

Domestic and international financial integration in Switzerland, 1846-1893

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A stylized, line-art illustration of a building facade, likely representing a university building. It features a central entrance with a clock tower on the right side. The drawing is composed of simple lines and light blue and grey shading.

- Part of a wider project collecting and studying Swiss financial market data in the 19th century.
- Collect monthly discount rates of the most important Swiss financial and trade centers.
- Relate domestic financial market integration before and after the introduction of the Swiss franc to important historical events.
- Measure international financial market integration (Bank of England [BoE] and Banque de France [BdF]).

- Swiss franc one of the oldest currencies still in use (introduced 1850).
 - Surprisingly little data collected on the 19th century.
 - Usually annual if available.
- Establishment of modern Swiss Confederation followed by the creation of a monetary system.
 - Modelled on the French system, but various changes over time in response to crises.
- Early Swiss monetary union resembles euro area (somewhat).
 - Debt mostly issued at cantonal level (more federal debt late 1860s).
 - Role of federal government limited (continuously extended).
 - Segmented banking system (continuously more strongly regulated).

Historical background

Early 1850s: Domestic integration

- 1848: Founding of the modern Swiss confederation (Federal Constitution). Coins only to be minted by Confederation. Note issue not regulated. Progress in Swiss economic union (e.g. removal of internal tariffs).
- 1850: Federal Coinage Act, introduction of silver Swiss franc (4.5 grams).
- 1851-1852: Redemption of old coins (35 issuers, 330 types) into Swiss francs (Niederer, 1965).

1860s: International (and some domestic) integration

- 1860: Revision of the Coinage Act, recognizing French gold and silver coins as legal tender (move to Bimetallism).
- 1864: Agreement of banks in SG, ZH, BS to accept banknotes at par.
- 1865: Switzerland, France, Belgium and Italy establish Latin Monetary Union.

1870s: Disintegration, both domestic and international

- 1870: Franco-Prussian War. Sharp rise in BdF discount rate, capital controls in France. “Geldcrisis” in Switzerland (liquidity shortage).
- 1870: Acknowledging US Dollar and English Sovereign as legal tender.
- 1874: Amendment of Federal Constitution to unify banknotes and ensure acceptance at par. But rejected by the people in 1876.
- 1876: Agreement between 20 (later 28) banks (“Konkordat”). Convertibility of notes above CHF 50 at par. Central clearing bank (in ZH).

1880s: Domestic integration

- 1881: Banknote Act requires convertibility of all banknotes at par. Minimum reserve requirement.
- 1882: Agreement to create an external clearing to facilitate convertibility.

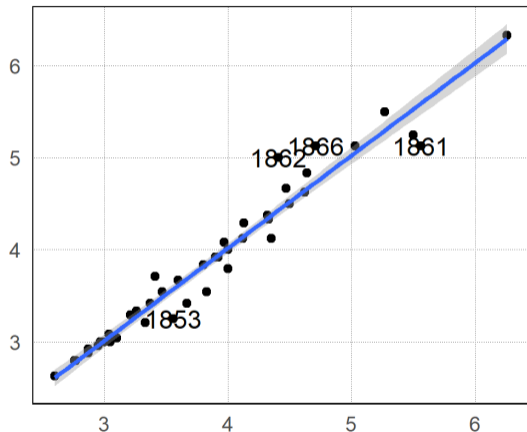
Data

- Discount rates of banks of issue in Zurich, St. Gallen, Basel, and Geneva.
 - Most important banks of issue in the most important economic centers.
- Newspapers, quotation sheets of stock exchanges, commemorative studies.
- Before 1860:
 - Basel: Kursblatt der Basler Börse.
 - Zurich: NZZ, Eidgenössische Zeitung.
 - Geneva: Journal de Genève, annual reports of the Banque du Commerce de Genève.
 - St. Gallen: St. Galler Zeitung and Tagblatt der Stadt St. Gallen.
- Missing values:
 - Information on annual average and number of changes (Jöhr, 1915).
 - Linear interpolation.
 - Very few missing years (Basel 1846, 1847) replaced by annual average.

