GENEVA GRADUATE INSTITUTE | INTERNATIONAL ECONOMICS

What Drives Long Term Interest Rates? Evidence from the Entire Swiss Franc History (1852-2020)

Niko Hauzenberger
Univ. of Salzburg, SCEUS

Daniel Kaufmann
Univ. Neuchâtel

Rebecca Stuart
Univ. Neuchâtel

Cédric Tille
Graduate Inst., CEPR

EEA / ESEM annual meeting, Milano, August 25, 2022

Motivation

- Several challenges from the downtrend in nominal and real interest rates since the 1980's:
  - Conduct of monetary policy, risks on financial stability.
  - Ability of pension funds to deliver on commitment.
- Most research has focused on large economies (especially U.S.) in recent decades.
- How about smaller countries, on a very long sample?
  - Switzerland, as a «safe haven». But was not always so.
- Taking a long view is challenging.
  - Scarce historical data are for Switzerland, especially before 1900.
  - Measurement errors, especially in inflation.
  - Structural shifts (such as change in FX regime).

What we do and find

- Construct data of short- and long-term interest rates for Switzerland since 1852, using novel archival data.
  - Long-term rates were previously unavailable even annually.

- Extract trend components using time-varying parameters VAR.
  - Historical decomposition of drivers of long-term rates.
  - Inflation expectations, term spread, foreign interest rates, cross-country spreads.
  - Connection between inflation (level and volatility) and spreads.

- Various phases.
  - Risky Switzerland until WWI.
  - Low interest rate island until early 21st century, not since.

(Brief) literature

- Trend decrease in natural real interest rate (r*).
  - Reliance on DSGE model (Laubach and Williams 2003, 2016).
  - Long perspective (Del Negro et al. 2019, Fiorentini et al. 2018).

- Historical analysis of Switzerland.
  - Challenges from mismeasurements (Kaufmann 2020).
  - Limited early data (Kaufmann 2019).
  - Swiss «low interest rate island» since WW1 (Kugler and Weder di Mauro 2002,4, Cunat 2003, Baltensperger and Kugler 2016).

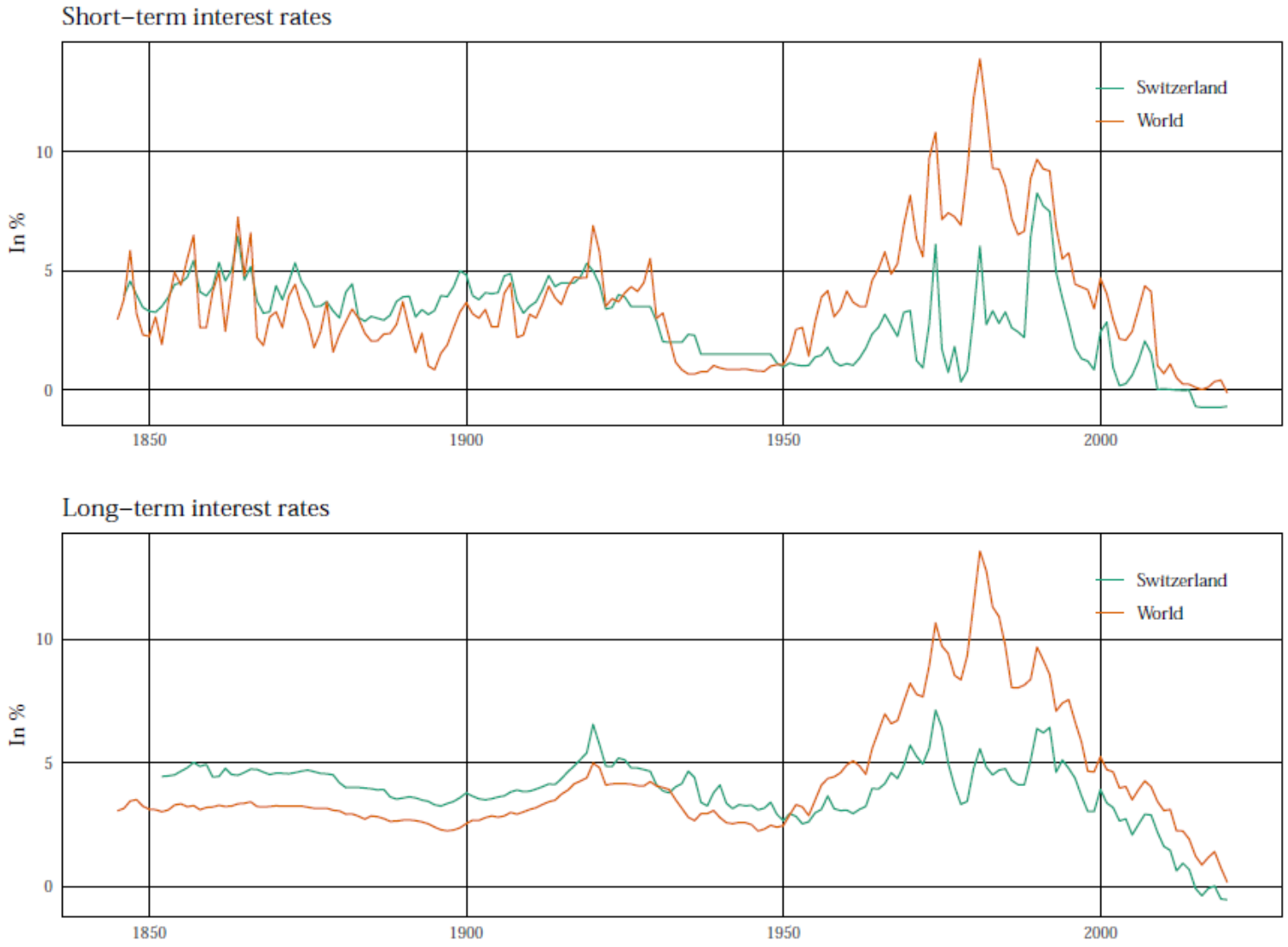
- Methodological literature.
  - Time-varying VAR (Primiceri 2008), allowing for rapid changes in parameters (Huber et al. 2019)

