

Cash and Crises: No surprises by the virus

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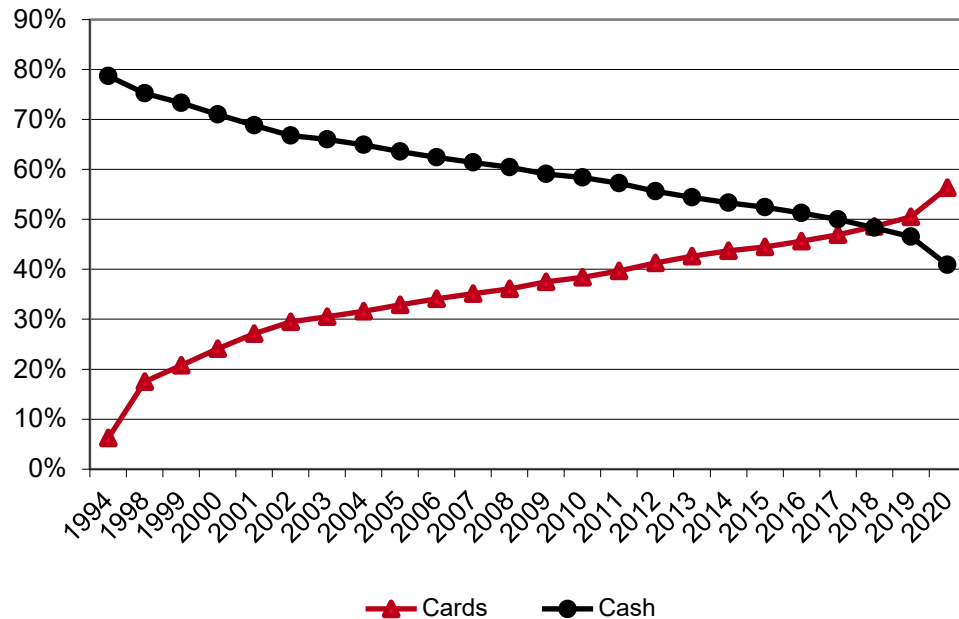


Introduction and motivation

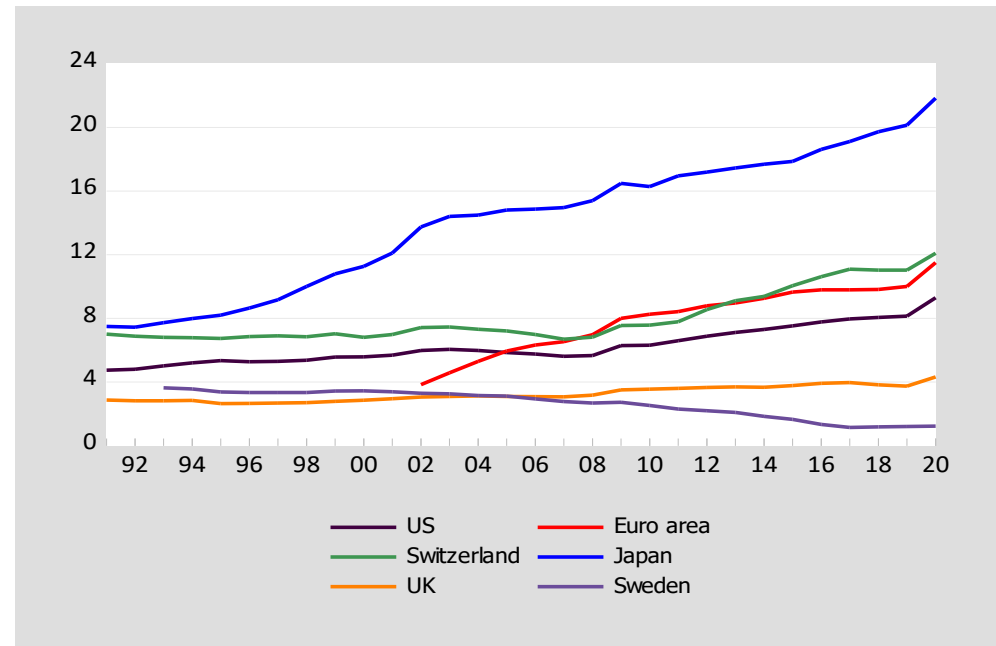
Cash paradox

Cash and card usage at POS

Data for Germany



Cash in relation to GDP (%)