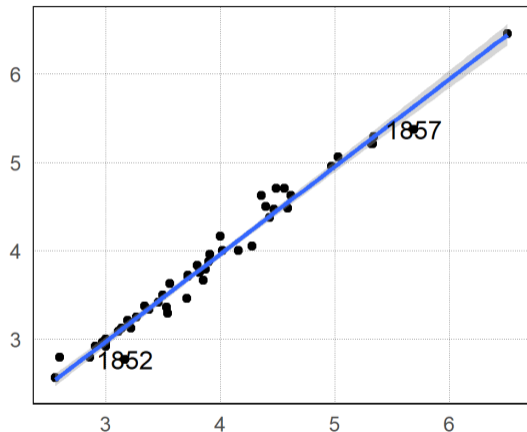
- 1860 to 1883: data on all four cities from the NZZ.
 - We filled some missing months with information from quotation sheets and various newspapers.
- 1884 to 1893: data on all four cities from Zürcher Kursblatt.
 - A few missing observations were added using the NZZ.
- No interpolations were needed during later periods.
- Last available value of the month.
- Start date: 1846, first year where we have information on all cities.
- End date: 1893, only one common discount rate for all banks of issue.

Comparison with annual data from Jöhr (1915)

Geneva



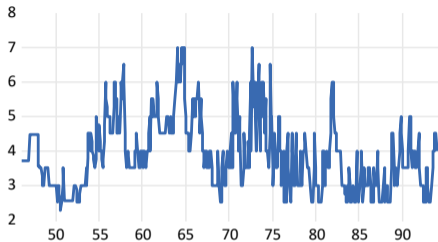
Basel



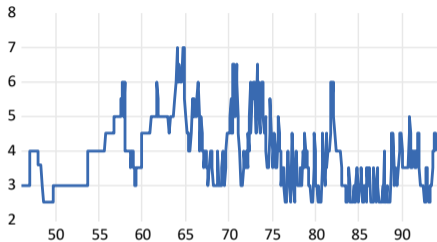
Linear regression line in blue with 95% confidence interval in grey. Labelled observations deviate more than 0.3pp from Jöhr's data in absolute value.

Monthly discount rates 1846-1893

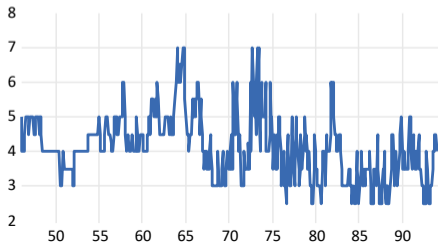
Basel



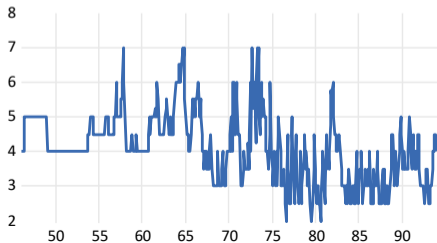
Geneva



St Gallen



Zurich



Financial integration regimes

- Our preferred measure of dispersion of discount rates $r_{i,t}$ across cities i (root-mean-squared deviation):

$$RMSD = \sqrt{\frac{\sum_{i=1}^N (r_{i,t} - \bar{r}_t)^2}{N}}$$

- Structural break test of average dispersion c (Bai, 1997):

$$RMSD_t = c + \varepsilon_t$$

- Identify four breaks: Sep 1853, May 1861, Aug 1869, Aug 1881

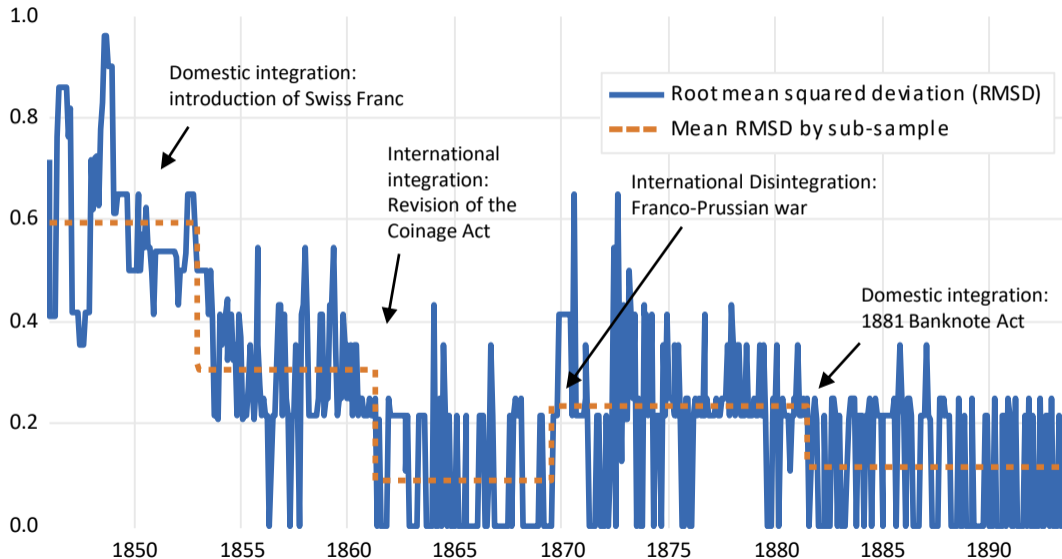
1. Range of the data.
2. Standard deviation.
3. Mean absolute deviation (MAD_{mean}).
4. Median absolute deviation (MAD_{med}).
5. Max deviation from mean (MAX_{mean}).
6. Maximum deviation from median (MAX_{med}).