19th century data

- Interest rate and inflation data available for «rest of the world».
  - United Kingdom until 1914 (Thomas and Dimsdale 2017).
  - Equal average of UK and United states from 1914 to 1963 (NBER macrohistory).
  - Trade-weighted measures across Switzerland's partners since 1963 (OECD, SNB).
- Swiss data in the 19th century are scarce, non-existent, and of limited frequency and precision.
- Hand collection from several archival sources: *Basler Börse*, *Bourse de valeurs de Genève*, *Neue Zürcher Zeitung*, and more.
  - End of month values for short-term discount rates, exchange rates, bond prices (Cantonal and Confederation bonds).
  - Splice estimates from different sources.

Short- and long-term rates

- Higher Swiss rates until WWII, then reversal.

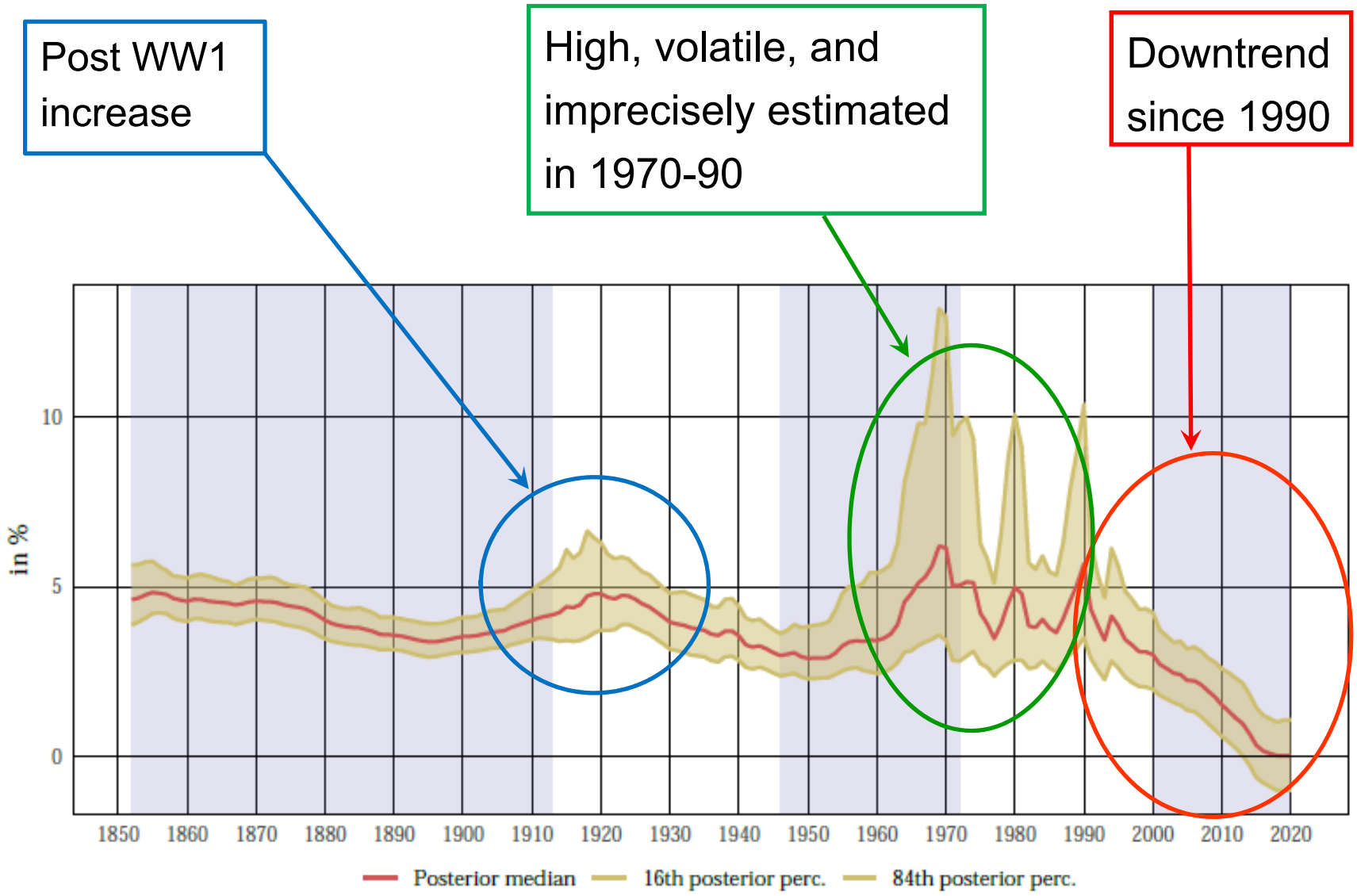


Extracting trends

- Usual theory-based approach based on general equilibrium model.
  - Challenging with historical data: several regime changes (Bretton Woods, floating exchange rates).
- Statistically-based approach using time-varying parameters VAR of inflation, exchange rates, interest rates.
  - Usually: impose smooth transition of parameters.
  - Instead: we allow for few but rapid transition (Huber et al. 2019).
- Trends: long run values from the VAR, once the dynamics given parameter values have played out.
  - Time varying parameters imply time varying trend values.