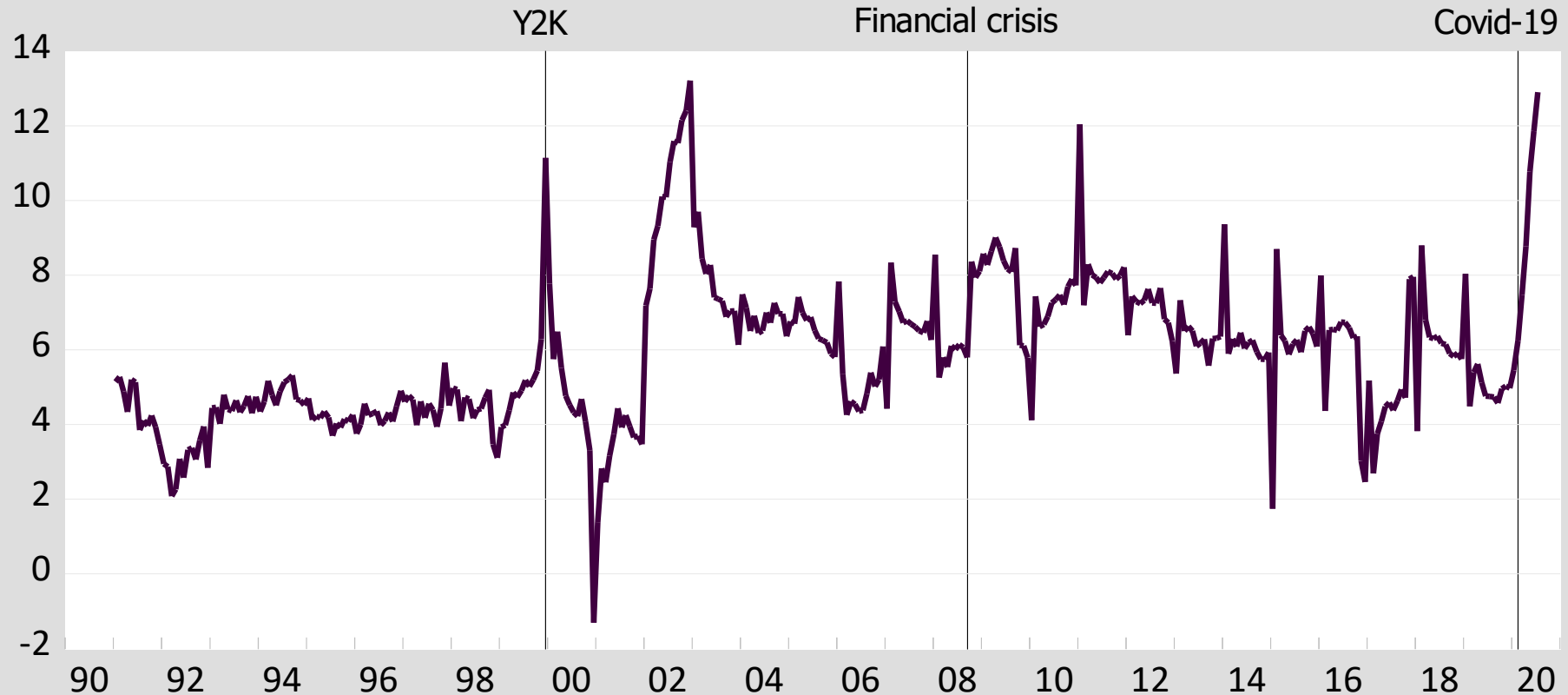


Cash and different crises worldwide

The setting

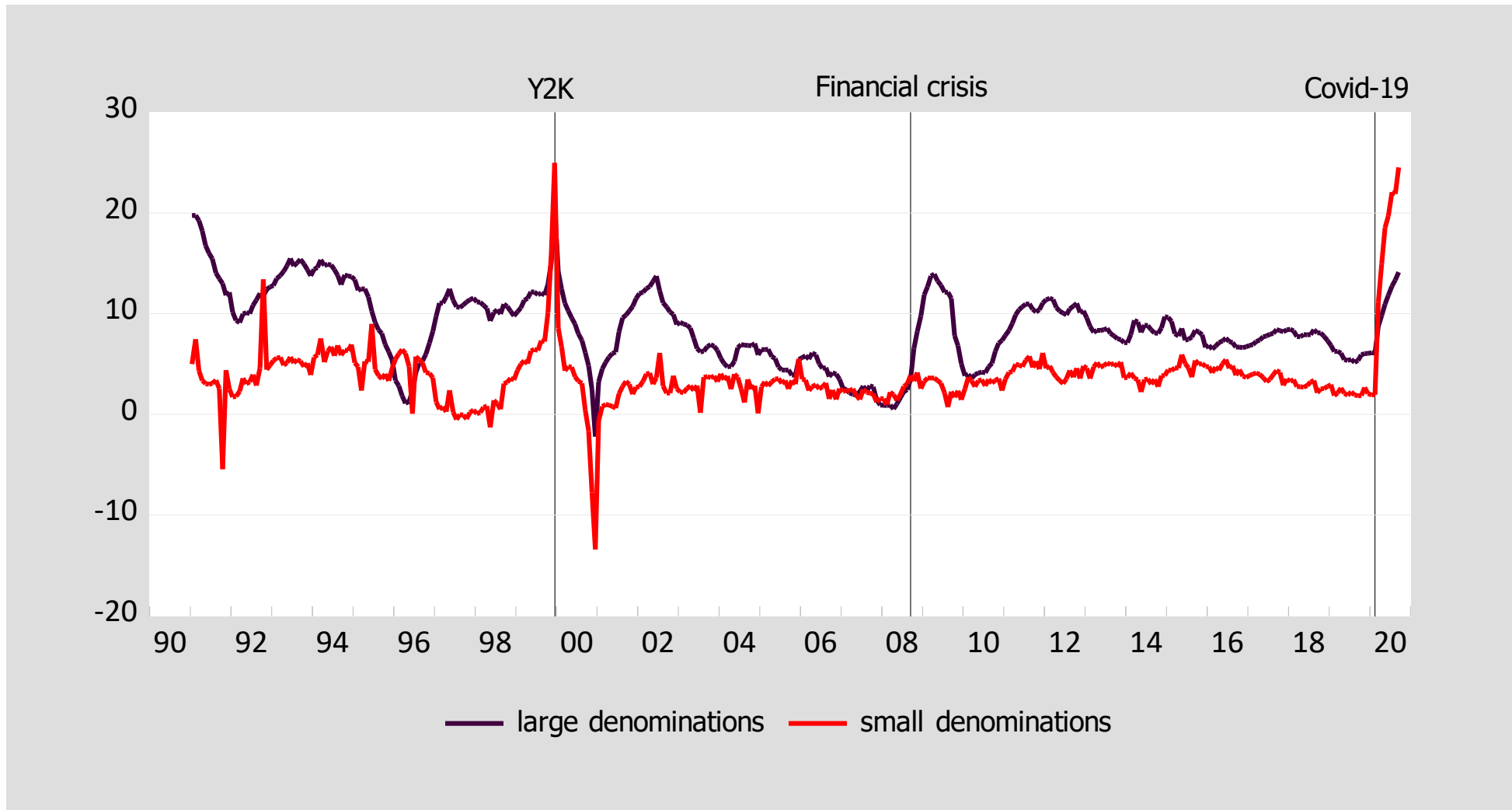
- ▶ Sample: 1990 – 2020, monthly data
- ▶ Countries: Euro area, Germany, US, UK, Switzerland, Sweden, Japan, Australia
- ▶ Three different crises
 - Technological crises (e.g., Y2K)
 - Financial market and economic crises (e.g., 2008/09)
 - Natural disasters (e.g., Covid-19 crisis, hurricanes, earthquakes)
- ▶ Graphical and econometric analysis
- ▶ Small and large denominations
- ▶ Concentration on specific and characteristic examples
- ▶ Crises demand vs. long-run trend