Correlation coefficients, 7 dispersion measures, 1846-1893

	Range	Std. dev.	MAD_{mean}	MAD_{med}	MAX_{mean}	MAX_{med}	$RMSD$
Range	1.00						
Std. dev.	0.99	1.00					
MAD_{mean}	0.96	0.99	1.00				
MAD_{med}	0.79	0.82	0.85	1.00			
MAX_{mean}	0.98	0.97	0.94	0.66	1.00		
MAX_{med}	0.93	0.92	0.89	0.55	0.99	1.00	
$RMSD$	0.99	1.00	0.99	0.82	0.97	0.93	1.00

- Differences in identified breakdates are rarely more than 2-3 months.

Dispersion of discount rates 1846-1893

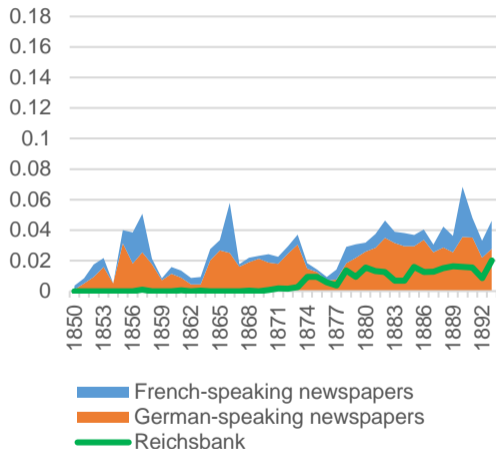


International financial integration

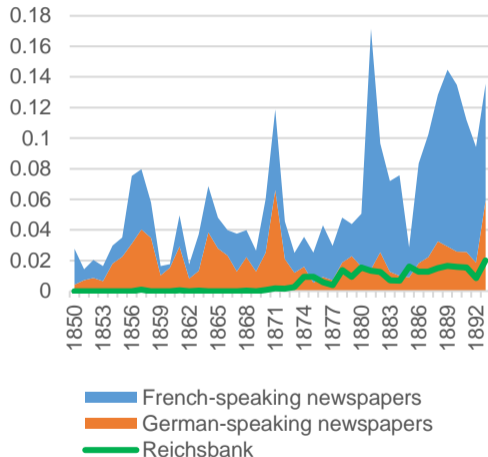
- Pass-through of BdF and BoE discount rate changes to Swiss discount rates
- Why these two central banks?
 - BdF was the center of the Latin Monetary Union. Also, Swiss franc was designed according to the French Franc.
 - BoE was the center of the international monetary system.
 - “Narrative” evidence from Swiss newspapers.

