Financial crises, Business cycles, and Bankruptcies in the Very Long Run: France during the 19th Century

Vincent Bignon

THE GRADUATE INSTITUTE | GENEVA

INSTITUT DE HAUTES ÉTUDES
INTERNATIONALES ET DU DÉVELOPPEMENT

GRADUATE INSTITUTE OF INTERNATIONAL
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Goal

- Compile a bankruptcy rate in France, 1820-1913
- Study its short-term fluctuations
- Link them with the varying policy of the central bank during crises

Roadmap

- Computing the bankruptcy rate: the stock of firms (and what type of legal statute)
- Extracting the short-term evolutions
- Compares them with other business fluctuations indicators
- Looks at 19th century financial crises in France
- Links the pattern with the changes in the LLR policy of the *Banque de France*

Hunting the primary numbers

- Bankruptcy numbers for each year
  - Taken in the *Comptes de la justice civile et commerciale* (1840-1913) and archives
- Number of firms that may file for bankruptcy
  - Excluded the agriculture and (sometimes) *Professions libérales*
  - Use a fiscal source: la *Patente* tax (revolutionary tax on each business selling something on the market) except farmers and some *professions libérales*

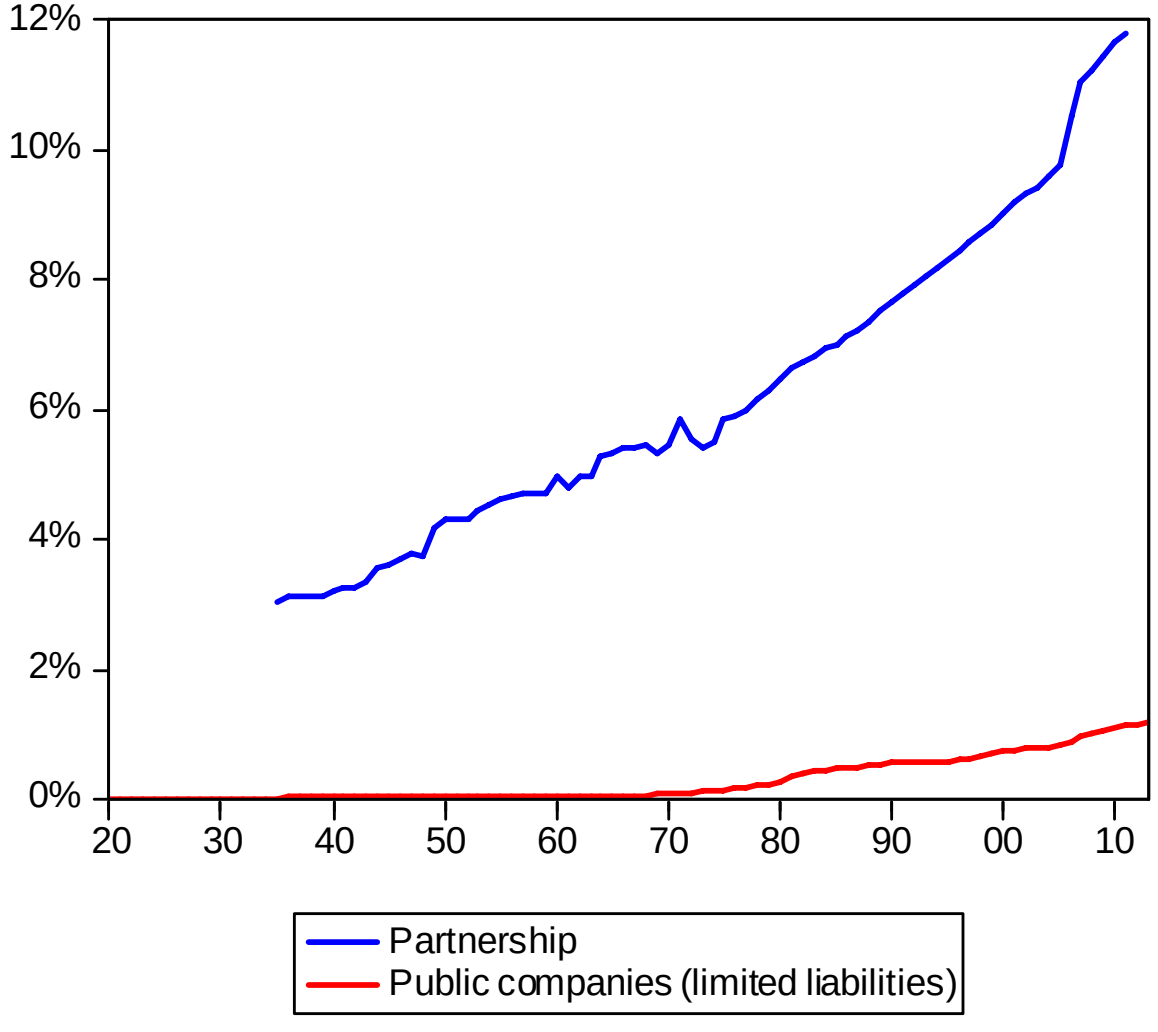
Adjusting the series # of firms for legal changes

- Generate spurious fluctuations of the BR
  - Tax evasion and the 1841 census
  - Changes in geographic borders: 1860 (Savoie), 1870 (Alsace)
  - Fiscal reforms: 1844, 1850, 1858, 1862, 1868
- Fiscal reforms modified the population liable to tax's payment:
  - Commissioned workers
  - *Professions libérales*
- Corrections were implemented

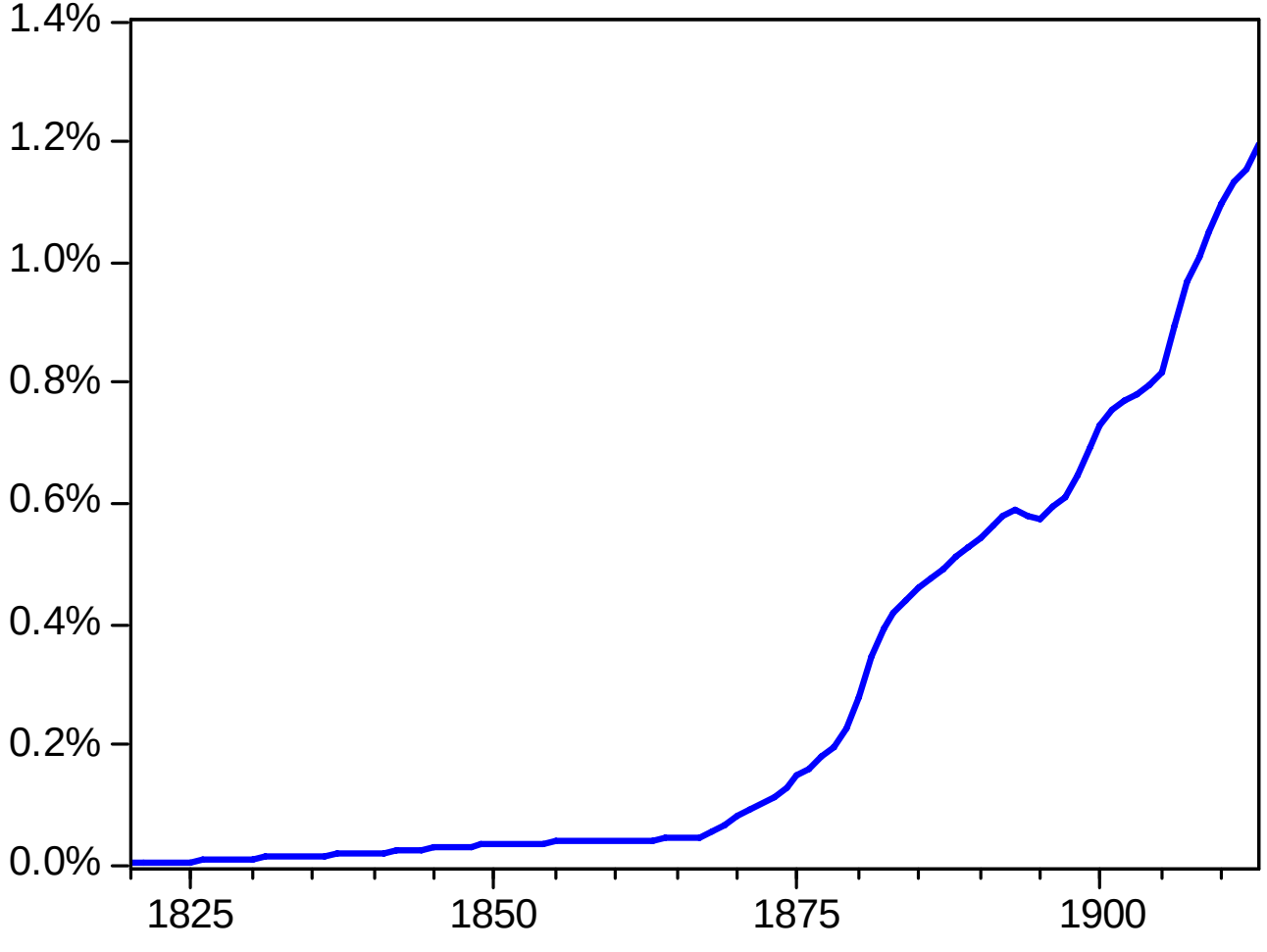
What types of firms?

- legal framework: *1807 code de Commerce*
- Individual private firms (unlimited liabilities)
- Partnerships
  - ordinary partnership (*société en nom collectif*): at least 2 individuals liable on personal wealth
  - limited partnership (*société en commandite simple*): general partner(s) – manage with unlimited liability – and special partner(s) – limited liability
  - Joint-stock companies, i.e. limited partnership with shares. Liability of partners identical to limited partnerships but shares are tradable
  - Public company (*société anonyme*): liabilities limited to capital contribution. Before 1867, required gvt agreement

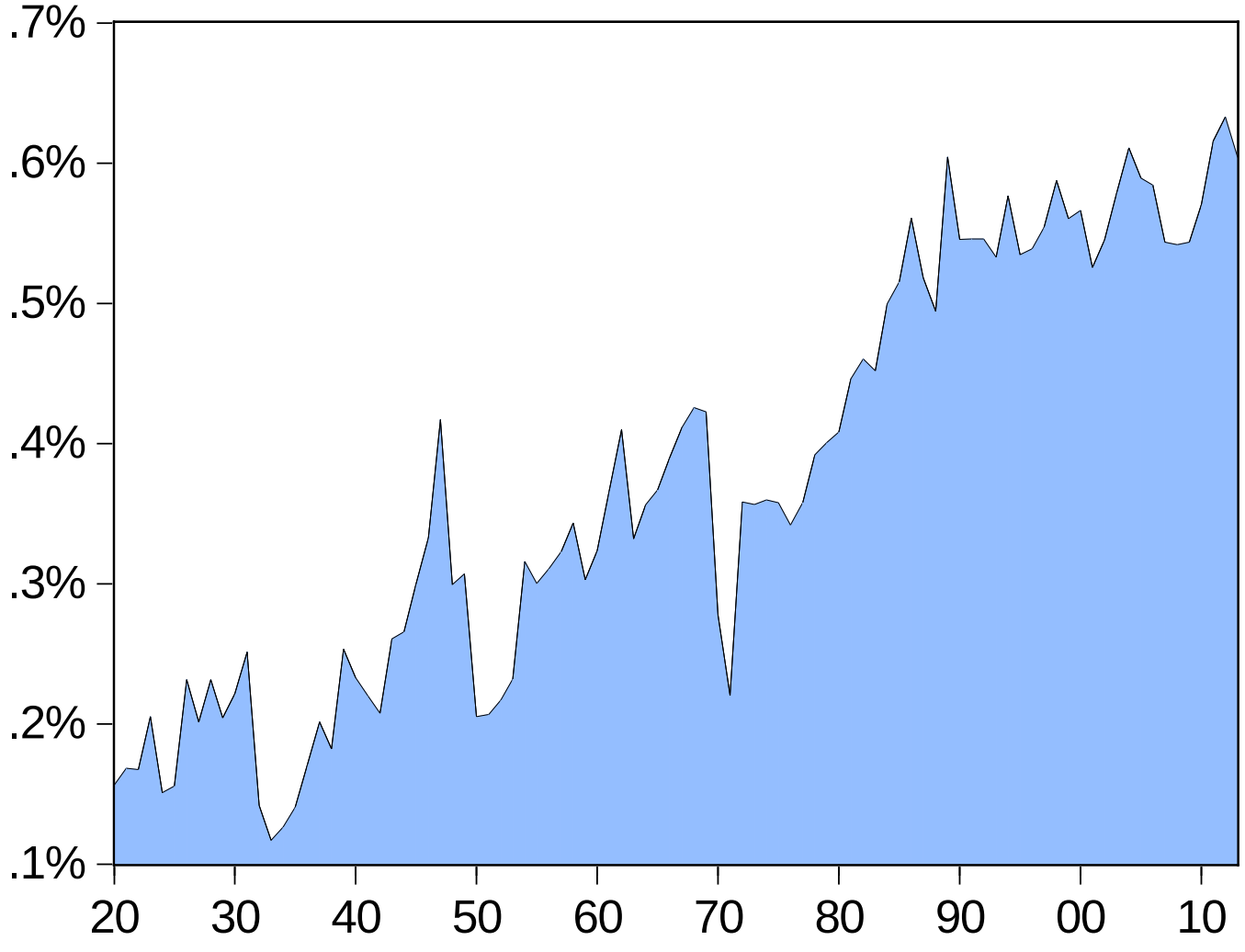
Share of companies in the total # of firms