- Consider Swiss long-term nominal rate and several decompositions

Nominal long-term rate trend

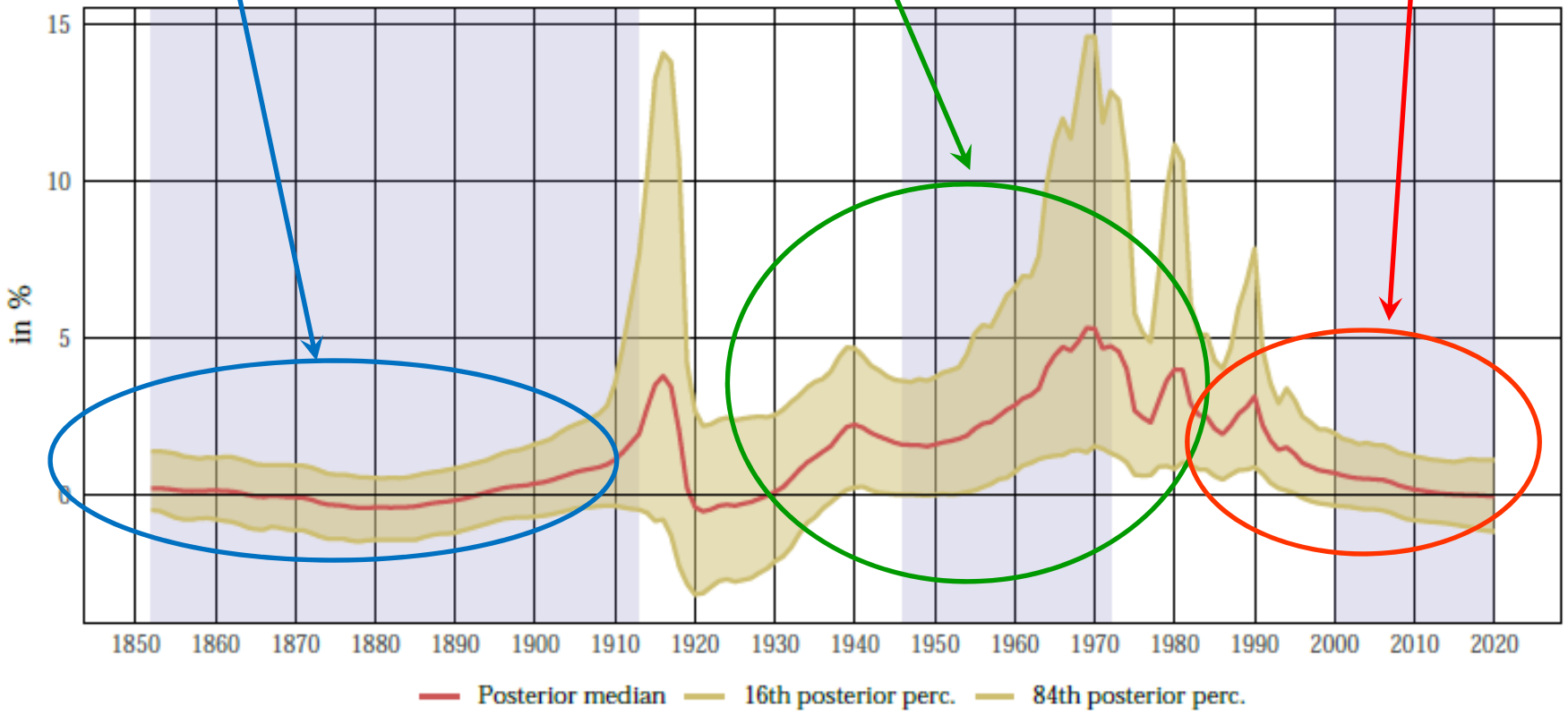


Inflation trend

Low and stable trend inflation

Increase in Great Depression and in 1970-1980

Stable and low



Decomposition of trends

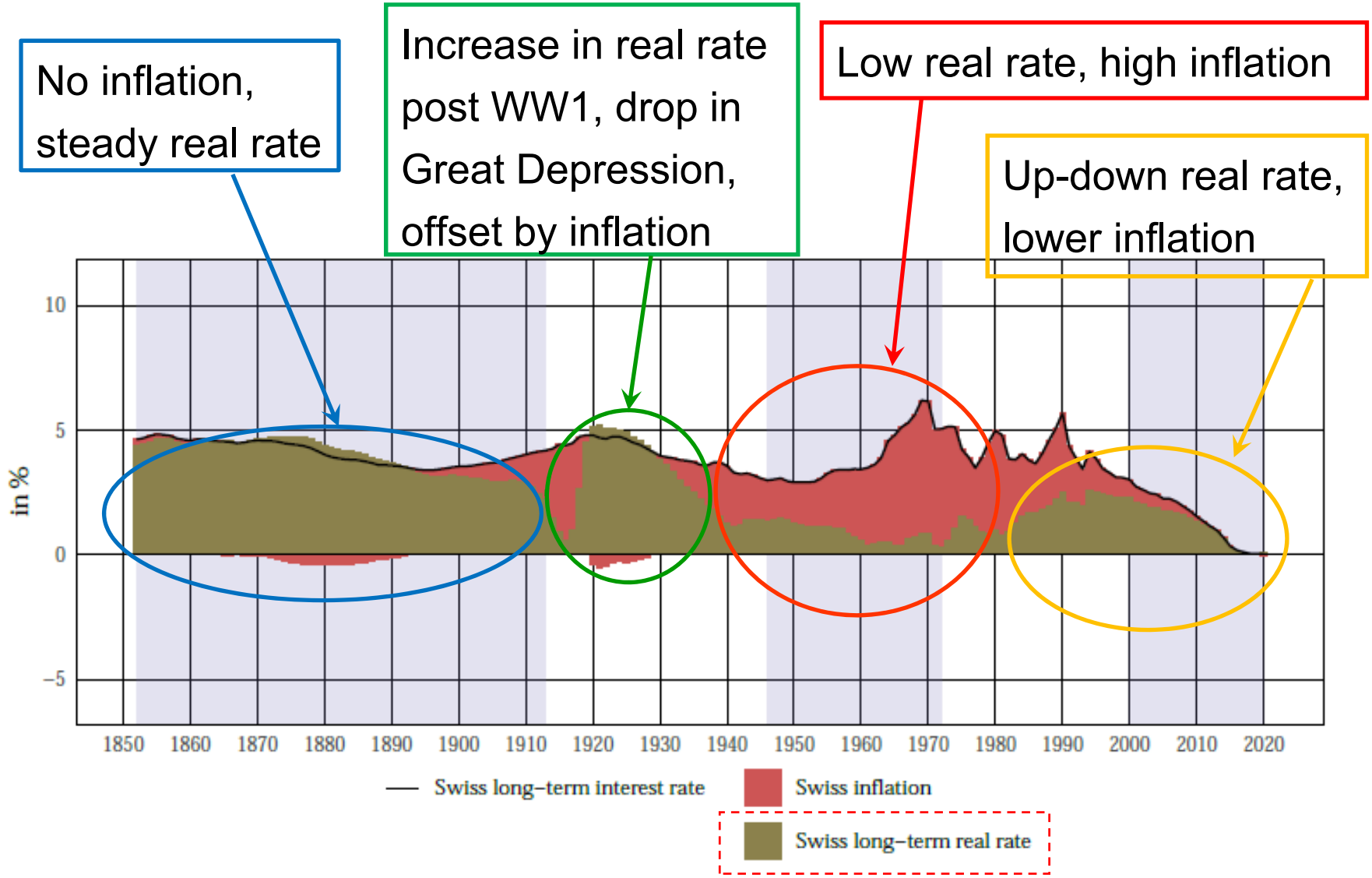
- 4 ways to split the Swiss long term nominal interest rate

$i^l = \pi + r^l$	Inflation + real long rate
$i^l = \pi + s^{term} + r^s$	Inflation + term spread+ real short rate
$i^l = \pi + s^{term} + r^{s,w} + \underbrace{diff^{s,CH-W}}_{r^s - r^{s,w}}$	Inflation + term spread+ World real short rate + CH-W short differential
$i^l = \pi + s^{term} + r^{s,w} + \underbrace{UIP\_dev}_{r^s - r^{s,w} - depr^{real}} + \underbrace{PPP\_dev}_{depr^{real}}$	Inflation+ term spread + World real short rate + UIP deviation + PPP deviation

- UIP deviation: + = high Swiss interest rate.
- PPP deviation: + = real trend depreciation of Swiss franc.