BoE, BDF references in Swiss newspapers

Bank of England

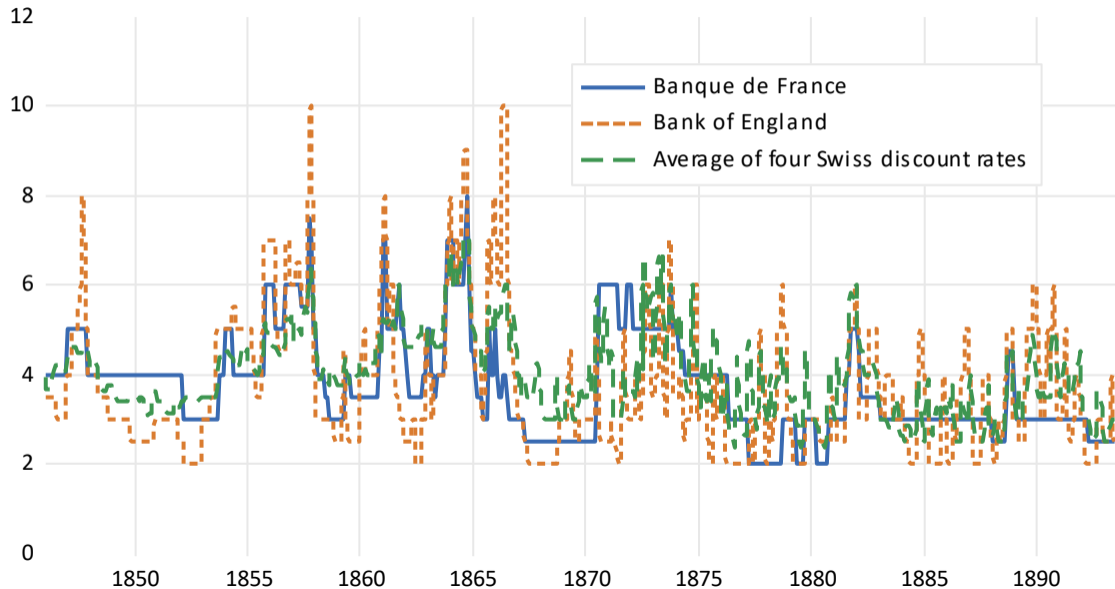


Banque de France



Normalized number of appearances of "Bank von England" or "Banque d'Angleterre" in a historical Swiss newspaper archive.

Discounts BdF, BoE and Swiss average

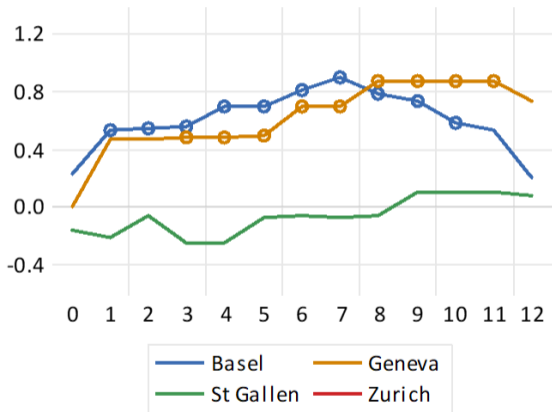


- Fixed exchange rate regime. If financial markets were perfectly integrated, we expect a high and regionally uniform pass-through to Swiss discount rates.
- Local projections of Swiss discount rates on either BdF or BoE rate changes (following Bazot, Monnet, and Morys, 2019).
- We estimate cumulative impulse responses of discount rates in each Swiss region to changes in official rates in Paris and London by OLS using the following equation:

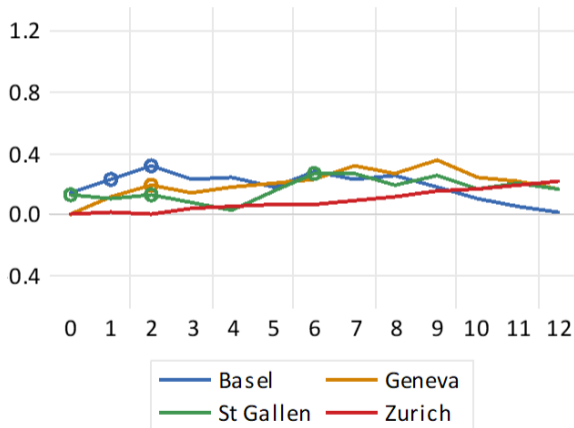
$$r_{i,t+h} - r_{i,t-1} = \alpha_h + \beta_h \Delta r_{j,t} + \sum_{l=1}^L \delta_{h,l} \Delta r_{j,t-l} + \sum_{l=1}^L \gamma_{h,l} \Delta r_{i,t-l} + \varepsilon_{i,t+h}$$