Share of the limited liabilities companies in the total # of firms



French bankruptcy rate



Long-run vs. short-run fluctuations of the bankruptcy rate

- Liquidity dry-ups:
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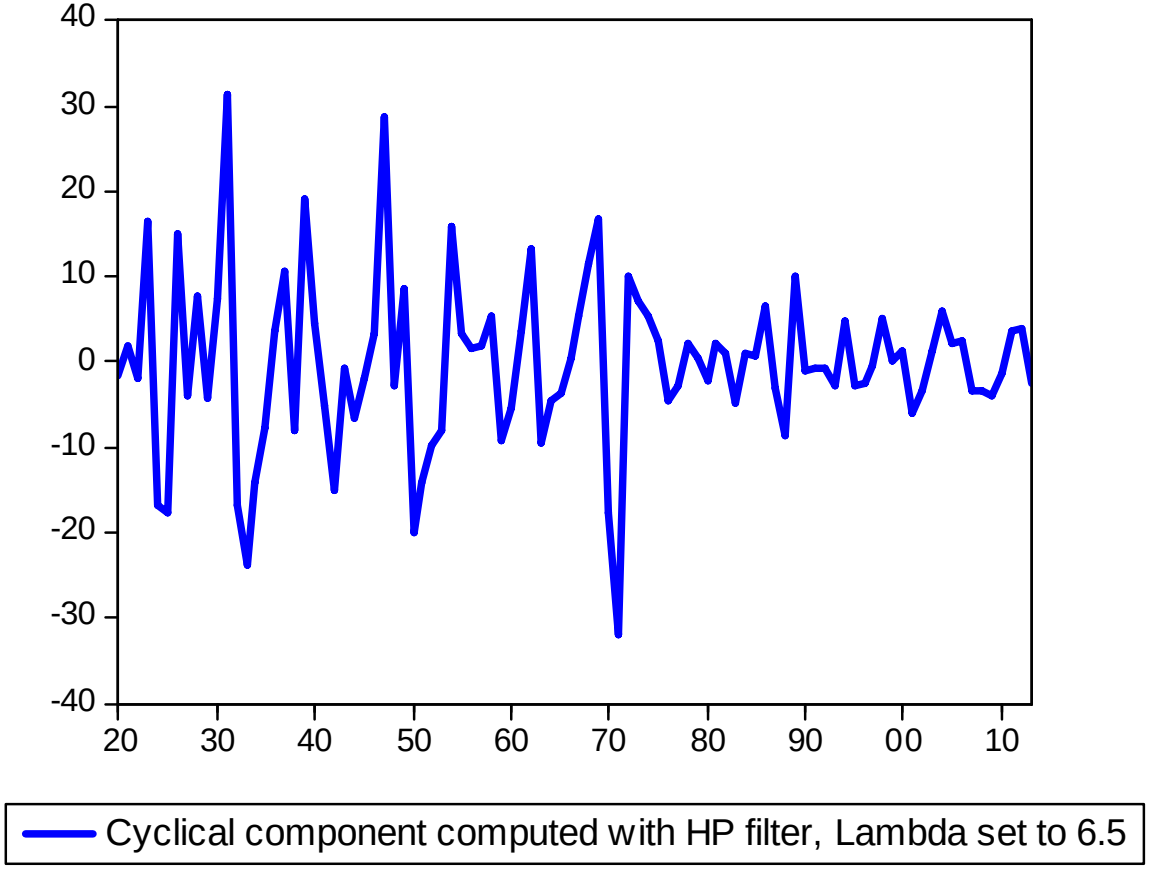
$\Rightarrow$ Use of filtering method to separate short-run from long-run components

Vanishing fluctuations of the BR

Deviation of the cyclical component of the bankruptcy rate to its trend (HP filter)



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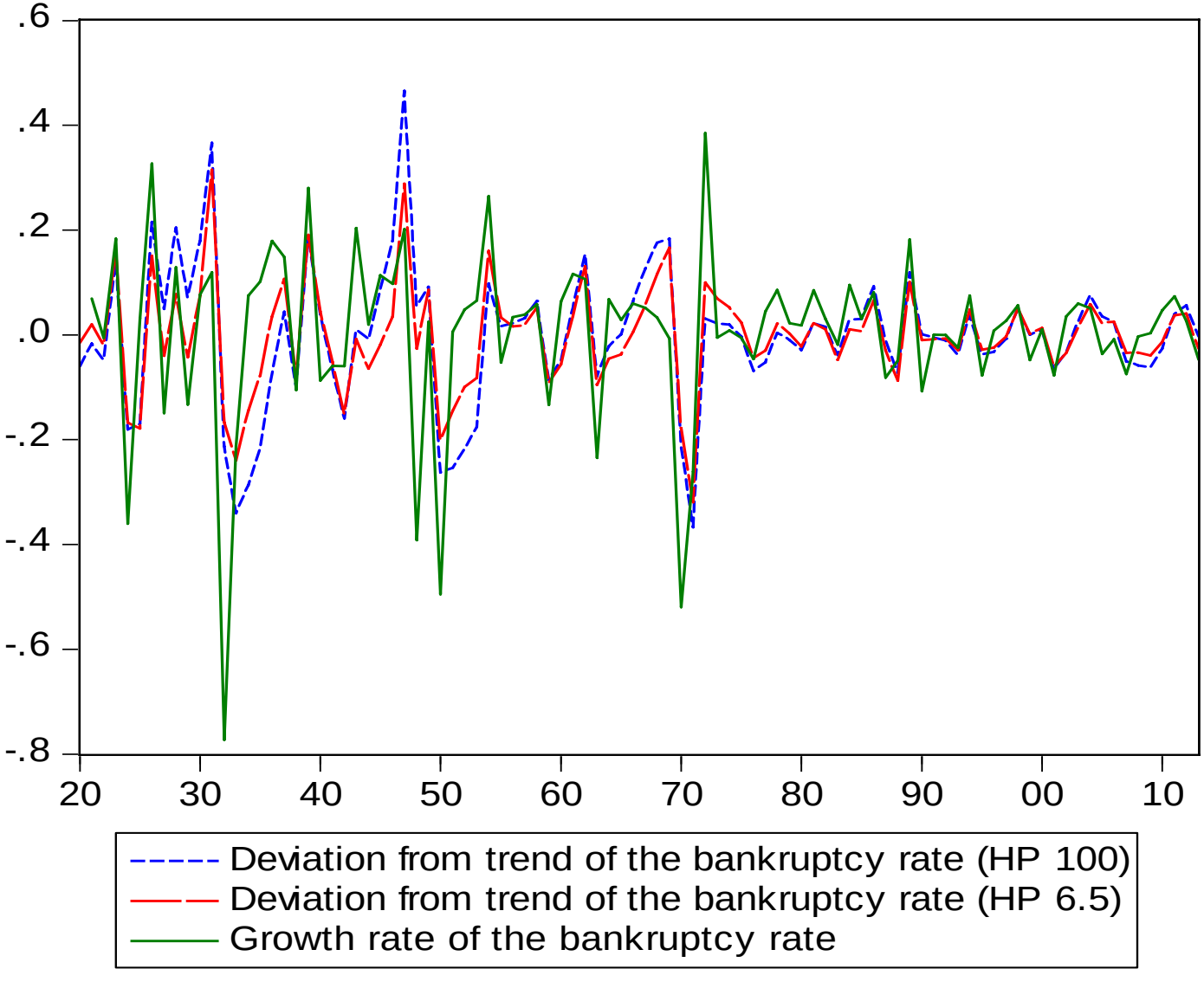
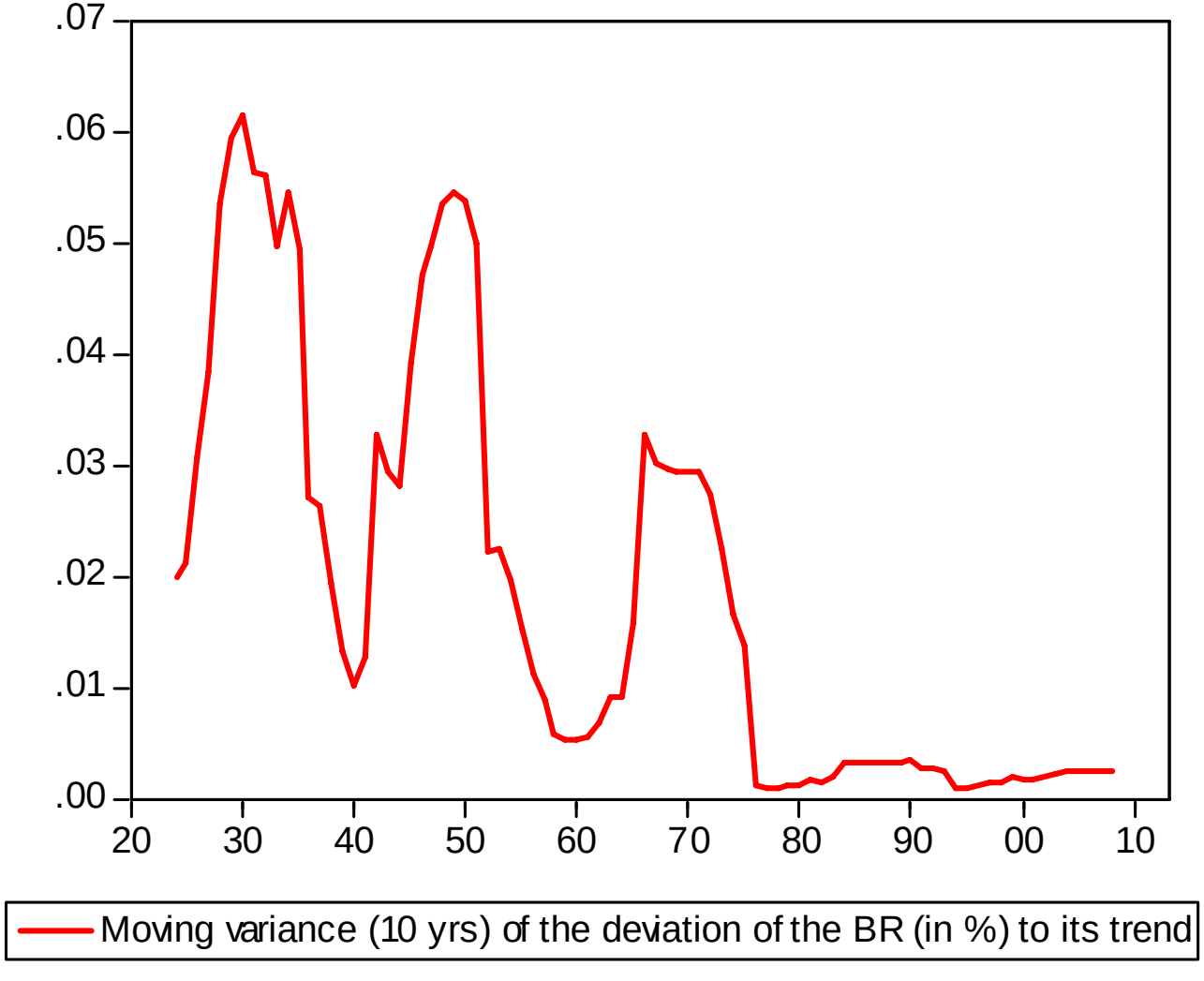
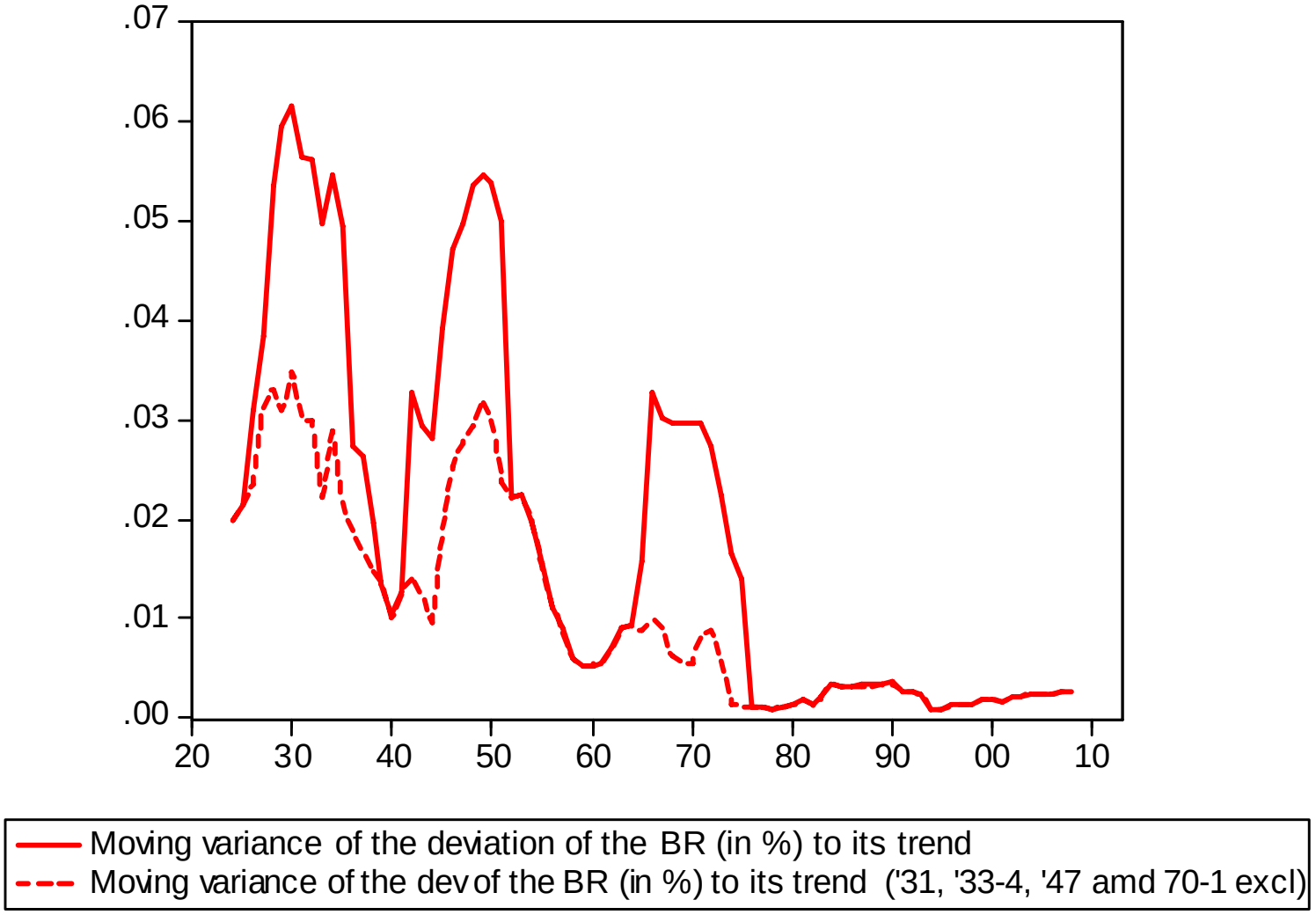