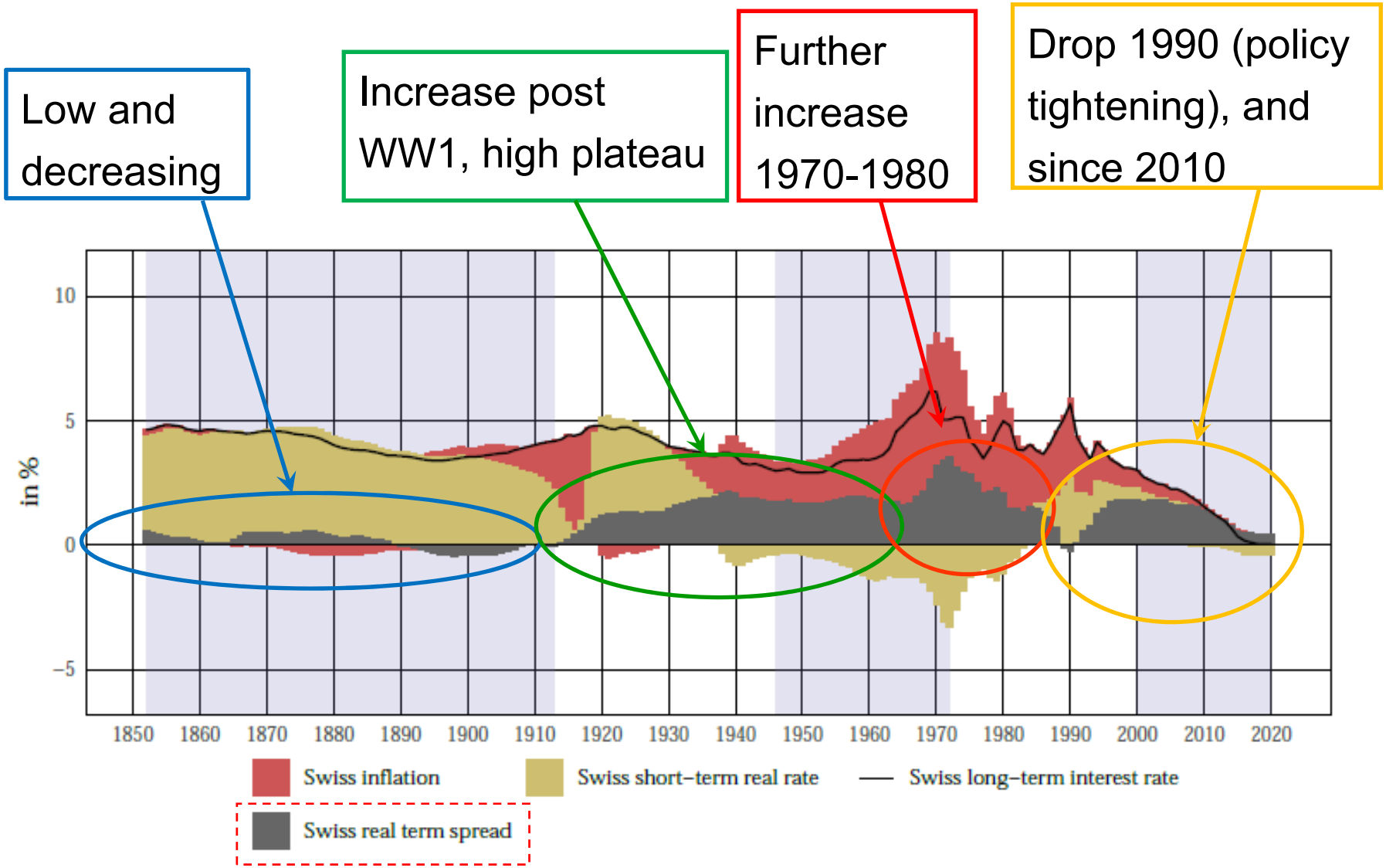
Decomposition 1: inflation and real

- Early reduction in real rate, offset by rising trend inflation.