Impulse responses during 1846-1853

Banque de France



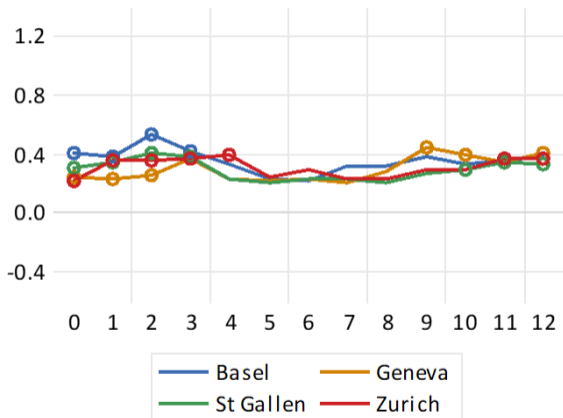
Bank of England



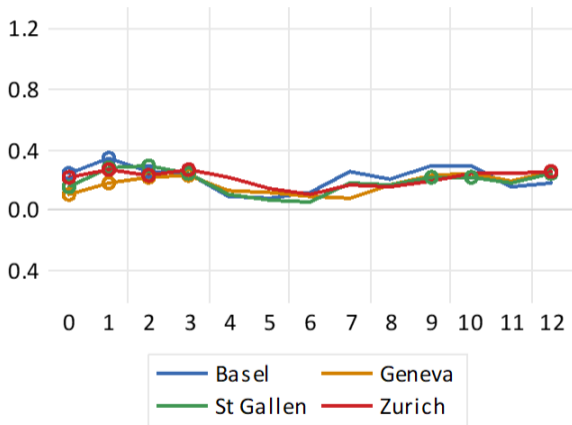
Circles: the impulse response function is statistically significant (5% level).

Impulse responses during 1853-1861

Banque de France



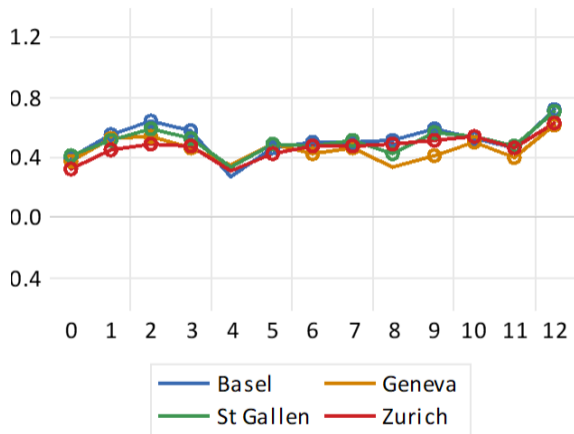
Bank of England



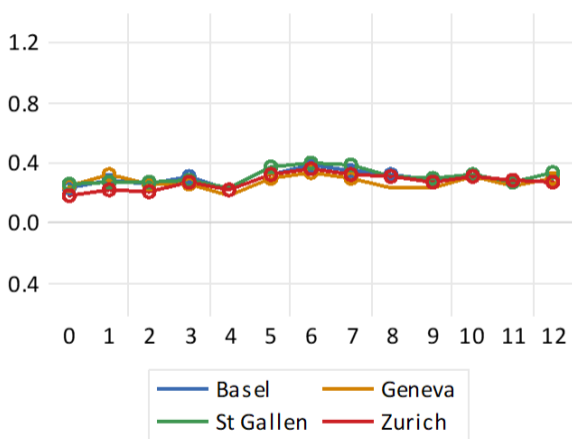
Circles: the impulse response function is statistically significant (5% level).

Impulse responses during 1861-1869

Banque de France



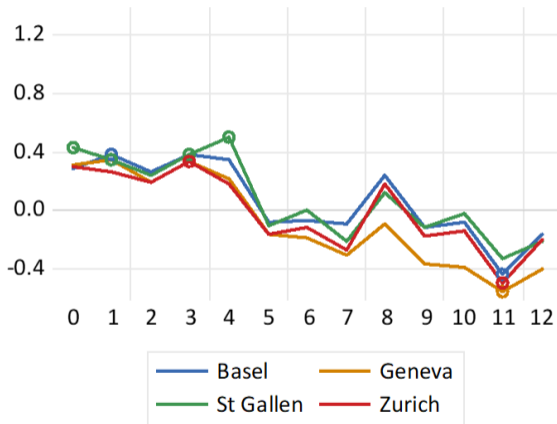
Bank of England



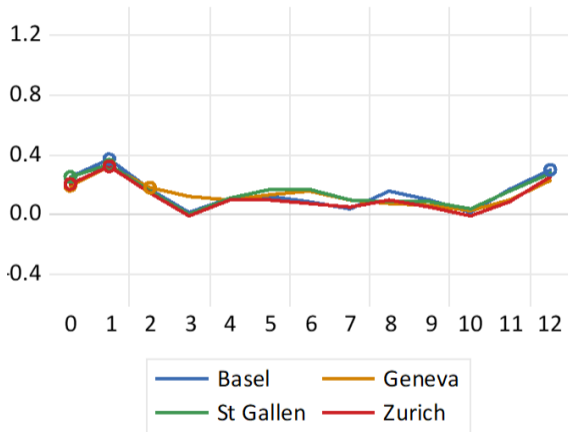
Circles: the impulse response function is statistically significant (5% level).