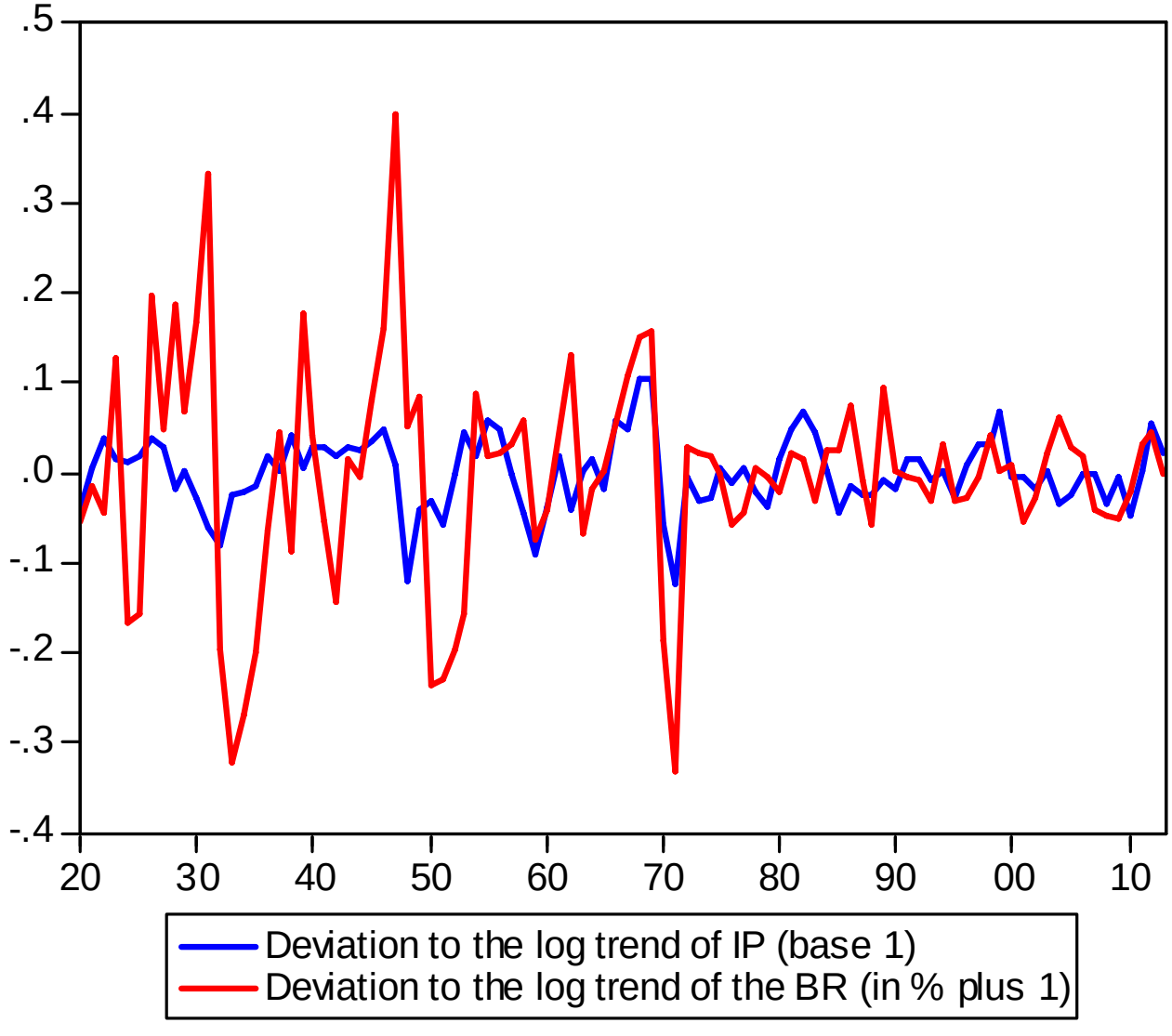
Moving variance of the deviation of the bankruptcy rate (10 yrs)



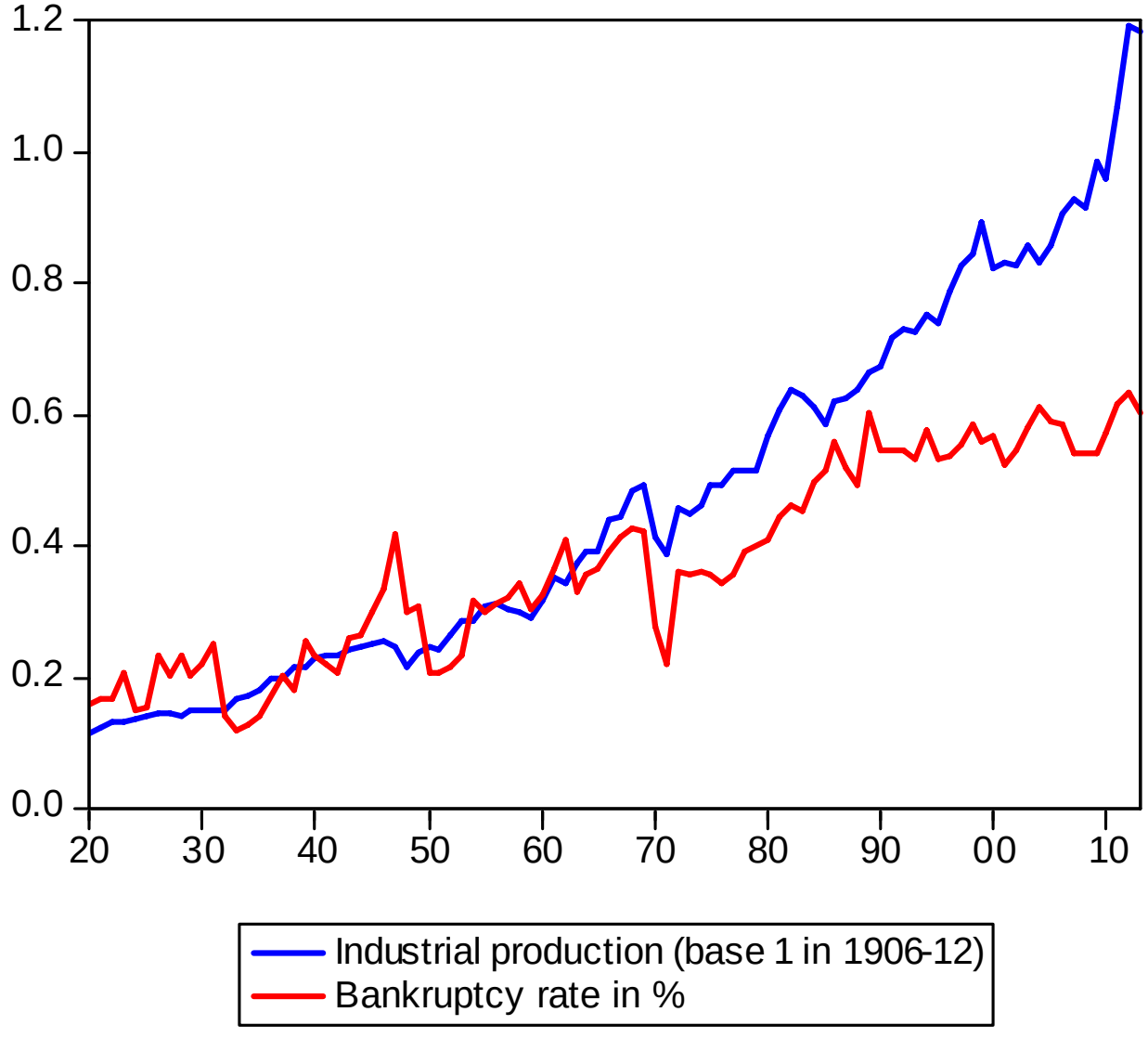
Removing the outliers (+ 2 st. dev)