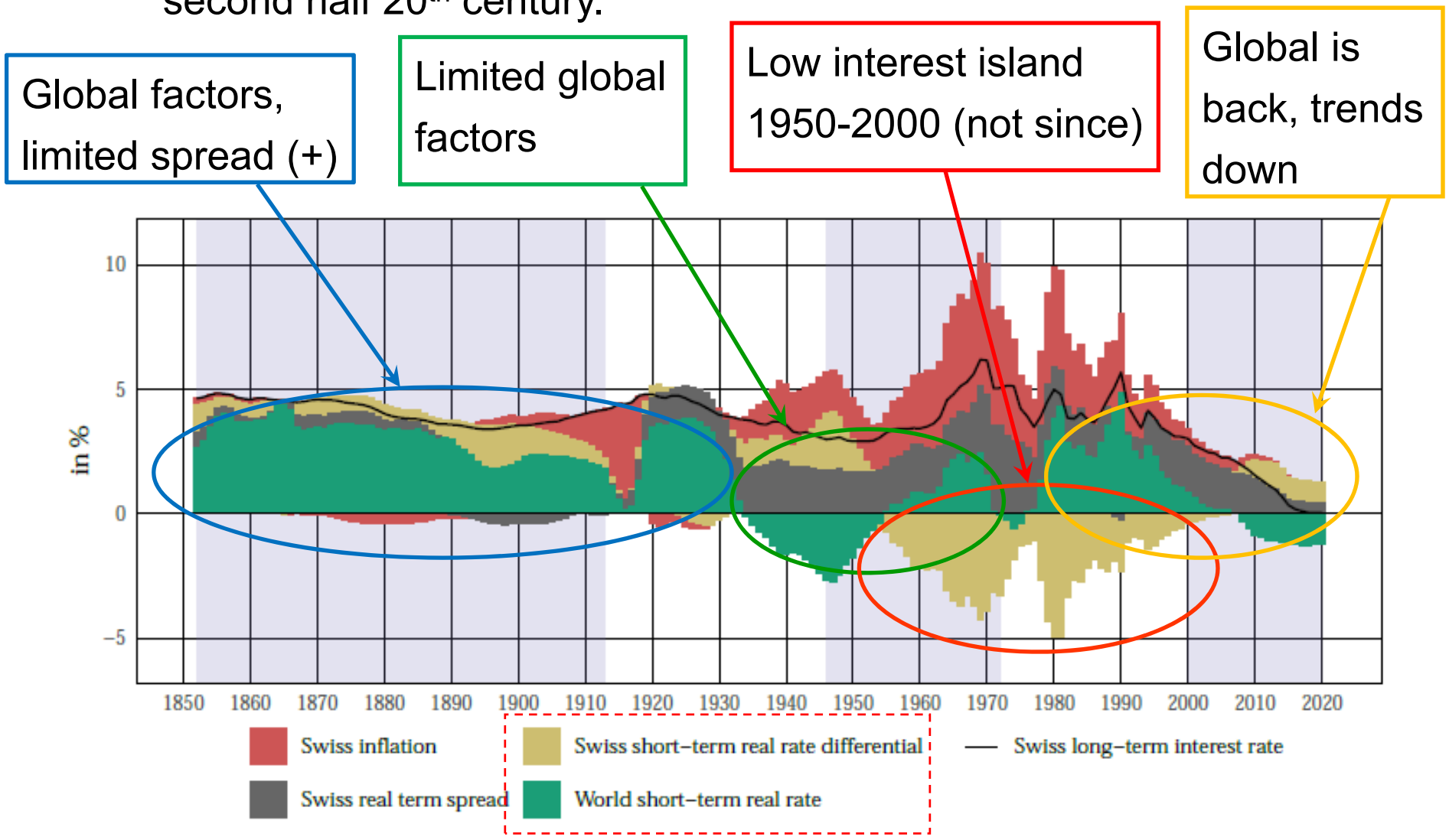
Decomposition 2: term spread

- Increase in terms spread since WW1 until recently.



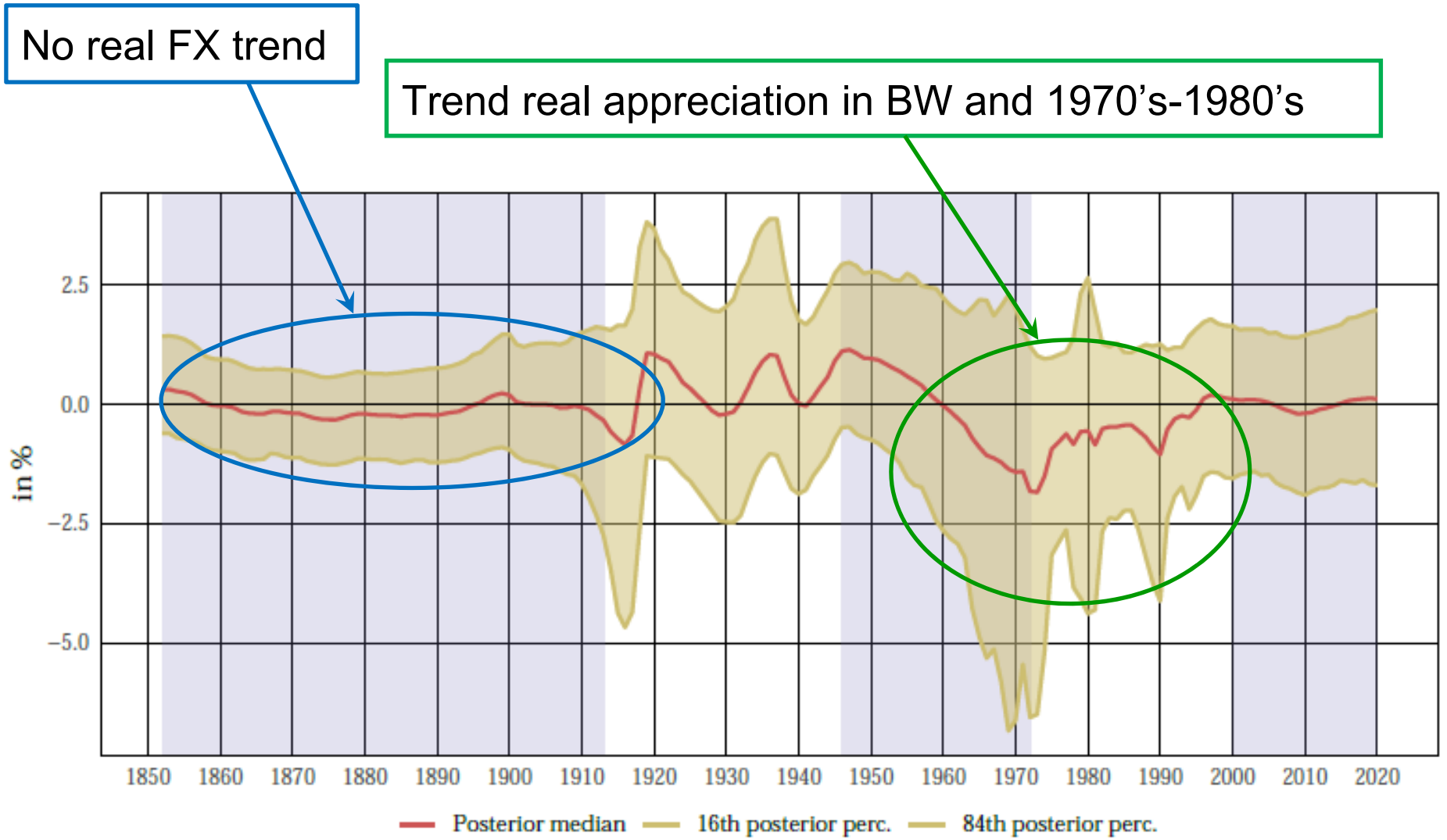
Decomposition 3: global and foreign spread