Impulse responses during 1869-1881

Banque de France



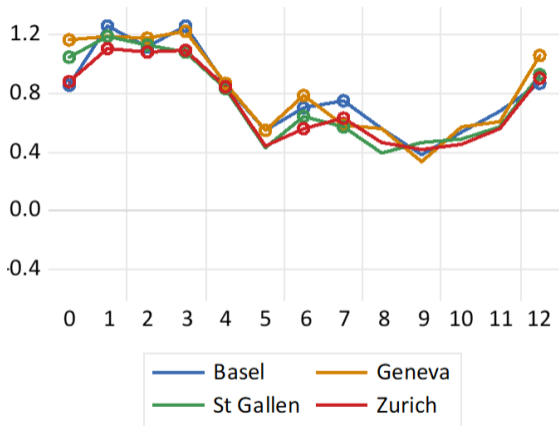
Bank of England



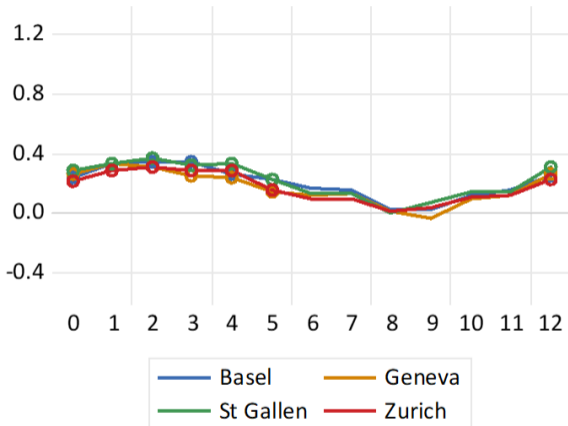
Circles: the impulse response function is statistically significant (5% level).

Impulse responses during 1881-1893

Banque de France



Bank of England



Circles: the impulse response function is statistically significant (5% level).

Robustness

- Estimated series of monetary policy shocks for the UK is available for part of the sample period (Lennard (2018)). Does not contain any additional information beyond that in the rate changes.
- Consider average pair-wise correlations instead of measures of dispersion.
- Rate changes by the Bank of England may prompt some response from the Banque de France, and vice versa.
 - We estimate the impulse responses to rate changes by both banks jointly in the one equation and carry out Wald tests to see if the responses to the two rate changes differ.
 - Results indicate that the impulse responses are qualitatively similar.
 - The main exception is the final sub-sample where at several horizons from $h = 0$ to $h = 8$, the null of equality of the two responses is frequently rejected for the Basel, Geneva and Zurich discount rates.

- Use a set of dummies and interaction terms representing the various sub-samples to test whether the impulse responses vary significantly across sub-sample.
 - Impulse responses to changes in the Bank of England rate are almost never statistically different across sample periods.
 - In terms of the BdF, the responses in the final sub-samples are almost uniformly different from the first, second and third sub-samples at the 5% level upon impact ($h = 0$).
- Altering the lag-length in the local projection regression has little effect.
- Using monthly average data from BdF and BoE has little impact.
- Include the long-term London interest rate (consols) as an additional control capturing expected changes in short-term interest rates. We use the London rate since it is available for the full sample. The results remain very similar.

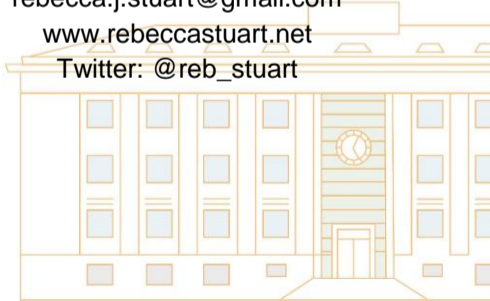
Conclusions

- Two waves of domestic financial integration (1850, 1881).
- One wave of international financial integration (1860).
- Until the Franco-Prussian War, BdF and BoE almost equally important (but few crises).
- International disintegration (1870).
 - Revealed problems in domestic integration.
 - Pass-through of foreign discount rate changes less pronounced/more uncertain.
 - Capital controls by France.
- Resolved only with the Banknote Act of 1881, when BdF became a more important reference than the BoE.
- Ultimately paved the way for establishing the Swiss National Bank (1907).