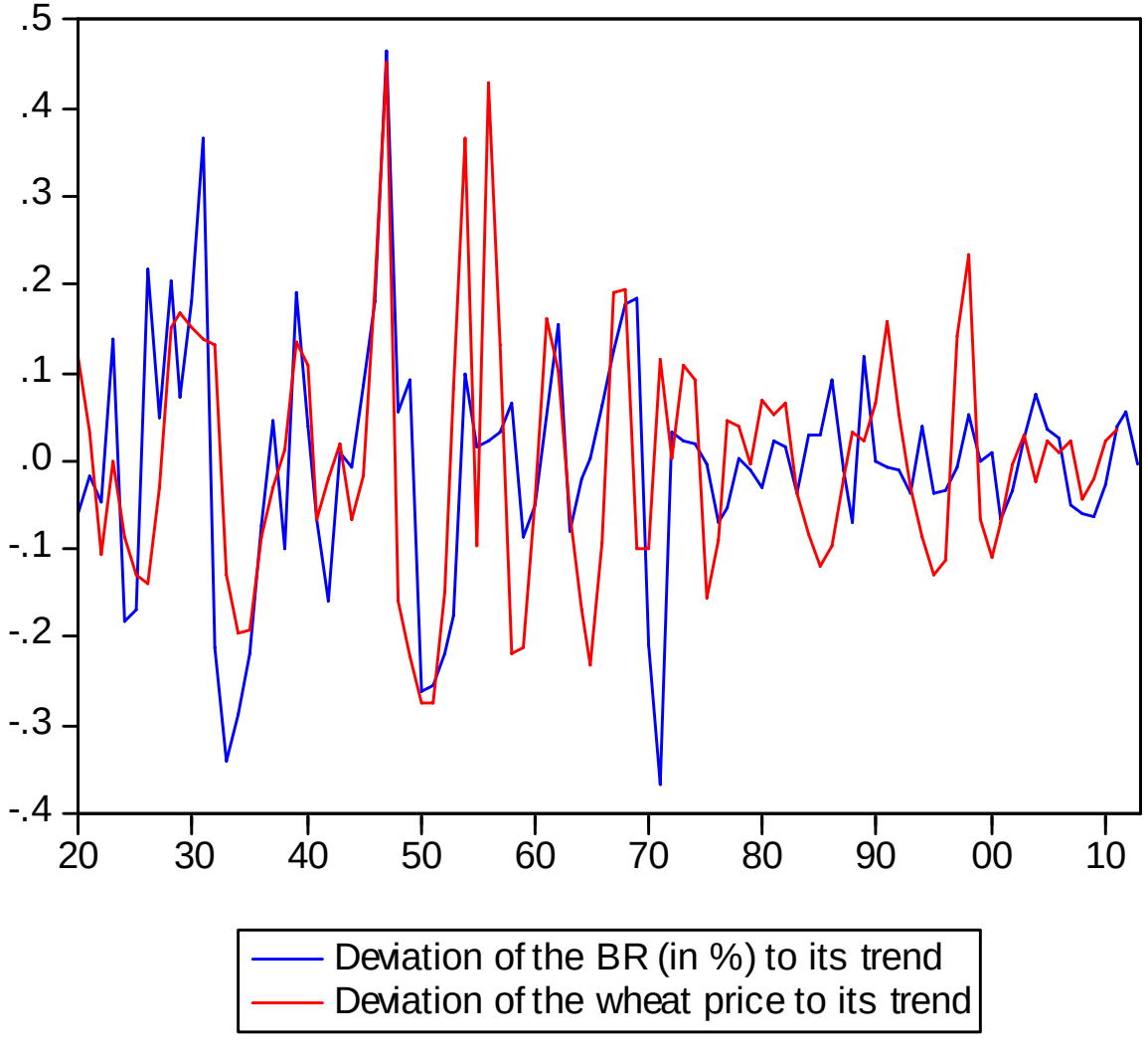
IP and BR Deviations compared



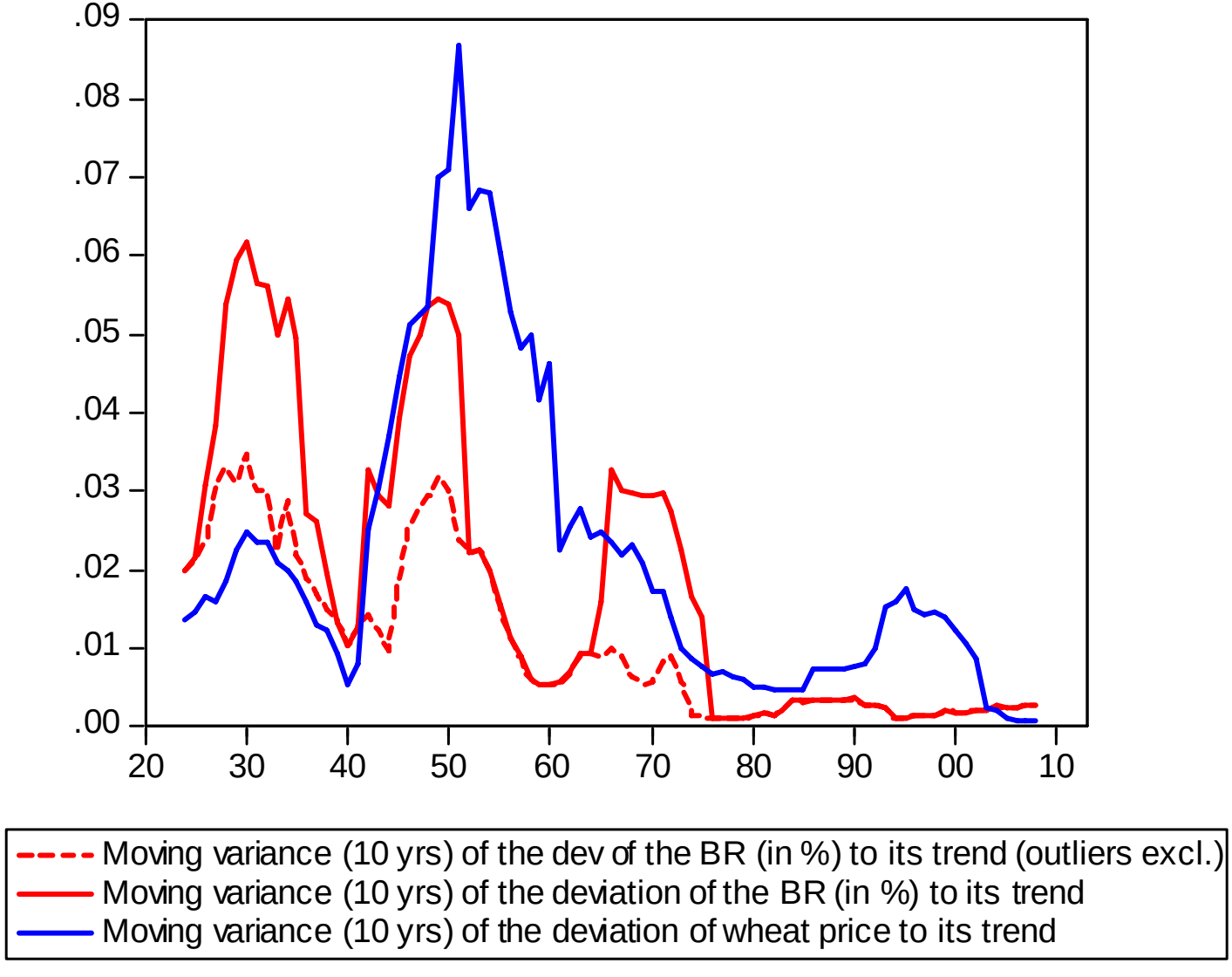
Evolution IP index and BR



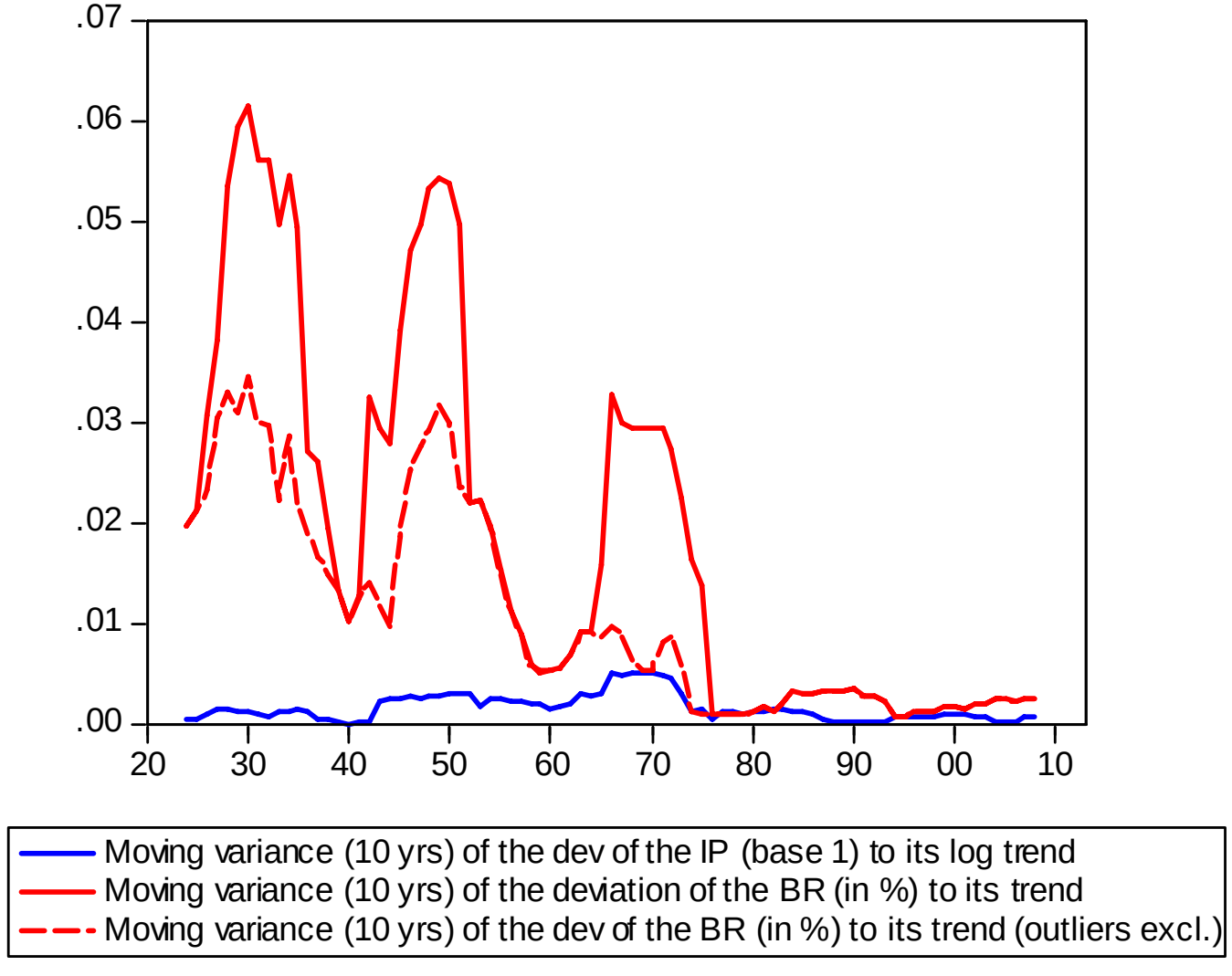
Deviations of BR vs wheat price



Comparing it with the wheat price



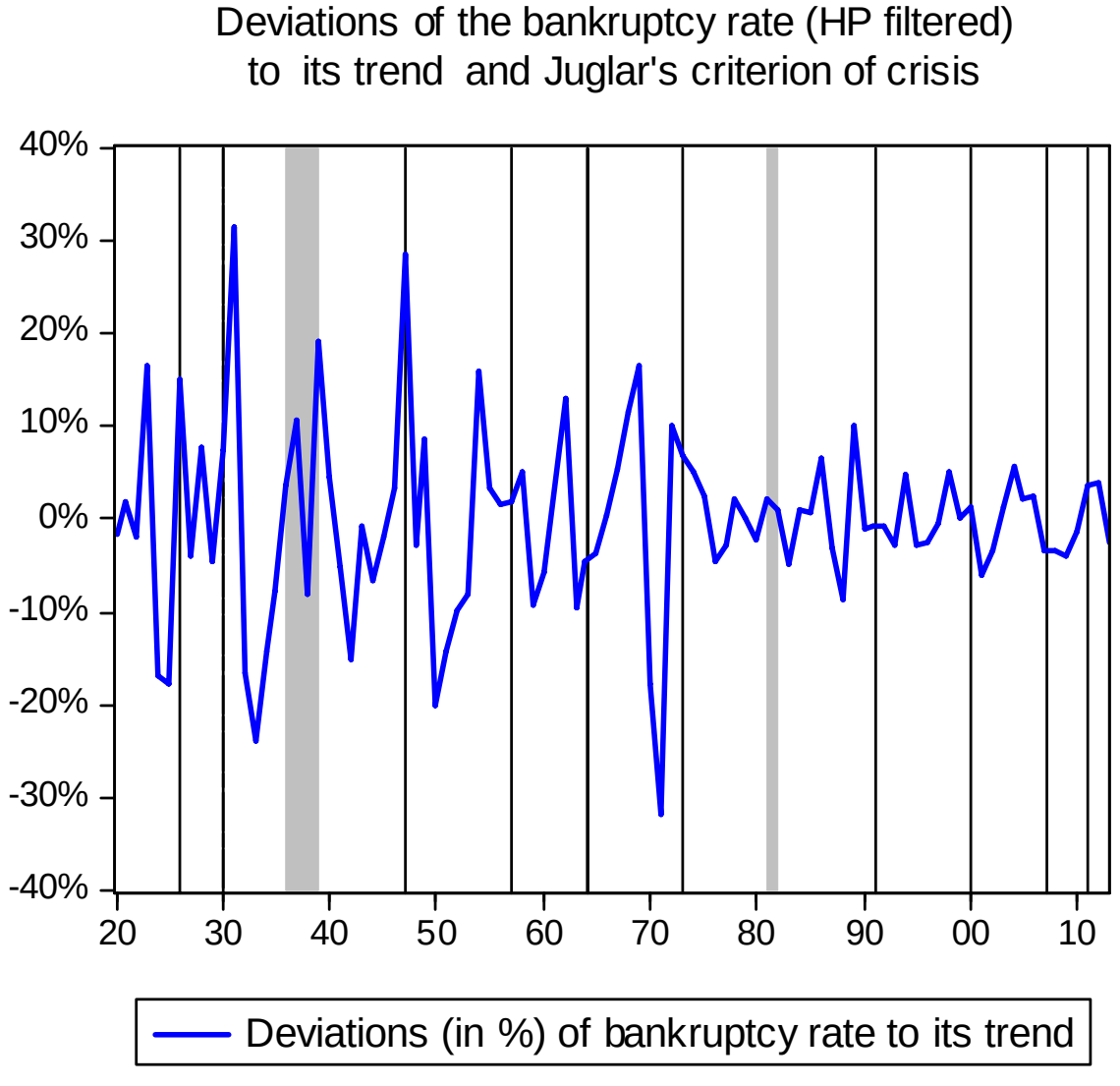
Moving variance IP vs. BR



What about financial crises?

- Extract financial crises using
  - Stock prices index (Arbulu, 2006)
  - 3 months interest rate (offshore –London – before 1870) and onshore after)
  - CB liquidity ratio: banknote to metallic reserves
  - CB refinancing ratio: discount to metallic reserves
- Shows that crisis occurred regularly
- Indicators give broadly the same crises' years

Deviations of the BR and crises



Central bank refinancing

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  - From a policy of rationing during crises (up to the 1850s) to a policy of rediscounting at will (Bignon, Flandreau and Ugolini, 2010) : increase of metallic reserve