Global cash (annual growth rates in %)

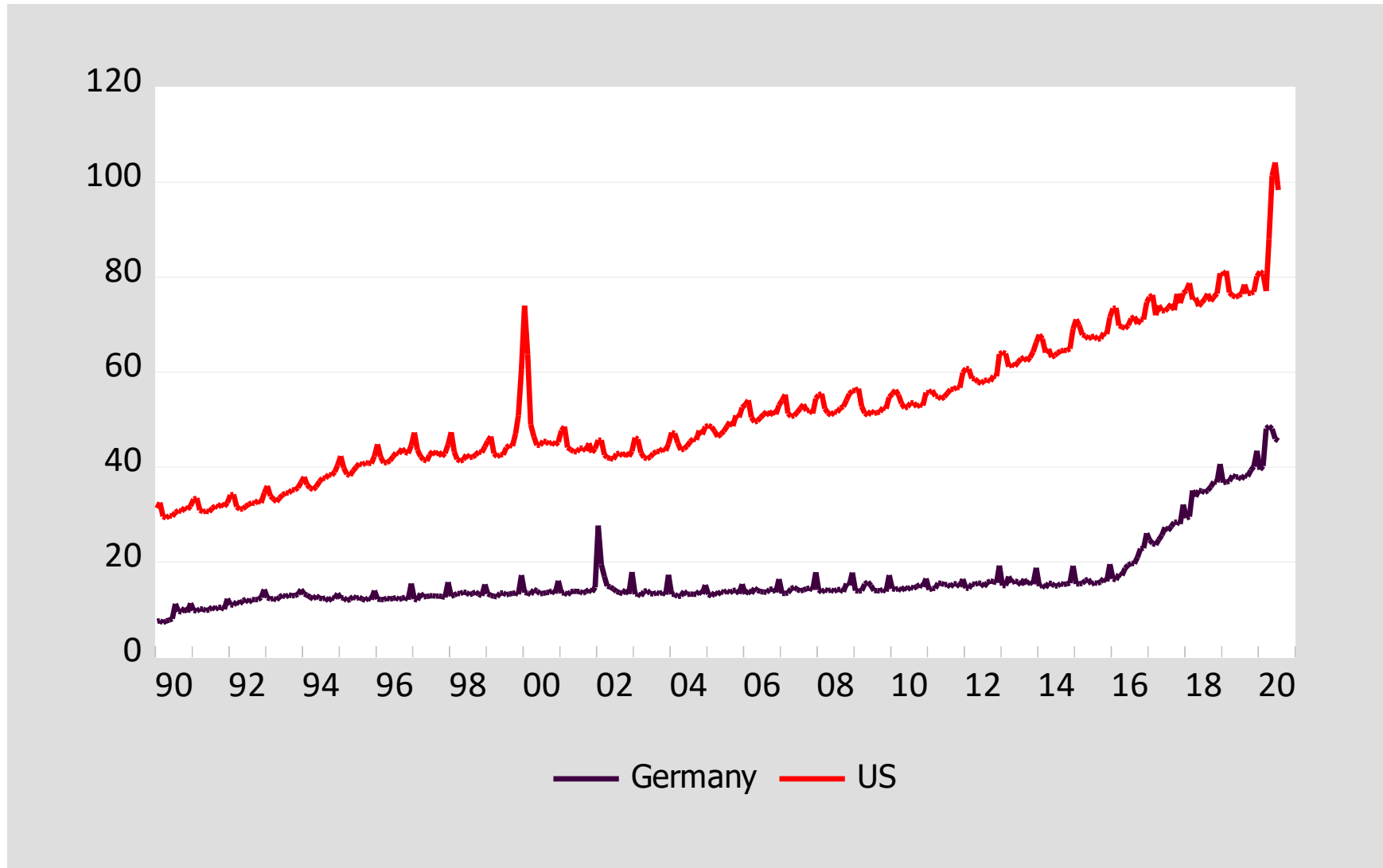


Countries included are Egypt, Australia, Brazil, China (since 2006), Denmark, Germany (until end of 2001), Euro area (since 2002), United Kingdom, India, Japan, Canada, Norway, Russia, Sweden, Switzerland, South Africa, South Korea, USA. National figures converted in US dollar by using the average exchange rate over the data period.