- Foreign short-term real rate mattered early on, negative spread in second half 20th century.

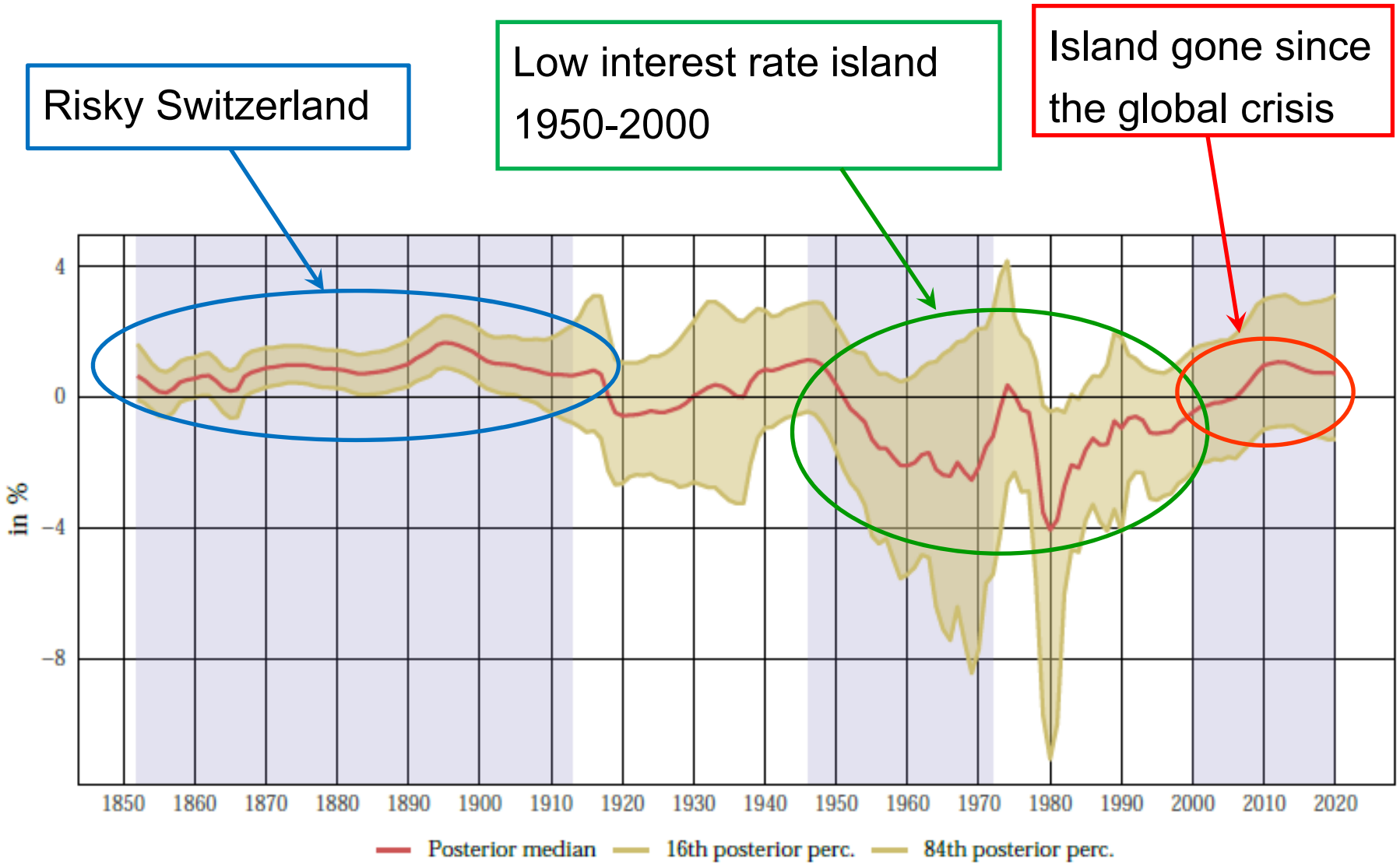


Decomposition 4a: deviations from PPP

- Trend appreciation in Bretton Woods and late 20th century.



Decomposition 4b: deviations from UIP



Relation with inflation volatility

- Are the term spread, international interest rate difference, and UIP gap, linked to inflation?
  - Level of inflation (higher is more uncertain).
  - Inflation volatility estimate from TVP-VAR.
  - Confidence band of our estimates.

- Positive (but not significant) relation overall.

- Distinguish by monetary regimes.
  - Positive and significant during Bretton Woods for term spread and UIP deviation.

Conclusion

- Long perspective on drivers of Swiss interest rates.
- New dataset from archival sources.
- Extraction of time-varying trends, and decomposition of drivers of interest rates.
  - Gold standard: Switzerland in line with rest of the world, but viewed as riskier.
  - Interwar and 1970-1980's: higher trend inflation, decrease in real interest rate, positive term spreads, low interest rate island (since WW2).
  - Since 2000: normalisation, end of low interest island (other countries become more similar to Switzerland).

Extra slides

Spreads and inflation volatility

(a) Without interaction terms

	Term spread			Interest rate differential			Deviation from UIP		
	INF	IQR	UCV	INF	IQR	UCV	INF	IQR	UCV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Uncertainty	0.36*	0.24	0.07	0.61	1.05	0.45	0.55	0.76	0.33