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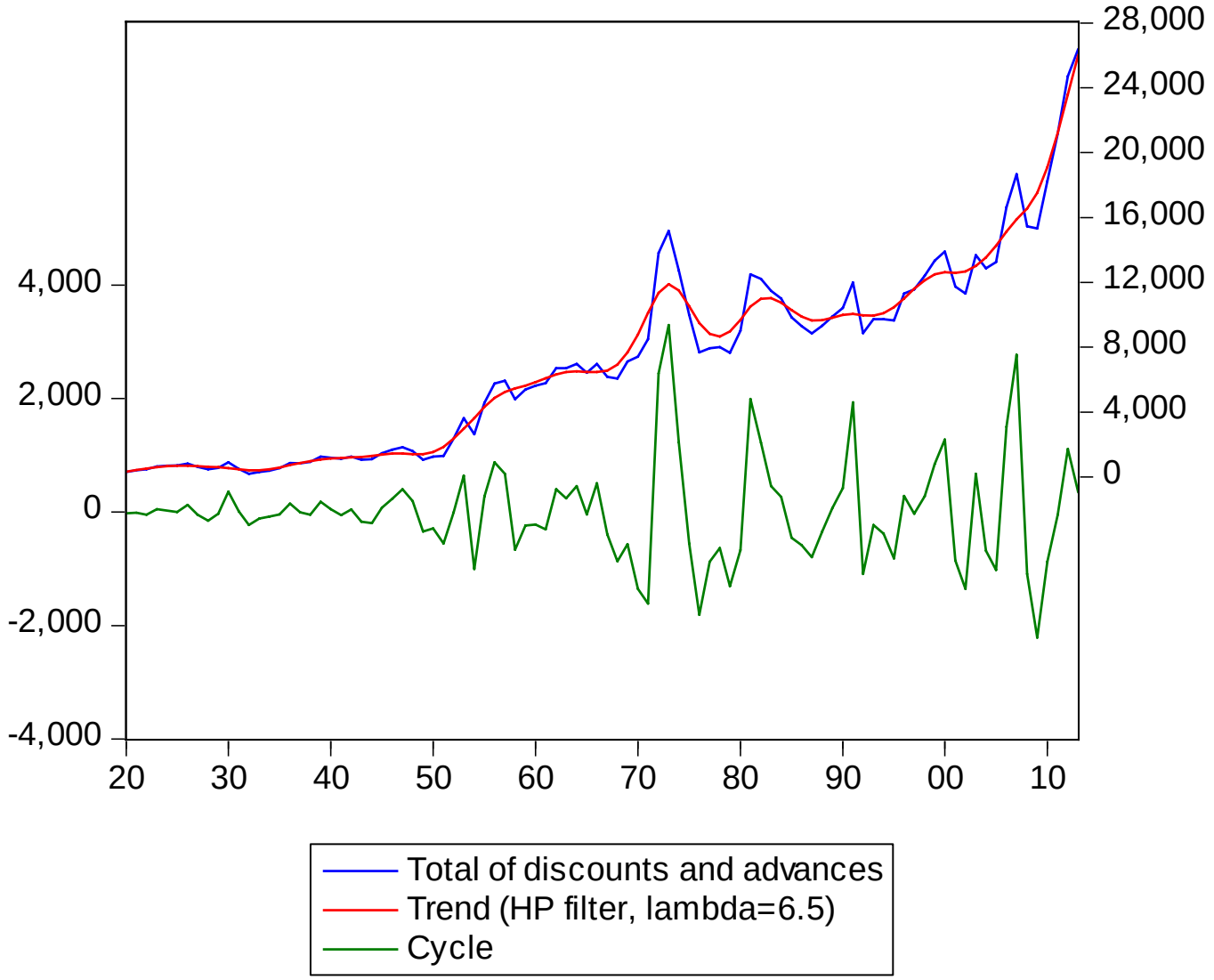
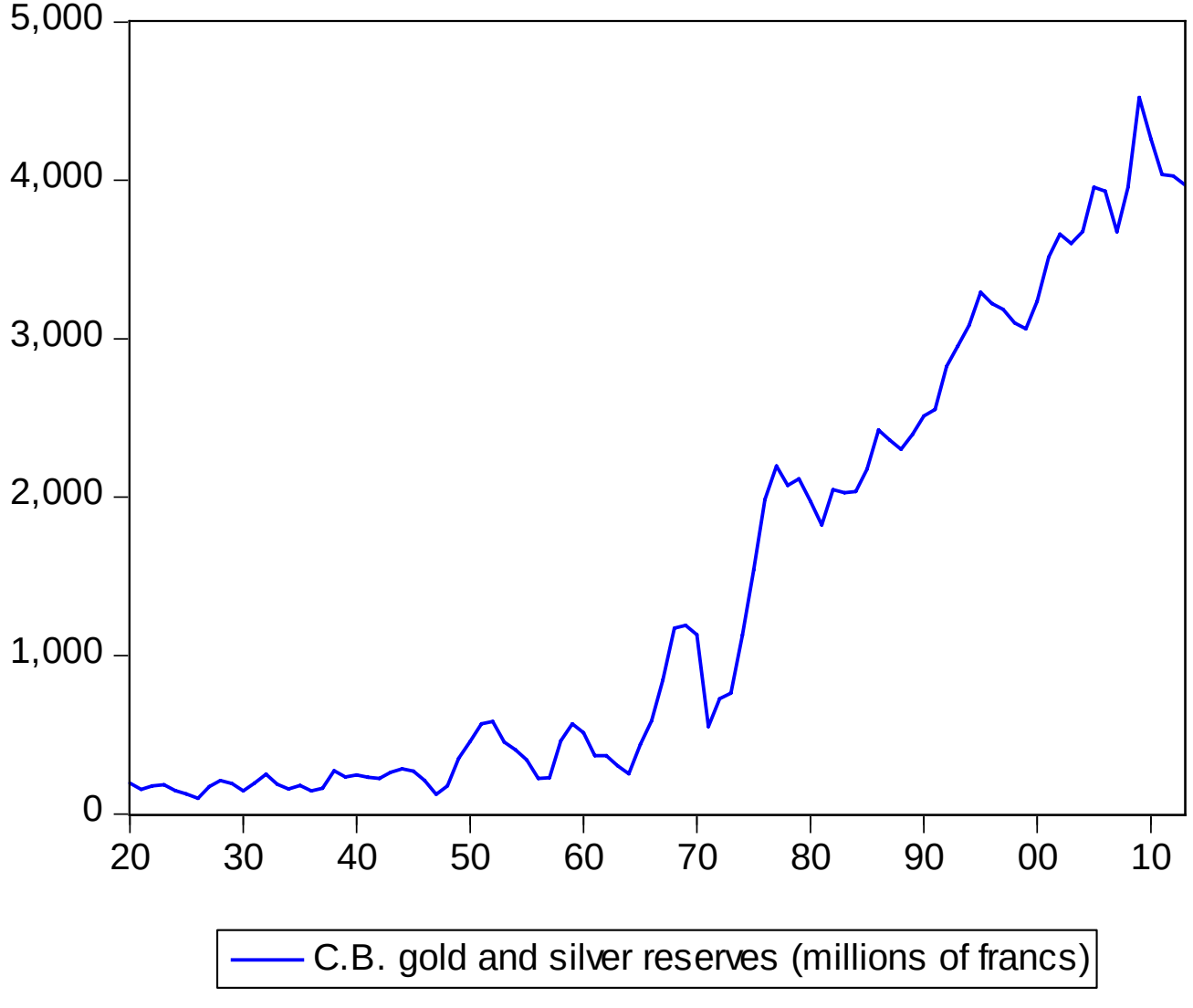
Central bank refinancing

- Main instrument: bills of exchanges
- 19th c. changes of monetary policy stance: Two constraints were removed
  - From a policy of rationing during crises (up to the 1850s) to a policy of rediscounting at will:
    - increase of metallic reserve
  - Change in monetary policy implementation with the development of a network of branches
    - decentralized refinancing with tight bills' screening

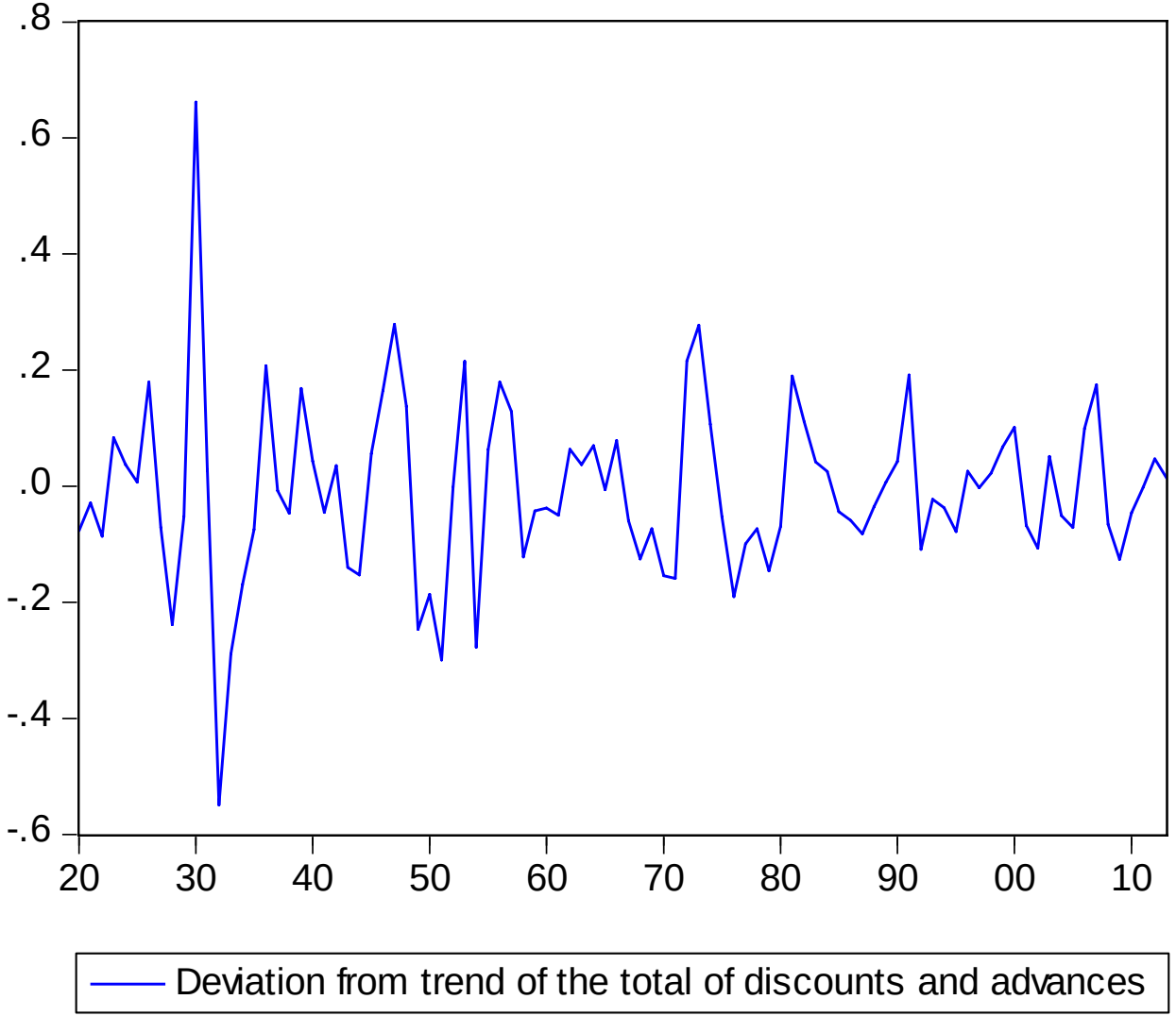
Evolution CB refinancing (discounts and advances)



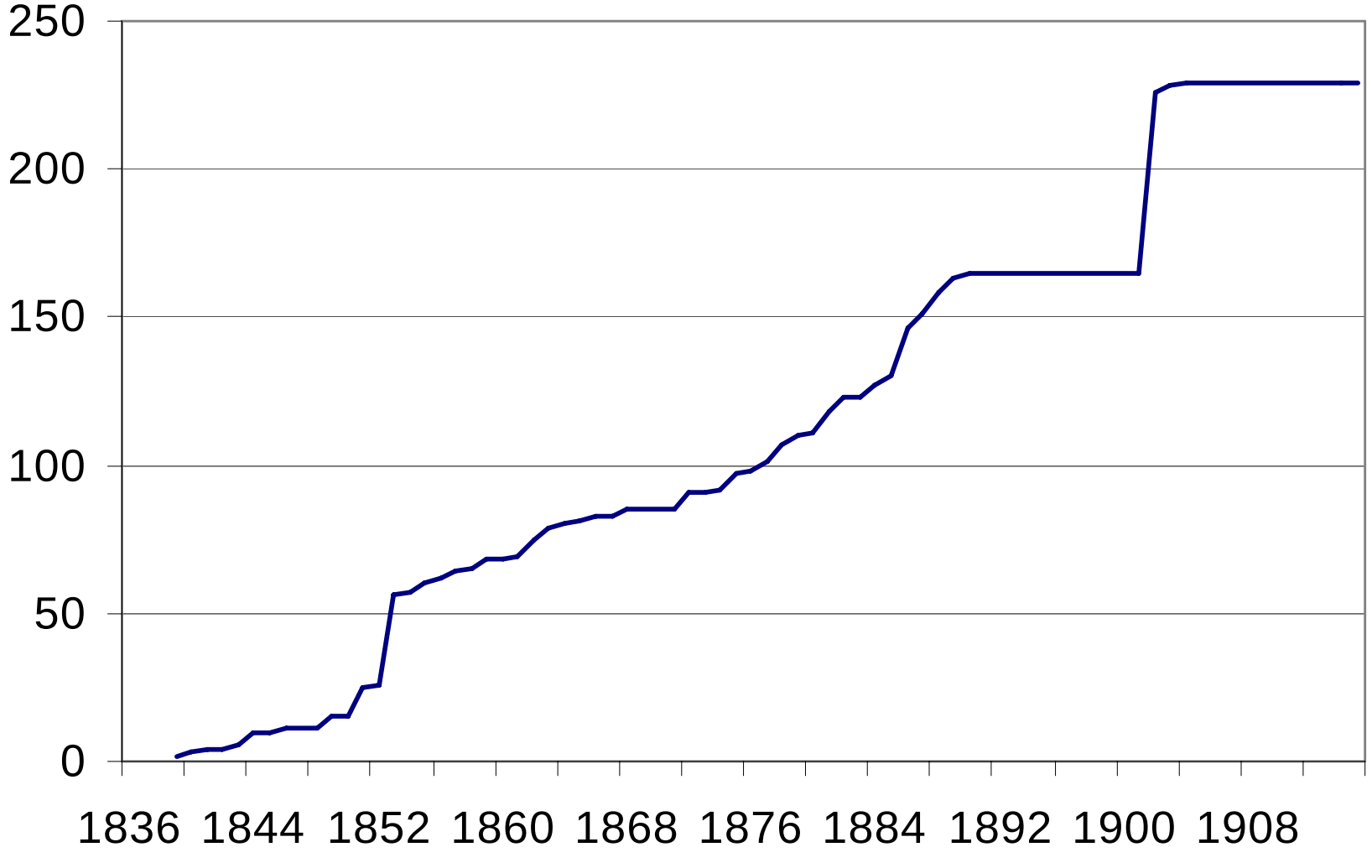
Metallic reserves in the vaults of the central bank