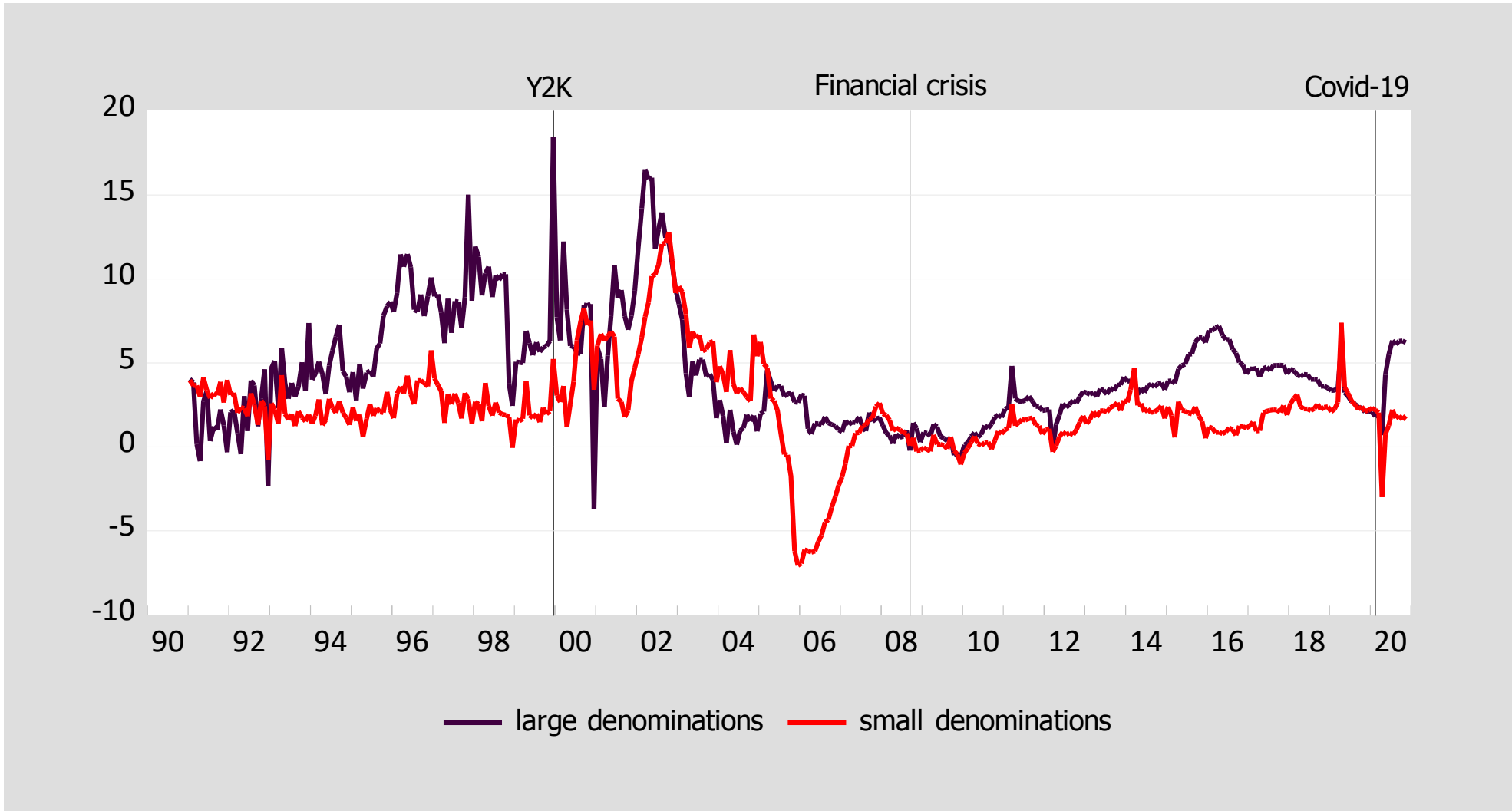
Annual growth rates (%) of small (US-\$ 1-50) and large (US-\$ 100) US dollar denominations



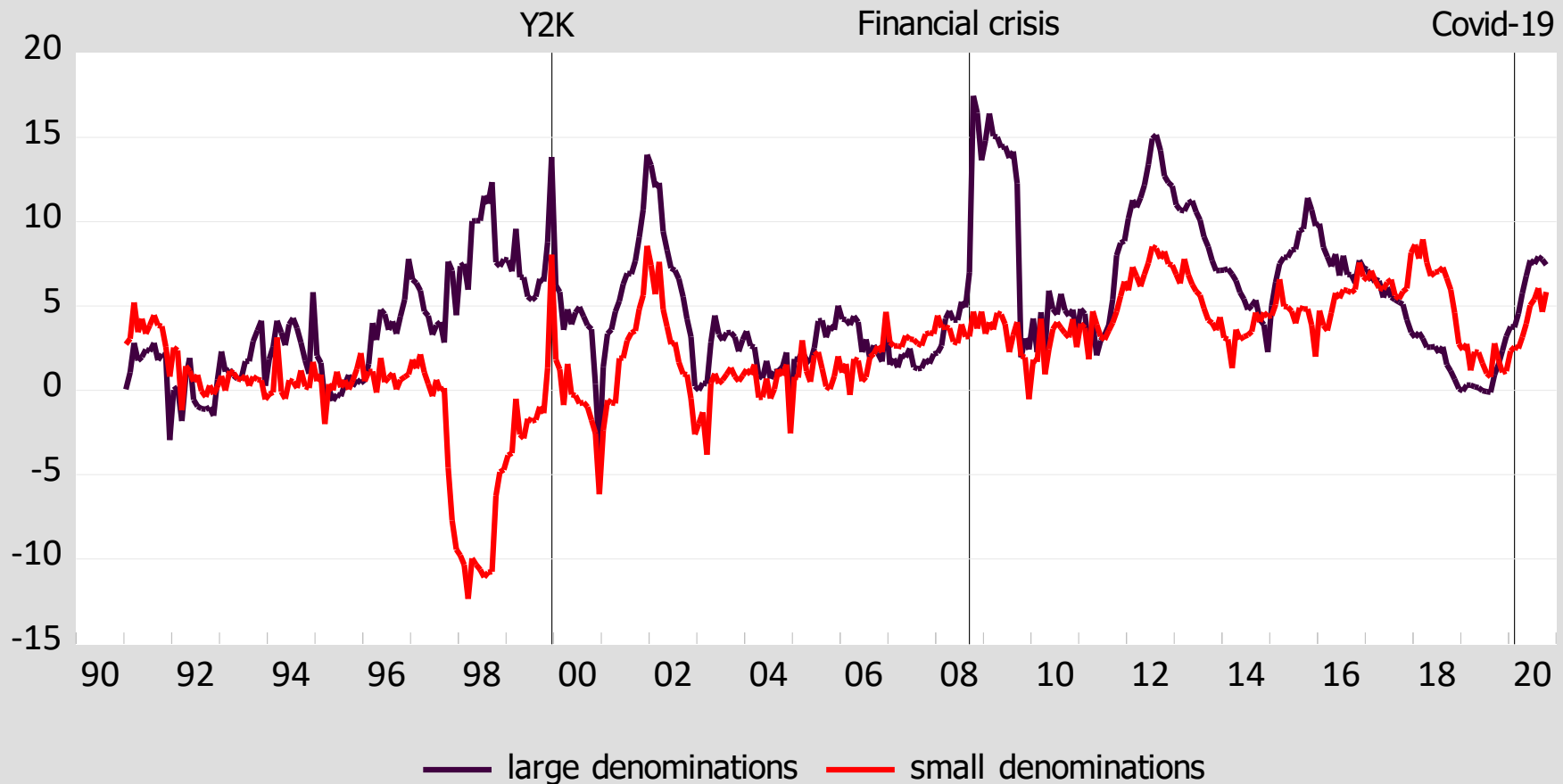
Vault cash of banks in the US and Germany (\$/€ bn)