Thank you very much for your attention

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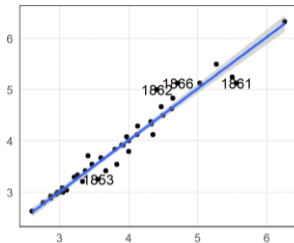
- Baltensperger and Kugler (2017): Monetary history of Switzerland over a long period of time. Estimates structural breaks in the interest rate differential vis-à-vis other countries and investigates deviations from metallic parities
- Herger (2021, 2022): Focuses on period after 1881 and provides a theoretical account of the instability after the demise of unregulated free banking period. Argues that central note-issuing bank is needed to issue sufficient amounts of standardized banknotes.
- Gerlach and Kugler (2018): estimate money demand during the period we investigate.
- Bazot, Monnet and Morys (2019): Use changes in the BoE discount rate changes to investigate the response of the exchange rate, interest rate, and balance sheet of other central banks (1891-1913)

Accuracy of the data

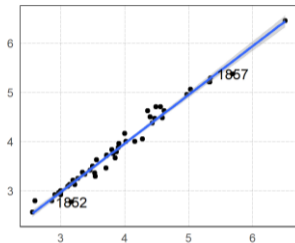
Scatter plots of new data (annual average of monthly data) against existing annual data (Jöhr, 1915).

Linear regression line in blue with 95% confidence intervals in grey. Labels give the years of observations that deviate more than 0.3pp in absolute value from Jöhr's data.

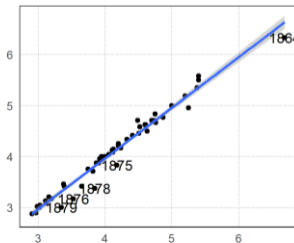
Geneva



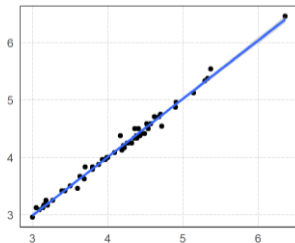
Basel



Zurich



St Gallen



Correlations with foreign discount rates

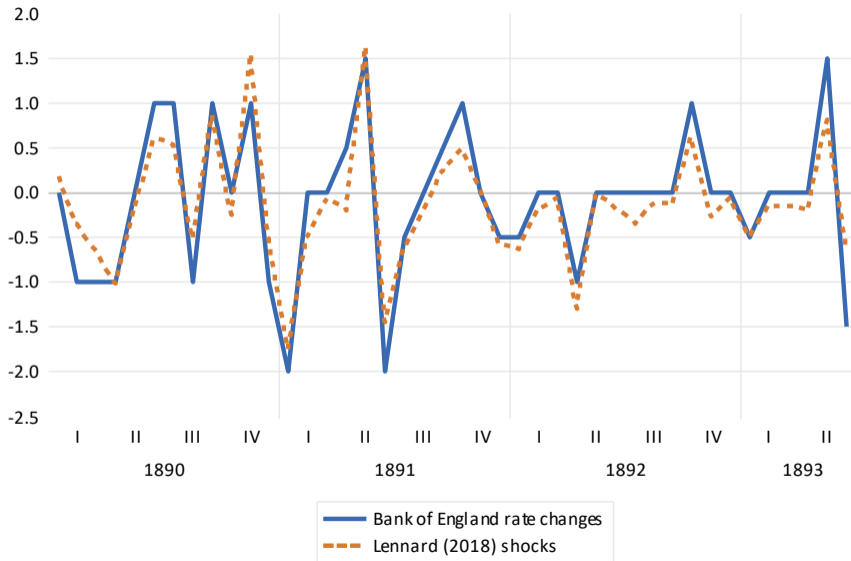
		Basel	Geneva	St Gallen	Zurich	Average
Full sample	BdF, Paris	0.66	0.61	0.65	0.69	0.65
	BoE, London	0.70	0.63	0.66	0.64	0.66
1846-1853	BdF, Paris	0.67	0.54	0.38	0.53	0.53
	BoE, London	0.77	0.70	0.58	0.64	0.67
1853-1861	BdF, Paris	0.84	0.78	0.72	0.81	0.79
	BoE, London	0.80	0.71	0.75	0.80	0.77
1861-1869	BdF, Paris	0.86	0.87	0.86	0.84	0.86
	BoE, London	0.78	0.74	0.78	0.75	0.76
1869-1881	BdF, Paris	0.55	0.54	0.46	0.55	0.53
	BoE, London	0.60	0.56	0.60	0.55	0.58
1881-1893	BdF, Paris	0.69	0.71	0.69	0.68	0.69
	BoE, London	0.62	0.63	0.65	0.62	0.63