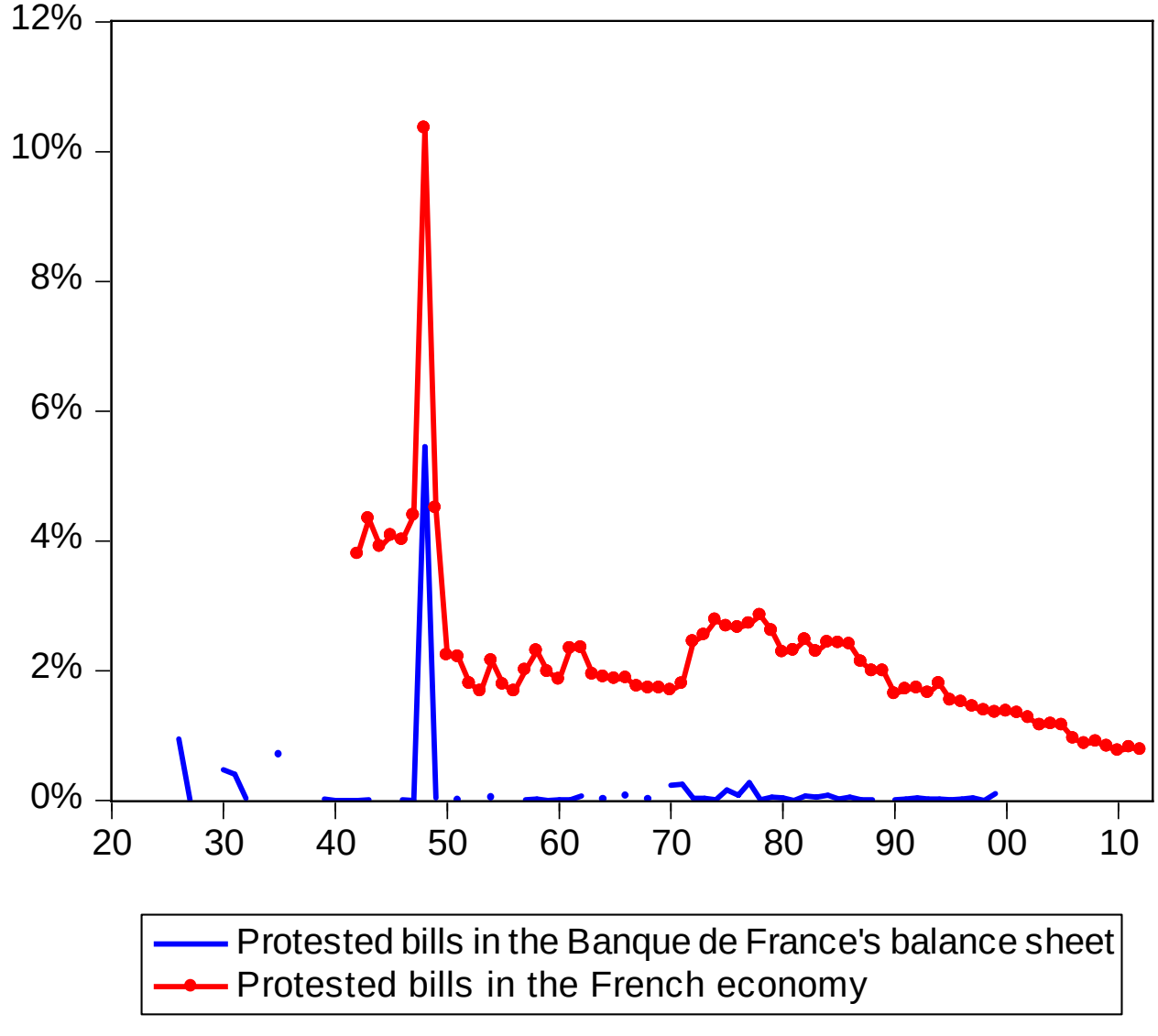
Deviation of CB refinancing



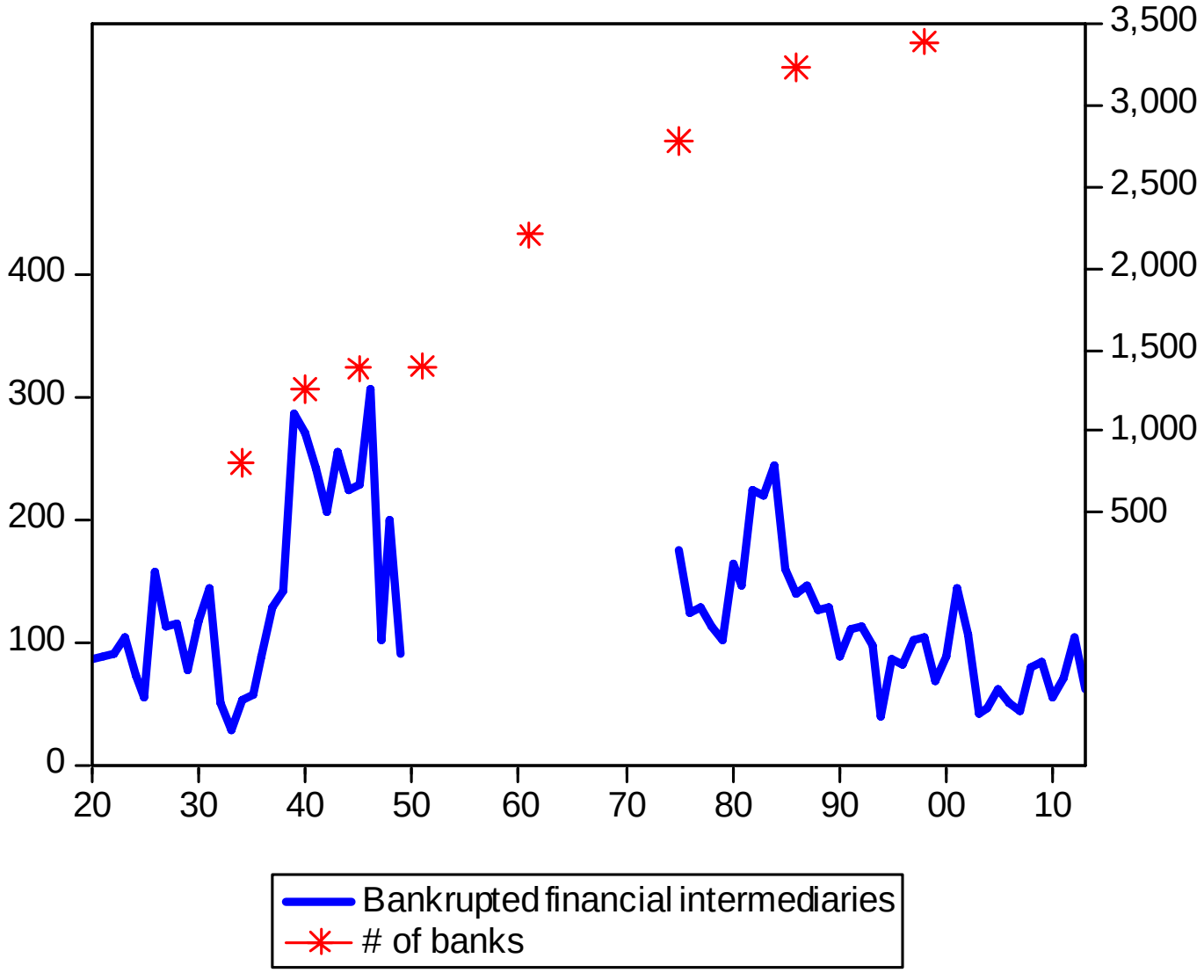
Central bank's branching development



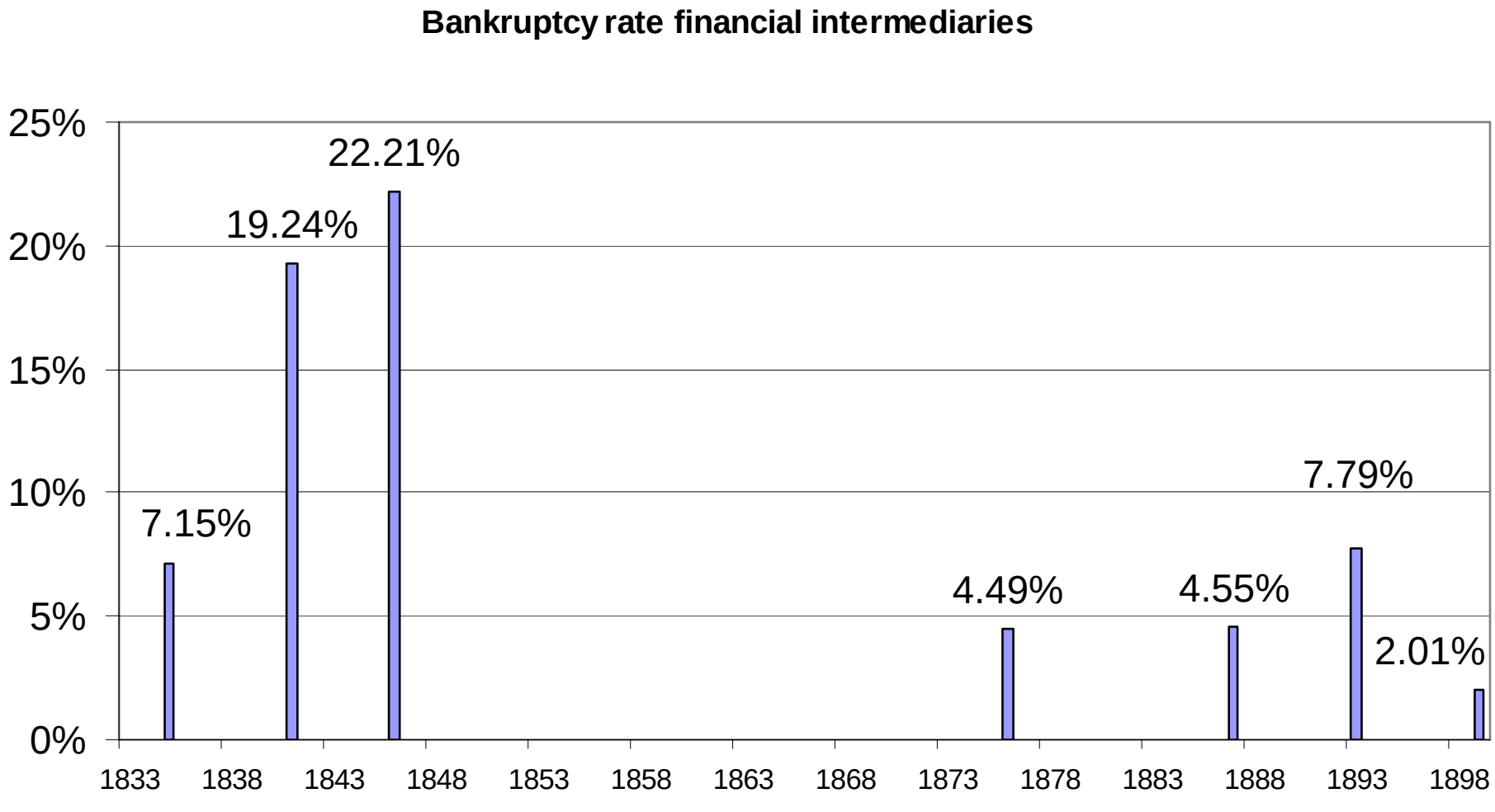
Moral hazard and protested bills



Financial intermediary bankruptcies



Bankruptcy rate of financial intermediaries



Conclusion

- Century-long increase of the BR
- Fluctuations became smoother over time
- They peaked during crises
- Financial crises did not disappear
- But the monetary policy of LLR changed
  - Reserves increases allowing more refinancing
  - Expanding network decentralized both screening and refinancing with very limited risk for the central bank

Corrections to patentes series (1)

- No corrections for the changes of geographic borders
- Fiscal evasion: for any t < 1842

$$y_t^{'} = x_t \left(\frac{x_{1842}}{x_{1841} * \left(1 + \overline{x}_{1820-1841}\right)} \right)$$

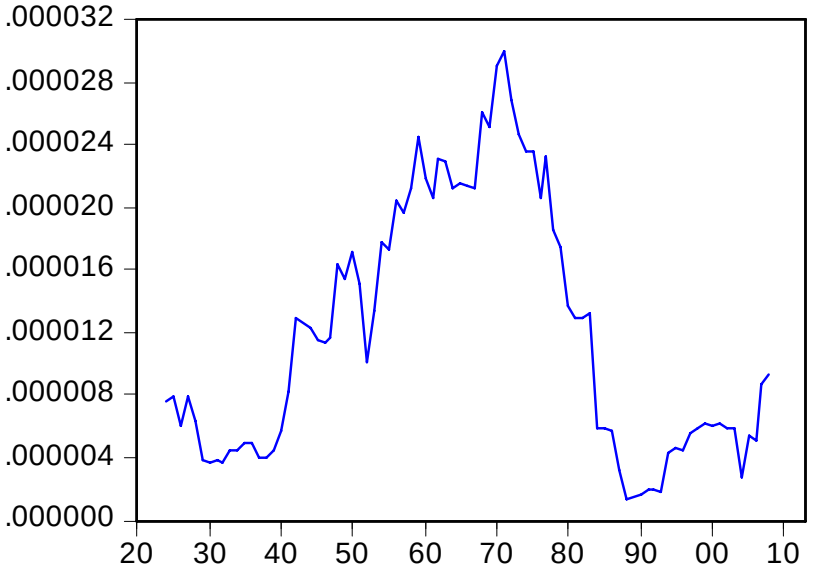
Corrections to patentes series (2)

$$\text{For any } t \le 1844 \begin{cases} y_t'' = y_t' \left(1 - \dfrac{68{,}000}{x_{1844}}\right) & \text{if } t \le 1842 \\ y_t'' = x_t \left(1 - \dfrac{68{,}000}{x_{1844}}\right) & \text{if } 1842 < t \le 1844 \end{cases}$$