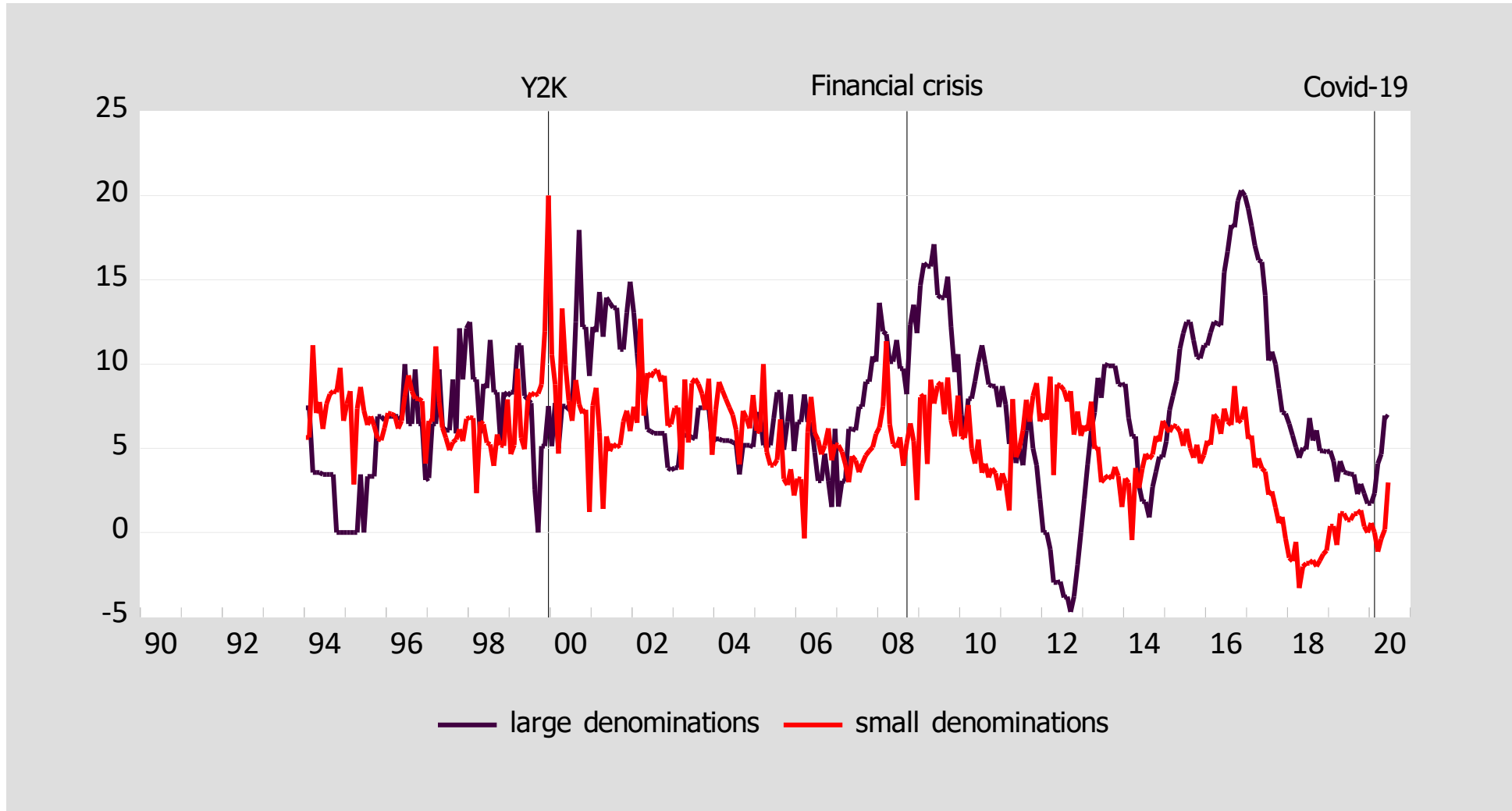
Annual growth rates (%) of small (JPY 500-5,000) and large (JPY 10,000) **JPY** denominations