	(0.21)	(0.35)	(0.23)	(0.74)	(0.64)	(0.34)	(0.51)	(0.48)	(0.29)
Constant	0.61	0.43	0.57	0.33	0.14	−0.05	0.36	0.14	0.01
	(0.81)	(0.98)	(1.68)	(0.85)	(0.90)	(0.85)	(0.79)	(0.62)	(0.81)
N	169	169	169	169	169	169	169	169	169
R^2	0.34	0.19	0.04	0.15	0.20	0.19	0.19	0.16	0.15
Adjusted R^2	0.34	0.19	0.04	0.15	0.20	0.18	0.18	0.15	0.15

Spreads and inflation volatility

(b) With interaction terms

	Term spread			Interest rate differential			Deviation from UIP		
	INF	IQR	UCV	INF	IQR	UCV	INF	IQR	UCV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Uncert. x Metallic reg.	−0.58**	−0.60**	−0.17	0.46	−2.94	−0.10	1.33	−2.69	0.08
	(0.27)	(0.29)	(7.84)	(1.65)	(1.83)	(0.57)	(1.59)	(2.13)	(0.77)
Uncert. x World Wars	0.29	0.02	0.01	−1.10	0.56	0.12	−0.06	0.44	0.02
	(0.50)	(0.14)	(3.92)	(1.05)	(0.87)	(0.33)	(0.93)	(1.04)	(0.48)
Uncert. x Bretton Woods	0.43***	0.22*	0.11	0.57	1.44	0.97	0.67	1.13**	0.86*
	(0.16)	(0.12)	(7.91)	(1.35)	(1.33)	(1.04)	(0.92)	(0.56)	(0.45)
Uncert. x Monetary targ.	0.37	0.15	0.07	0.93	1.27**	0.82	0.71	0.91	0.60
	(0.23)	(0.17)	(10.08)	(0.64)	(0.61)	(0.56)	(0.65)	(0.70)	(0.53)
Uncert. x Inflation targ.	2.18**	0.07	0.02	−0.19	−1.39	−0.23	−0.13	−1.28	−0.20
	(0.96)	(24.04)	(254.46)	(0.61)	(2.45)	(0.91)	(0.60)	(2.60)	(1.09)
Constant	0.58	1.14**	1.17	0.15	−0.07	0.20	0.23	−0.04	0.22
	(0.41)	(0.45)	(61.78)	(0.64)	(0.60)	(0.62)	(0.65)	(0.81)	(0.97)
N	169	169	169	169	169	169	169	169	169
R^2	0.54	0.64	0.64	0.32	0.38	0.32	0.31	0.35	0.28
Adjusted R^2	0.52	0.62	0.63	0.30	0.36	0.30	0.29	0.33	0.26