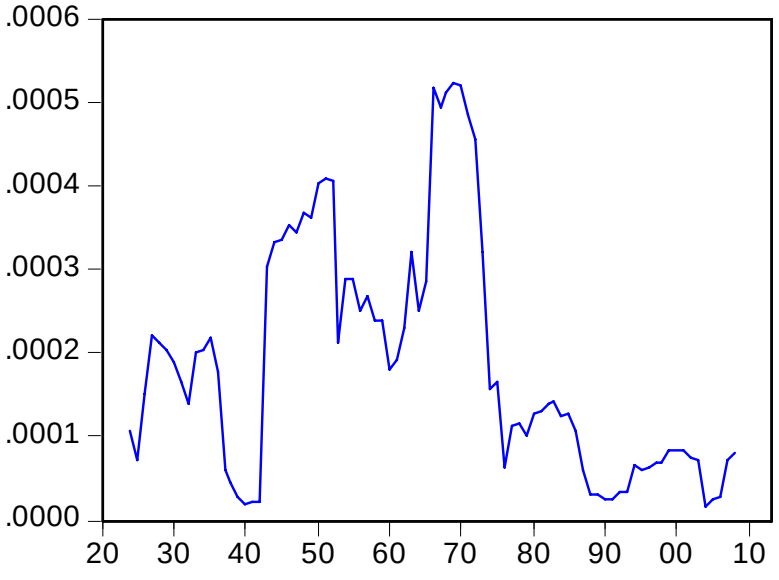
$$\text{For any } t \le 1858 \begin{cases} y_t''' = y_t'' \left(1 - \dfrac{120{,}000}{x_{1858}}\right) & \text{if } t \le 1844 \\ y_t''' = x_t \left(1 - \dfrac{120{,}000}{x_{1858}}\right) & \text{if } 1844 < t \le 1858 \end{cases}$$

$$\text{For any } t \le 1862 \begin{cases} y_t'''' = y_t''' \left(1 - \dfrac{100{,}000}{x_{1862}}\right) & \text{if } t \le 1858 \\ y_t'''' = x_t \left(1 - \dfrac{100{,}000}{x_{1862}}\right) & \text{if } 1858 < t \le 1862 \end{cases}$$

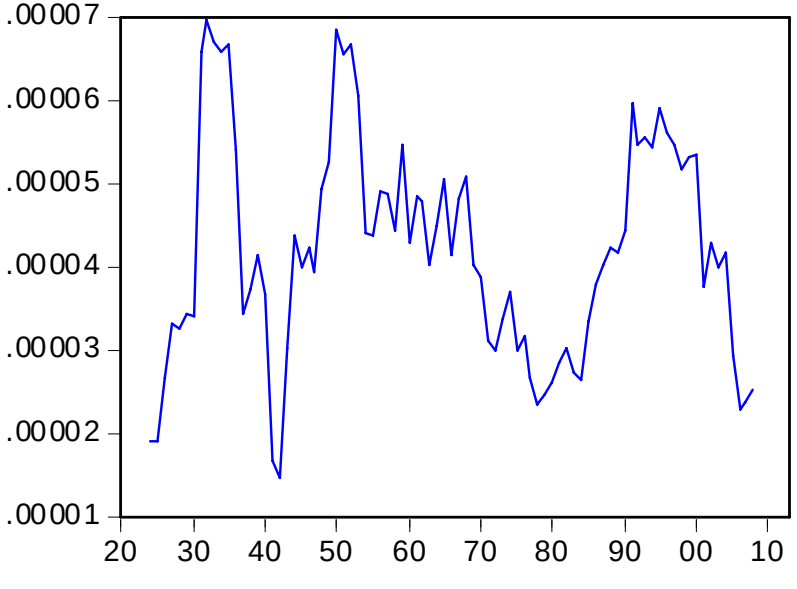
Real GDP



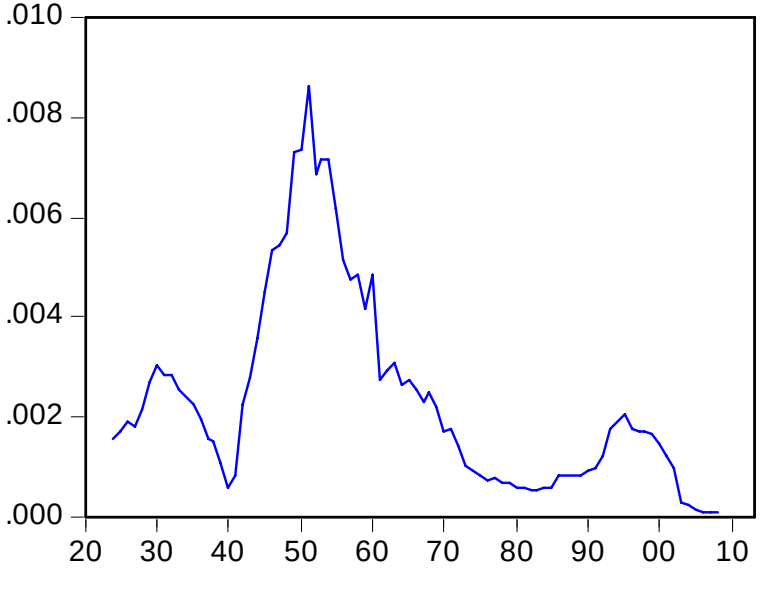
Index of industrial production



Index of industrial prices



Wheat prices



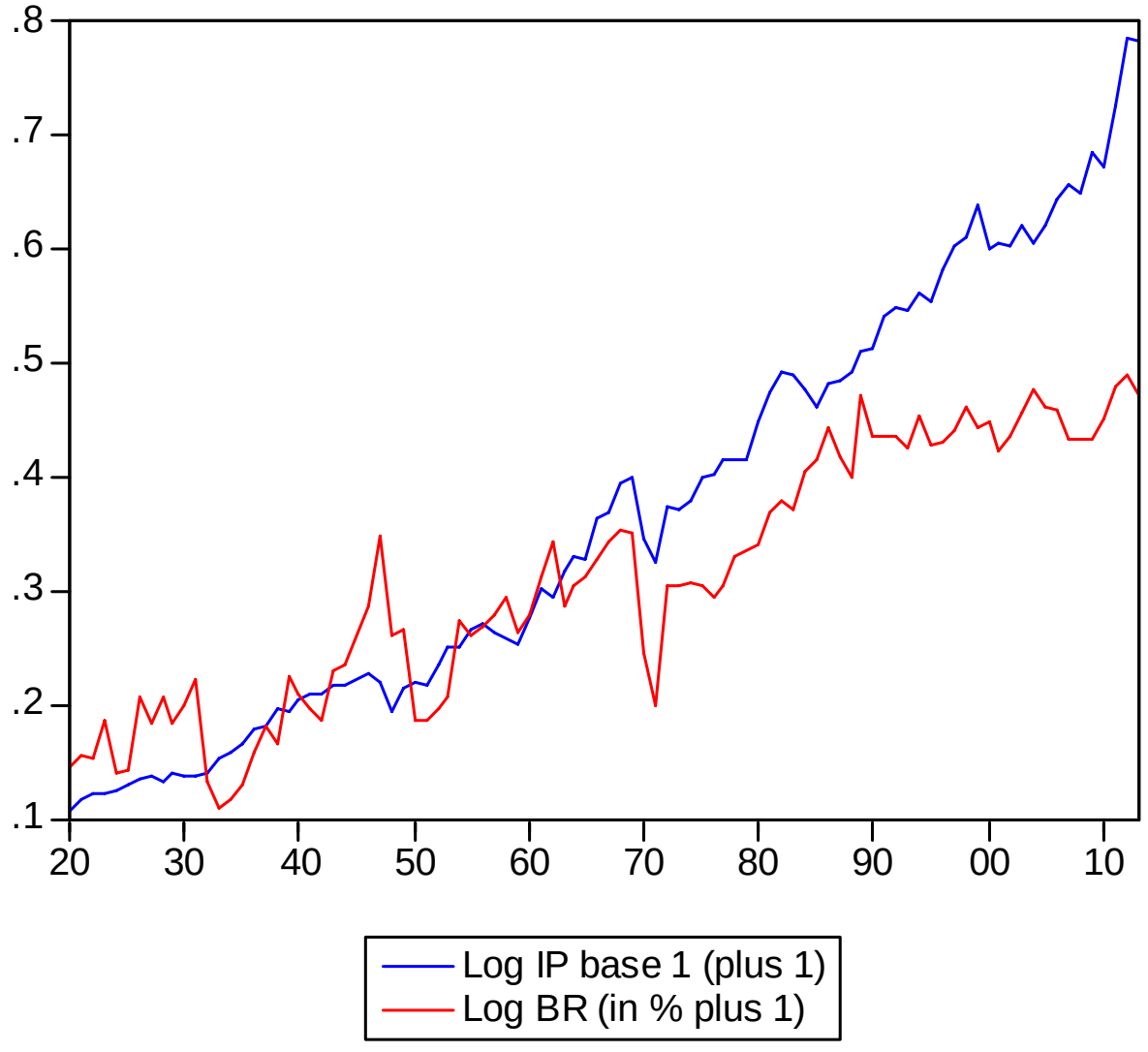
Regression Dev. BR on lagged Dev. wheat

Dependent Variable: DEVTXFAILLJPERCEN				
Method: Least Squares				
Sample (adjusted): 1823 1912				
Included observations: 90 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DEV WHEAT(-1)	0.284384	0.103613	2.744666	0.0074
DEV WHEAT(-2)	0.076624	0.109554	0.699413	0.4862
DEV WHEAT(-3)	-0.259010	0.103232	-2.508997	0.0140
C	-0.000860	0.012943	-0.066413	0.9472
R-squared	0.192724	Mean dependent var		-0.001419
Adj. R-squared	0.164563	S.D. dependent var		0.134285
S.E. of regression	0.122740	Akaike info criterion		-1.314075
Sum squared resid	1.295593	Schwarz criterion		-1.202972
Log likelihood	63.13338	Hannan-Quinn criter.		-1.269272
F-statistic	6.843690	Durbin-Watson stat		1.514417
Prob(F-statistic)	0.000344			

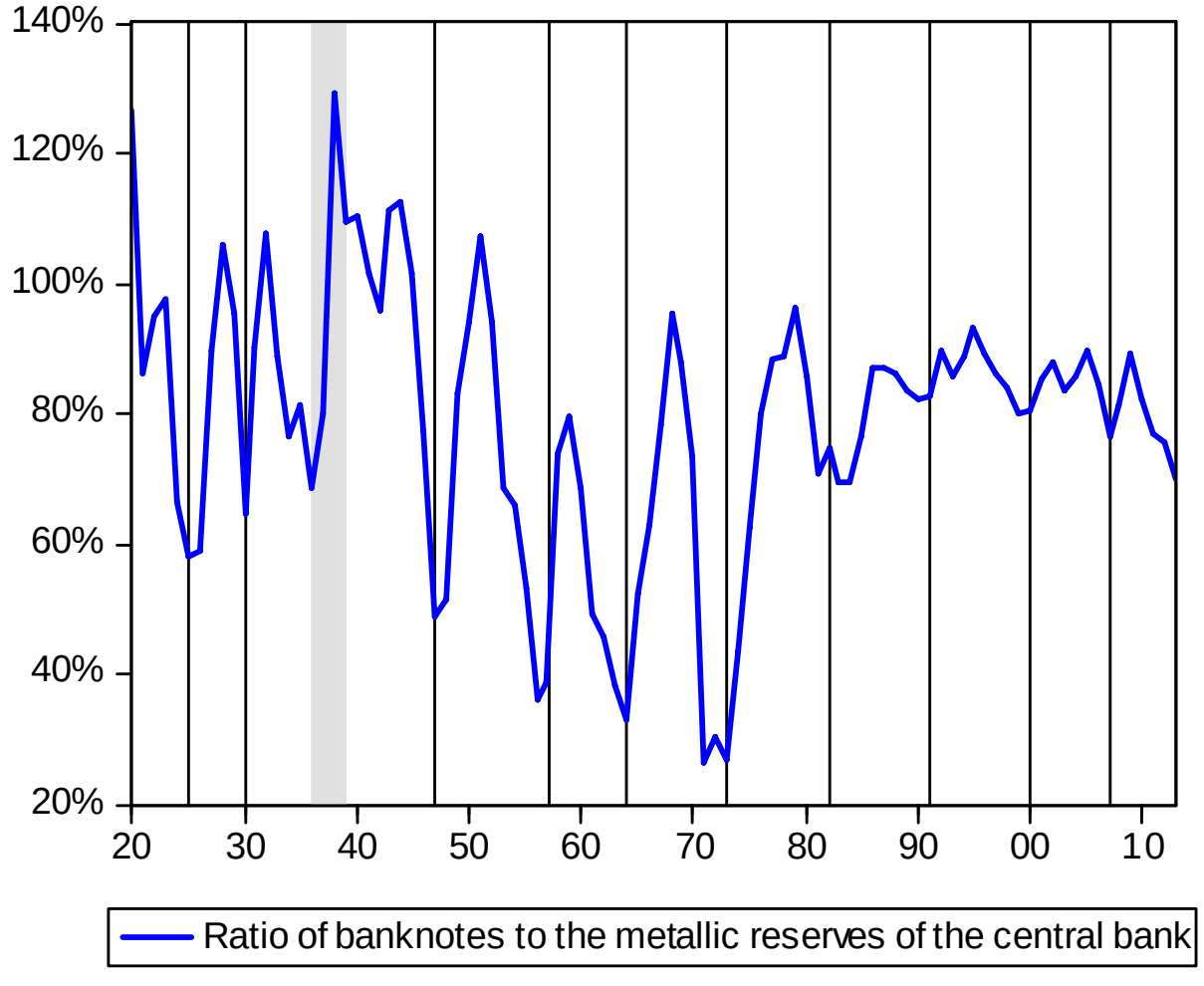
Regression Dev. BR on lagged Dev. Wheat and Dev BR