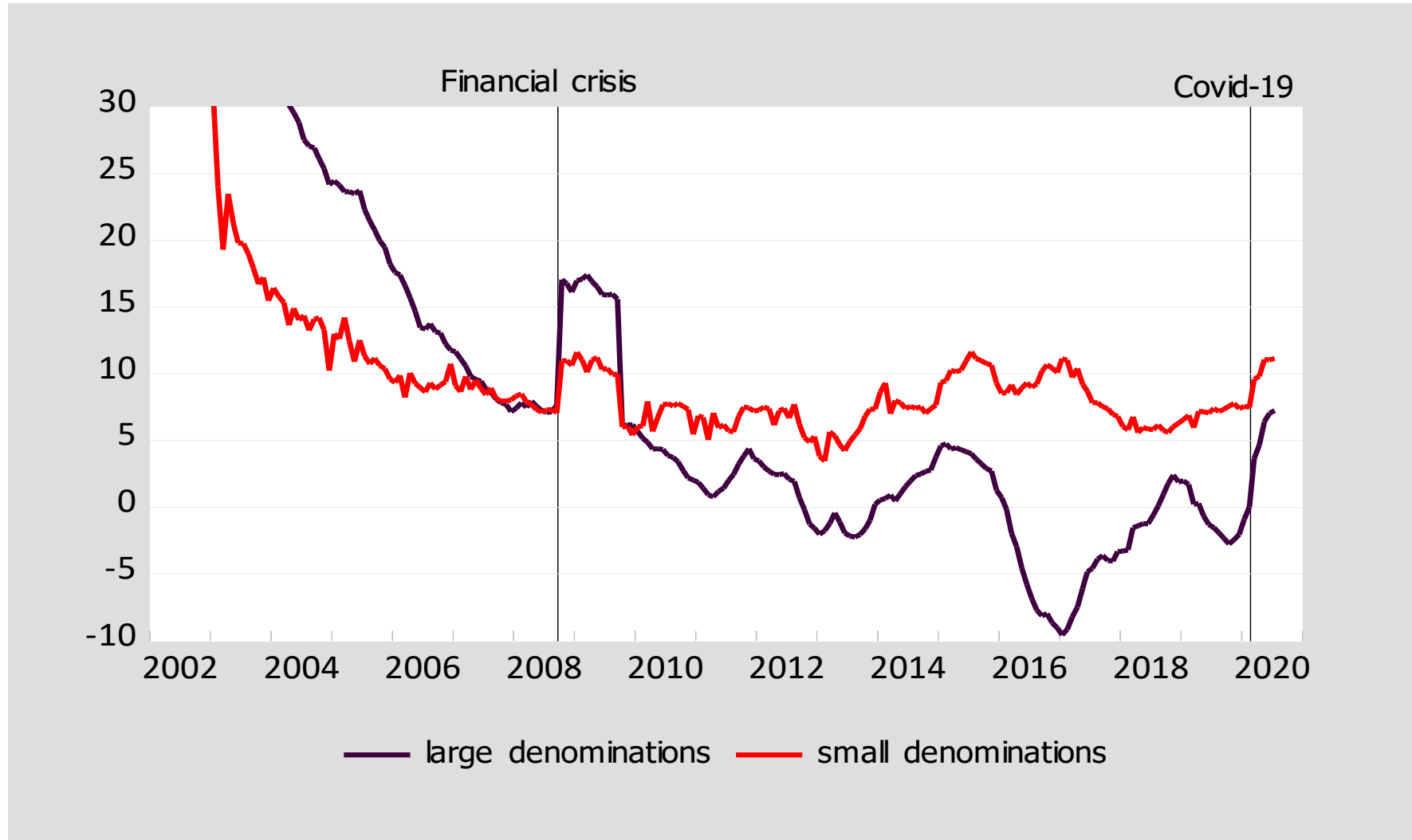
Annual growth rates (%) of small (CHF 5;10;20;50;100) and large (CHF 200;500;1,000) CHF denominations