Mean and average pairwise correlation

	Mean				
	Basel	Geneva	St Gallen	Zurich	Range
1846M1-1853M1	3.25	3.08	4.11	4.38	1.30
1853M2-1861M4	4.29	4.21	4.50	4.54	0.33
1861M5-1869M7	4.63	4.67	4.68	4.67	0.05
1869M8-1881M7	3.91	4.00	4.07	3.88	0.19
1881M8-1893M6	3.38	3.33	3.51	3.44	0.18

	Average pairwise correlation				
	Basel	Geneva	St Gallen	Zurich	Average
1846M1-1853M1	0.72	0.54	0.69	0.64	0.65
1853M2-1861M4	0.79	0.73	0.77	0.78	0.77
1861M5-1869M7	0.98	0.97	0.98	0.98	0.98
1869M8-1881M7	0.93	0.90	0.91	0.94	0.92
1881M8-1893M6	0.96	0.95	0.95	0.96	0.96

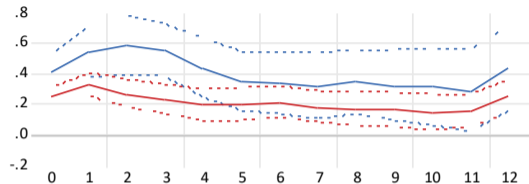
Discount rate changes and monetary policy shocks



- Bai, J., (1997), 'Estimating Multiple Breaks One at a Time', *Econometric Theory*, 13(3), 315-352.
- Baltensperger, E. and P. Kugler, (2017), Swiss Monetary History since the Early 19th Century, Cambridge University Press, Cambridge.
- Bazot, G, E. Monnet and M. Morys, (2019) 'Taming the Global Financial Cycle: Central Banks and the Sterilization of Capital Flows in the First Era of Globalization (1891-1913)', CEPR Discussion Papers 13895.
- Gerlach, S., and P. Kugler, (2018), 'Money demand under free banking: Switzerland 1851-1906', *Swiss Journal of Economics and Statistics*, 154, 1-8.
- Herger, N., (2022), 'Unregulated and regulated free banking: Evidence from the case of Switzerland (1826-1907)', *Explorations in Economic History*, 83,
- Jöhr, A., (1915), Die Schweizerischen Notenbanken, 1826–1913, Orell Füssli, Zurich.
- Niederer, A., (1965), 'Der Münzumtausch von 1851/52 in der Schweiz: mit einer Tabelle, die die Anzahl aller eingelösten und eingeschmolzenen Münzen angibt', *Schweizerischemismatische Rundschau*, 44.
- Lennard, J., (2018), 'Did monetary policy matter? Narrative evidence from the classical gold standard', *Explorations in Economic History*, 68, 16-36.

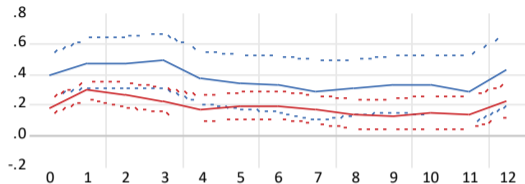
Impulse responses, full sample

Basel



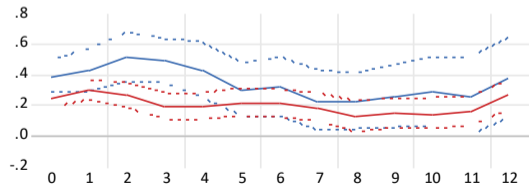
— Response to Banque de France rate change - - - +/- 2 standard errors
— Response to Bank of England rate change - - - +/- 2 standard errors

Geneva



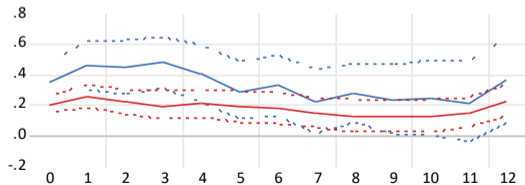
— Response to Banque de France rate change - - - +/- 2 standard errors
— Response to Bank of England rate change - - - +/- 2 standard errors

St. Gallen



— Response to Banque de France rate change - - - +/- 2 standard errors
— Response to Bank of England rate change - - - +/- 2 standard errors

Zurich



— Response to Banque de France rate change - - - +/- 2 standard errors
— Response to Bank of England rate change - - - +/- 2 standard errors