Dependent Variable: DEVTXFAILLJPERCEN				
Method: Least Squares				
Sample (adjusted): 1823 1912				
Included observations: 90 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DEVTXFAILLJPERCEN(-1)	0.297805	0.114174	2.608348	0.0108
DEVTXFAILLJPERCEN(-2)	-0.013197	0.117761	-0.112062	0.9110
DEVTXFAILLJPERCEN(-3)	-0.075676	0.110590	-0.684295	0.4957
DEVWHEAT(-1)	0.172887	0.110009	1.571571	0.1199
DEVWHEAT(-2)	0.026068	0.113548	0.229577	0.8190
DEVWHEAT(-3)	-0.243108	0.112353	-2.163782	0.0334
C	-0.000834	0.012590	-0.066276	0.9473
R-squared	0.263147	Mean dependent var		-0.001419
Adjusted R-squared	0.209881	S.D. dependent var		0.134285
S.E. of regression	0.119364	Akaike info criterion		-1.338686
Sum squared resid	1.182571	Schwarz criterion		-1.144256
Log likelihood	67.24087	Hannan-Quinn criter.		-1.260281
F-statistic	4.940200	Durbin-Watson stat		2.043533
Prob(F-statistic)	0.000229			

Log IP vs. log BR (+1)

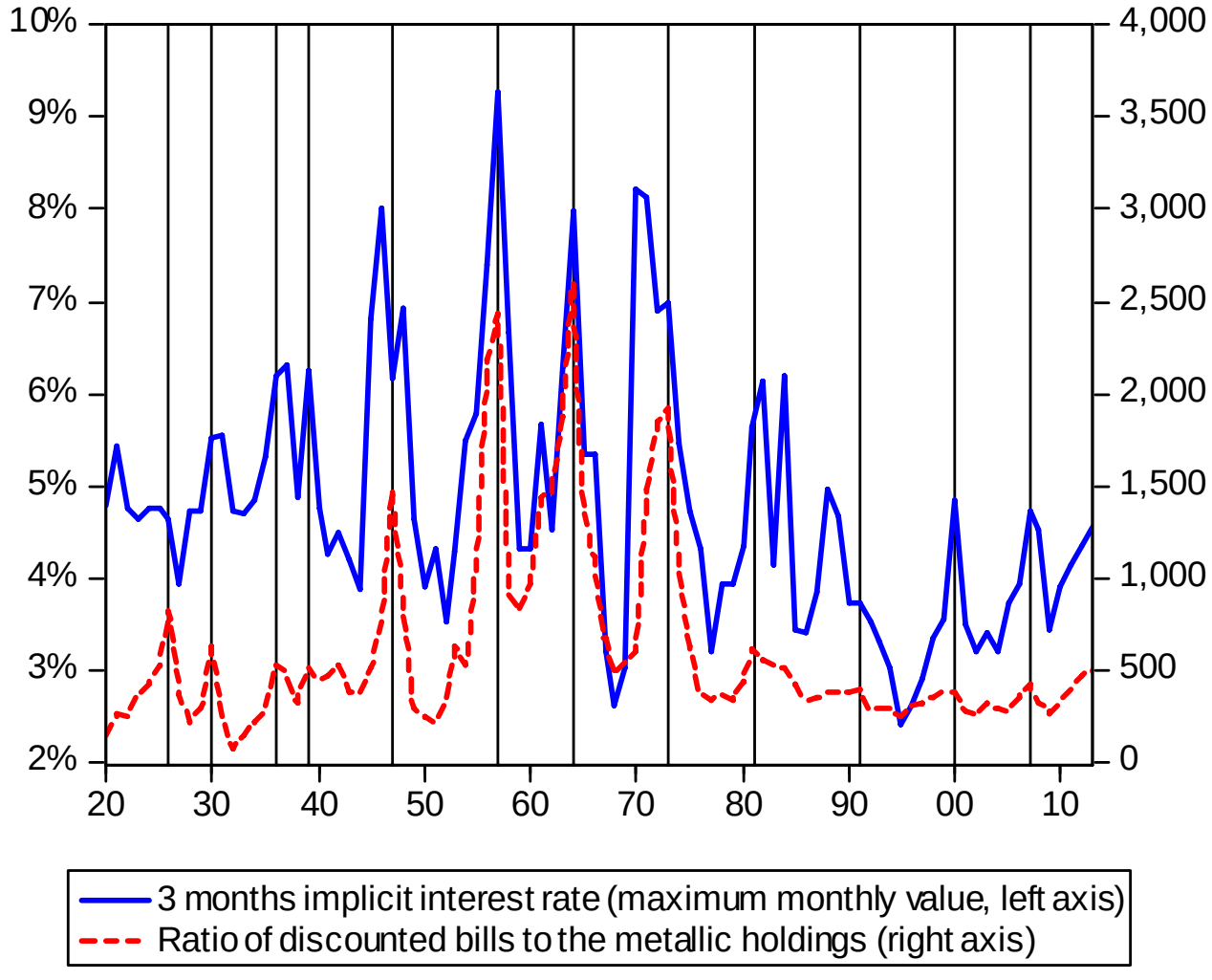


Crisis years according to liquidity ratio of the CB



Vertical lines are crisis' years according to Juglar's criterion

3 months interest rate in London



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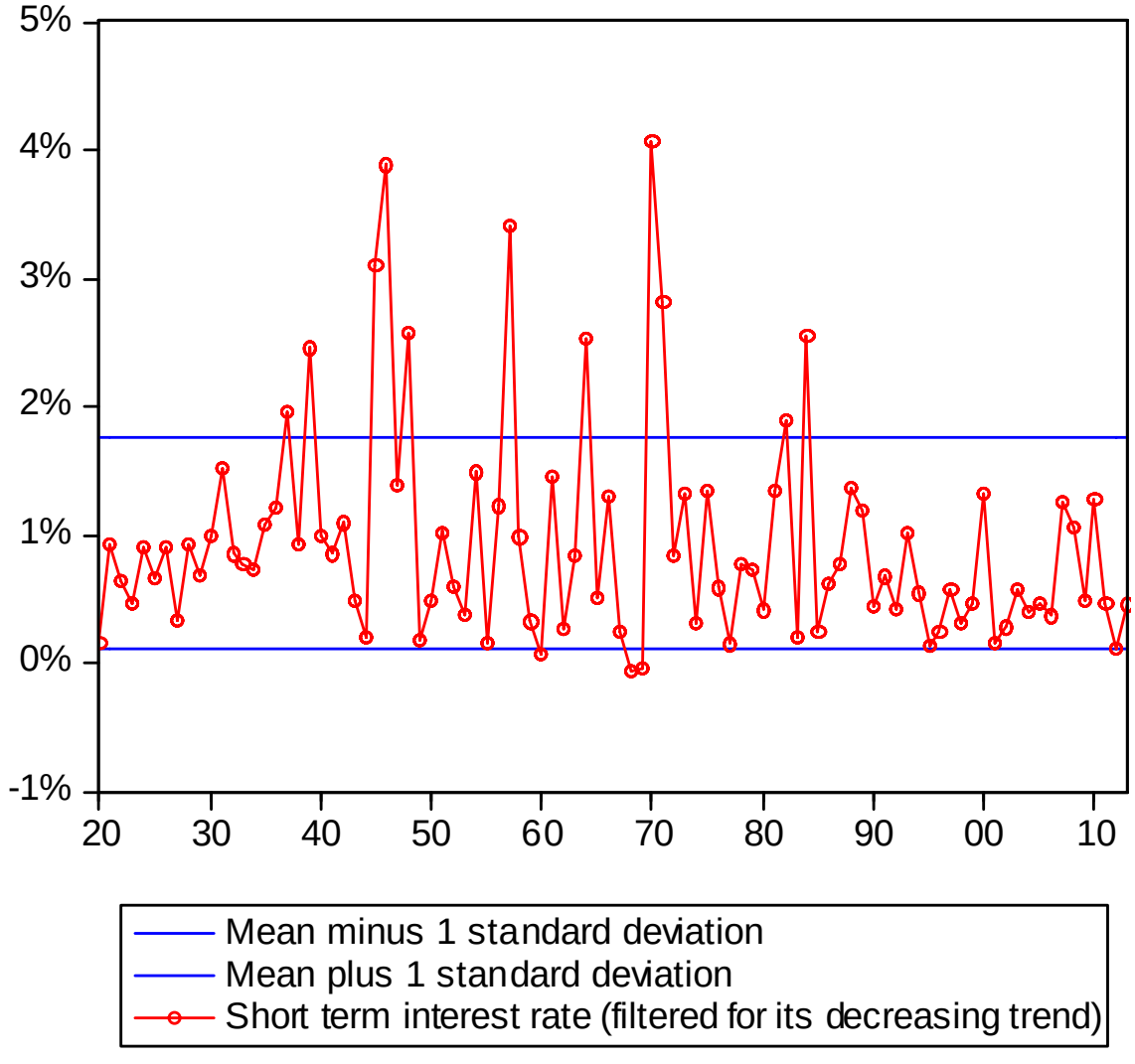
Short-term interest rate peaks



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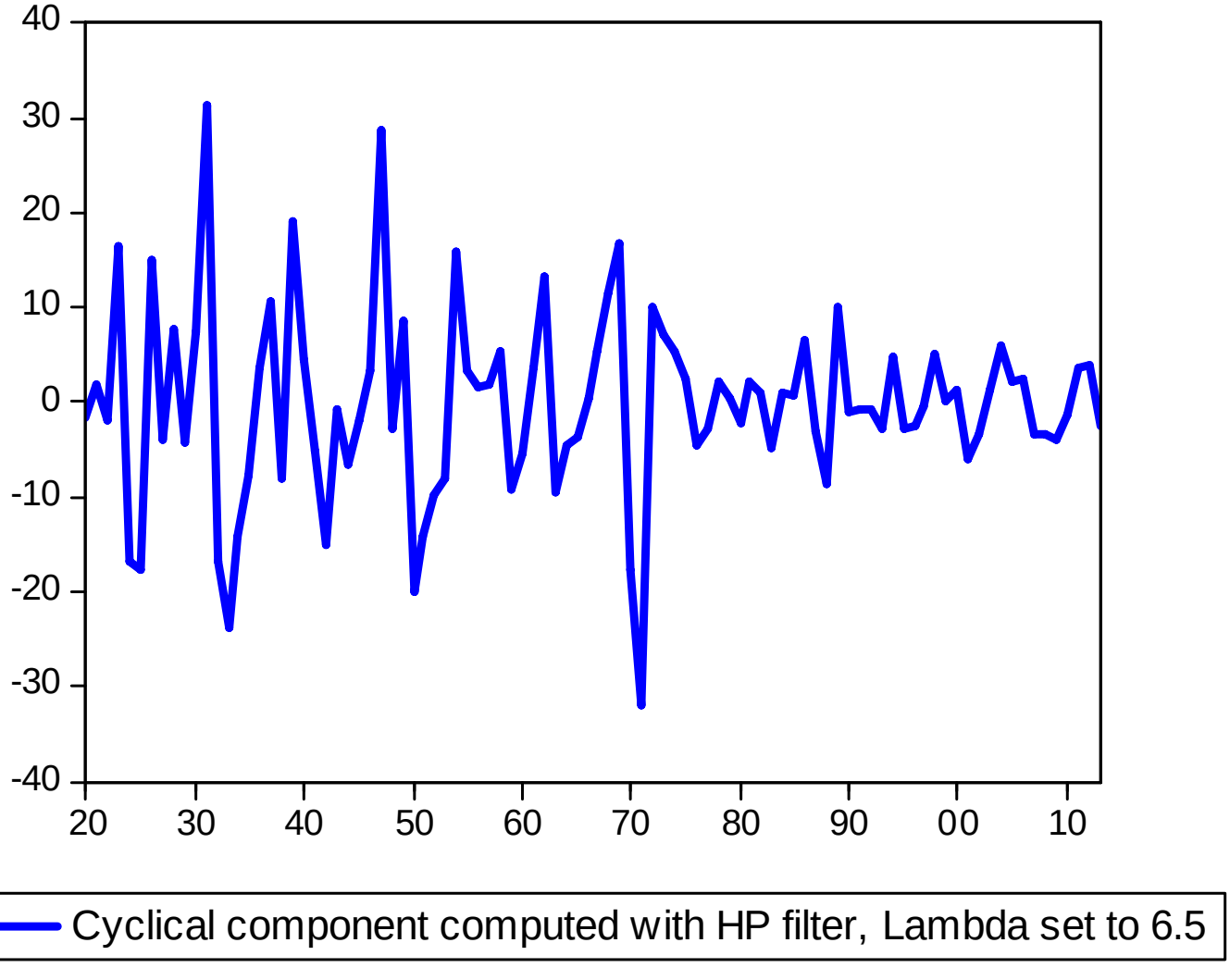

CB advances and discounts