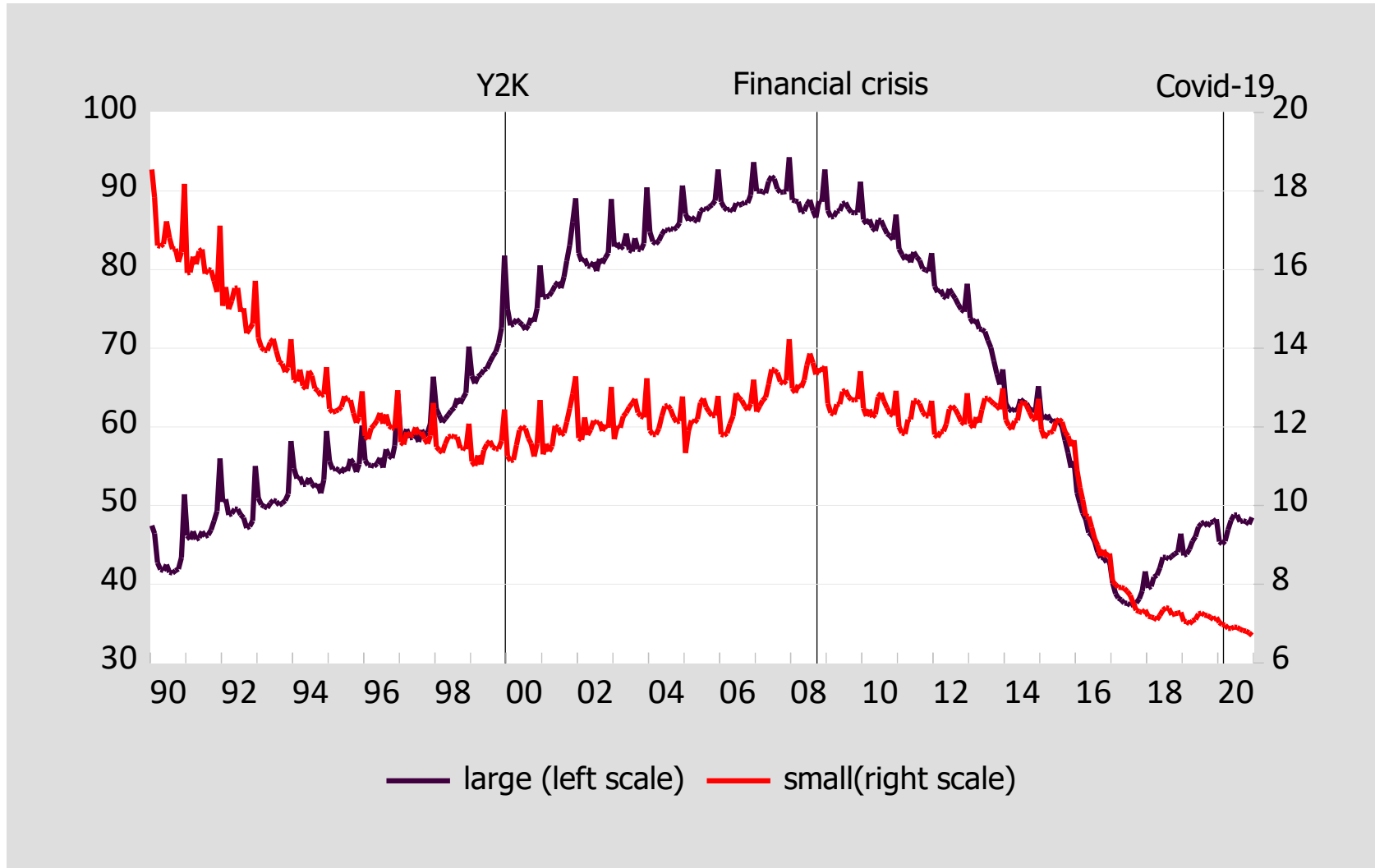
Annual growth rates (%) of small (5, 10, 20) and large (GBP 50) GBP denominations



Annual growth rates (%) of small (EUR 5,10,20,50,100) and large (EUR 200,500) EURO denominations



Sweden: Small (SEK 5;10;20;50;100) and large (SEK 10,000;1,000;500) SEK denominations (SEK bn)



Some econometrics

- ▶ Long-term relationship between cash, its main determinants and crises
- ▶ Standard long-run cash (banknote) demand functions (y, i, e) for small and large denominations augmented with crisis-related dummy variables
- ▶ Eight currencies: USD, JPY, DEM, EUR, CHF, GBP, SEK, AUD
- ▶ Quarterly data from 1990q1 – 2020q3
- ▶ Impulse crisis dummies for Y2K, the financial crisis (fin) and the covid-19 crisis (cov)

$$bn_t = \beta_0 + \beta_1 y_t + \beta_2 i_t + \beta_3 e_t + \beta_4 ytk_t + \beta_5 fin_t + \beta_6 cov_t + \beta_7 x_t + \varepsilon_t$$

Large denominations

	Euro area	US	Switzer- land	Japan	UK	Sweden	Australia	Germany
GDP	-	-	***	***	**	***	**	-
Interest rate	-	**	-	***		-	**	***
Exchange rate	**	***	***	-	-	-	-	-
Y2K		0.05 (0.01)***	0.05 (0.02)***	0.05 (0.01)***	0.02 (0.01)*	0.04 (0.02)**	0.02 (0.01)*	0.00 (0.01)
Fin	0.05 (0.01)***	0.02 (0.01)***	0.04 (0.01)***	-0.00 (0.01)	0.04 (0.01)***	0.01 (0.01)	0.01 (0.01)*	
<u>Cov</u>	0.03 (0.01)***	0.02 (0.01)***	0.02 (0.01)*	0.02 (0.01)*	0.02 (0.01)*	0.04 (0.02)**	0.02 (0.01)***	
x	$bn_{t-1}, bn_{t-4},$ $s(2), s(4)$	$bn_{t-1}, bn_{t-2},$ $s(1), s(4),$ <u>dum_{us}</u> , trend	$bn_{t-1}, s(3),$ $s(4)$	$bn_{t-1}, bn_{t-2},$ $s(1), s(4),$ <u>dum_{ja}</u>	$bn_{t-1}, bn_{t-4},$ $s(1), s(3),$ $s(4)$	$bn_{t-1}, bn_{t-2},$ $s(1), trend$	$bn_{t-1}, bn_{t-2},$ $bn_{t-4}, s(1),$ $s(3), s(4)$	$bn_{t-1}, bn_{t-2},$ $s(4)$ <u>dum_{de}</u>
Sample	03.1-20.3	90.3-20.3	90.2-20.3	90.3-20.3	94.1-20.2	93.1-20.3	91.1-20.3	90.3-00.4
Adj. R ²	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
SE	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01
LM(4)	0.83	0.67	0.01	0.00	0.02	0.04	0.00	0.07
Ramsey	0.83	0.85	0.07	0.15	0.21	0.17	0.33	0.08

