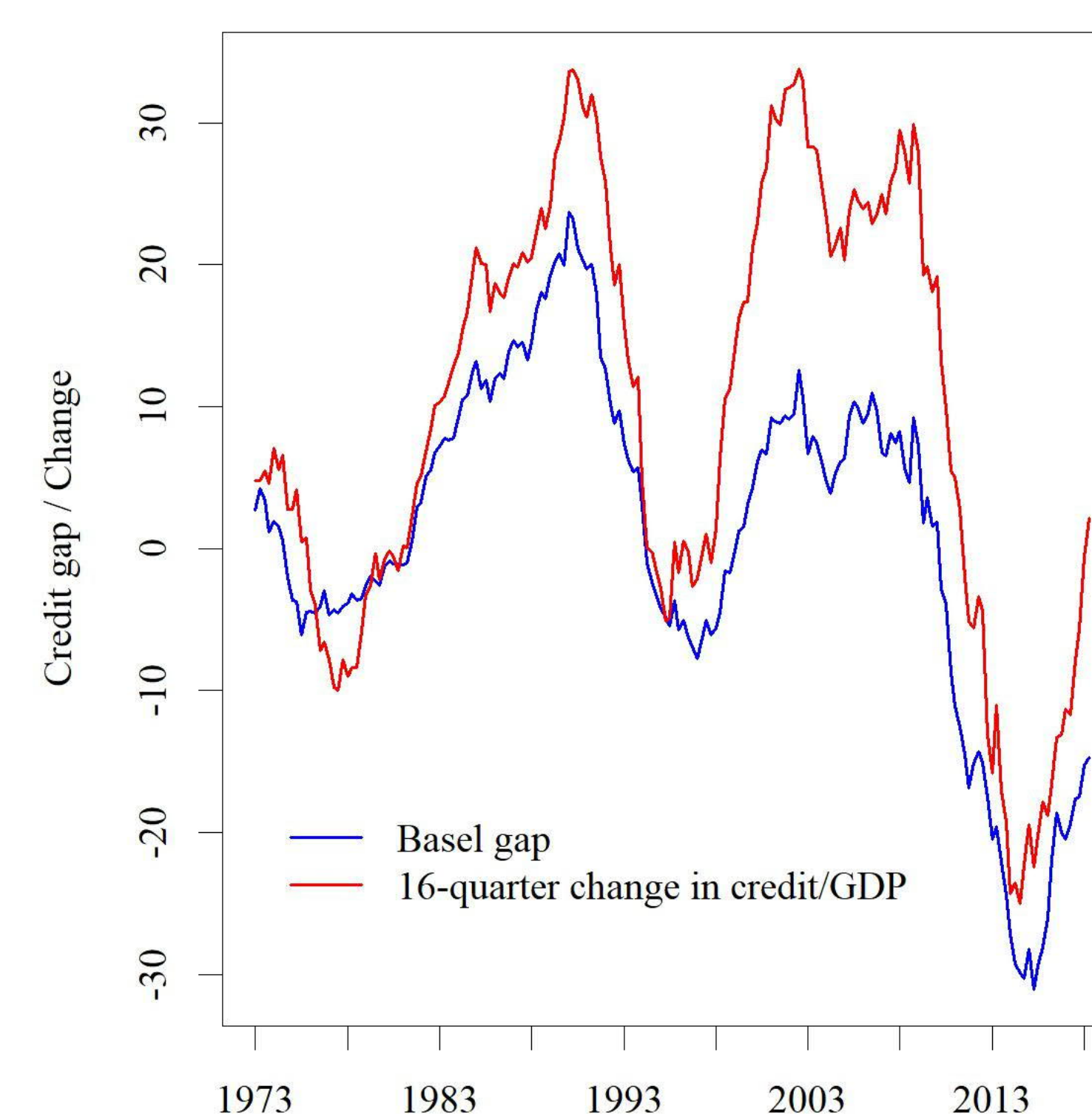
## 2. Contribution

Empirical: Basel gap is nearly equivalent to naive **16-quarter change** in credit-to-GDP ratio.

Analytical: one-sided Hodrick-Prescott (HP) filter applied to  **$I(1)$  process** generates mechanic relation between trend and lag.

## 4. Basel gap and 16-quarter change

The **Basel gap** (deviation from trend) is highly correlated with naive **16-quarter change in the Credit-to-GDP ratio**:



Correlation of **90%** between UK Basel gap and 16-quarter change in Credit-to-GDP ratio.

Both measures identify the same **credit cycles** (peaks and troughs).

## 6. International evidence

Correlation between Basel gap and naive change for 15 countries (*44 countries in paper*).

ADF test p-values demonstrate  $I(1)$  property of Credit-to-GDP ratio.

	n	k	cor(k)	cor(16)	ADF tests	
					Level	Change
Austria	231	17	0.94	0.94	0.51	0.00
Australia	233	16	0.89	0.89	0.92	0.00
Canada	251	17	0.93	0.93	1.00	0.00
Switzerland	231	17	0.90	0.90	0.97	0.00
Germany	231	19	0.95	0.94	0.18	0.00
Denmark	207	17	0.96	0.96	0.69	0.10
Finland	191	17	0.93	0.93	0.91	0.00
United Kingdom	222	16	0.90	0.90	0.90	0.00
Italy	231	13	0.93	0.92	0.44	0.09
Japan	215	14	0.90	0.89	0.35	0.08
Netherlands	230	12	0.88	0.86	0.87	0.00
Norway	231	17	0.90	0.90	0.88	0.00
Portugal	231	15	0.95	0.95	0.49	0.01
Sweden	230	16	0.92	0.92	0.99	0.00
United States	266	18	0.96	0.95	0.60	0.01
Median		17	0.93	0.92	0.87	0.00

## 7. Conclusion

The Basel gap relies on a seemingly sophisticated filtration method that is needlessly complicated and obscure. A naive change in the credit-to-GDP ratio identifies nearly identical credit cycles.