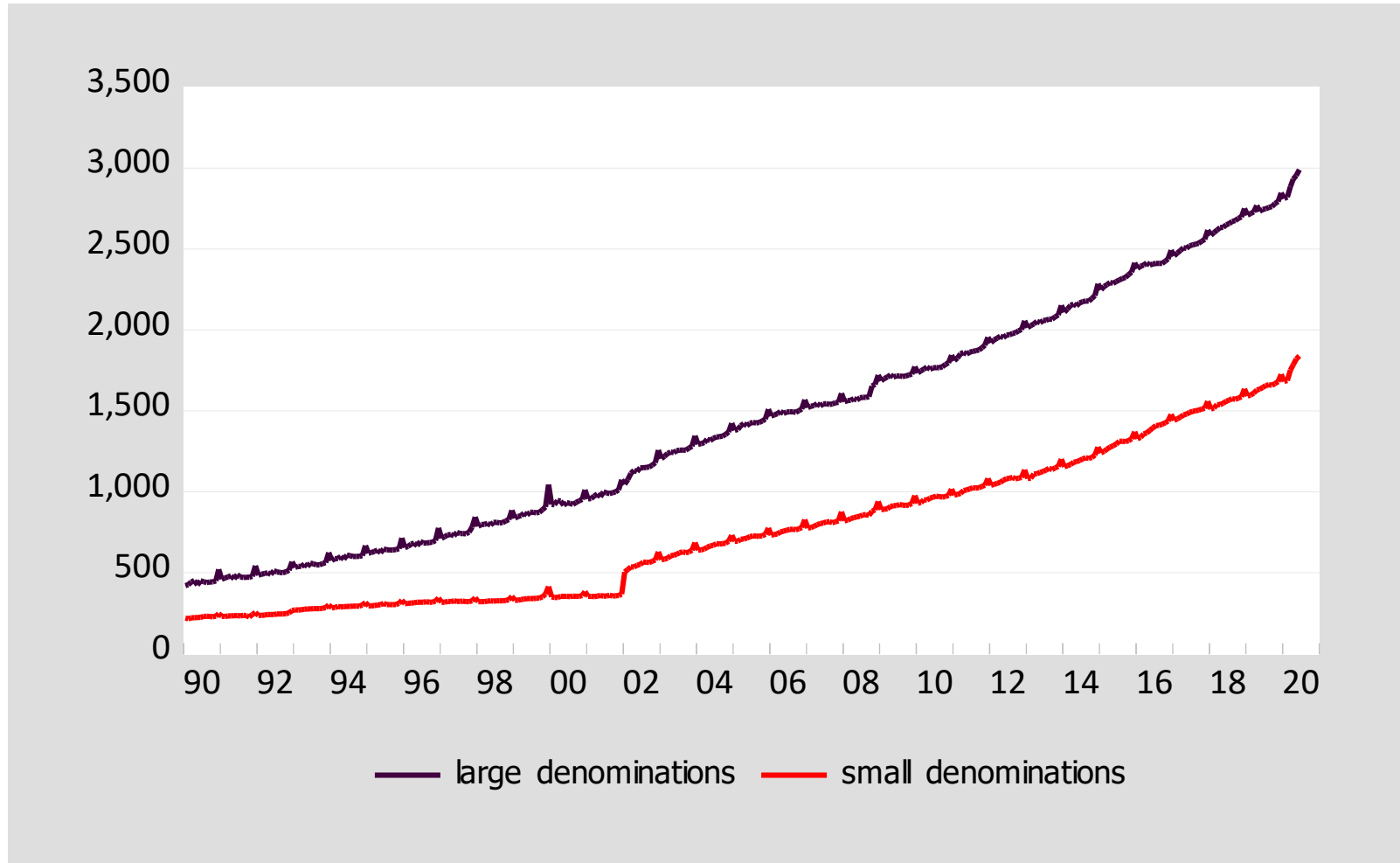
Small denominations

	Euro area	US	Switzer- land	Japan	UK	Sweden	Australia	Germany
GDP	***	-	**	*	-	***	**	***
Interest rate	***	**	-	-	***	-	-	-
Exchange rate	-	-	-	-	-	-	-	-
Y2K		0.11 (0.01)***	0.03 (0.01)***	0.02 (0.01)*	0.06 (0.01)***	0.01 (0.01)	0.03 (0.02)	0.02 (0.01)**
Fin	0.03 (0.01)***	0.02 (0.01)	0.01 (0.01)	-0.00 (0.01)	0.02 (0.01)*	-0.02 (0.01)*	0.05 (0.02)**	
<u>Cov</u>	0.04 (0.01)***	0.09 (0.01)***	0.01 (0.01)**	0.01 (0.01)	0.01 (0.01)	-0.00 (0.01)	0.04 (0.02)**	
x	bn _{t-1} , bn _{t-2} , bn _{t-3} , s(3)	bn _{t-1} , bn _{t-2} , s(1), s(2), s(4), <u>dum us</u>	bn _{t-1} , bn _{t-4} , s(1), s(4), <u>dum swi</u>	bn _{t-1} , s(1), s(4), <u>dum ja</u>	bn _{t-1} , bn _{t-4} , s(1), s(3), trend	bn _{t-1} , bn _{t-4} , s(1), s(4), trend	bn _{t-1} , bn _{t-2} , s(1), s(4)	bn _{t-1} , s(1), trend
Sample	02.4-20.3	90.3-20.3	91.1-20.3	90.2-20.3	94.1-20.2	93.1-20.3	90.3-20.3	91.1-00.4
Adj. R ²	0.99	0.99	0.99	0.99	0.99	0.90	0.99	0.99
SE	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01
LM(4)	0.01	0.54	0.64	0.00	0.06	0.09	0.15	0.70
Ramsey	0.12	0.02	0.04	0.07	0.22	0.20	0.36	0.01

Results on cash demand in times of crises

- ▶ **Confirmation** of the preliminary results of the visual inspection (general influence of the crisis, but also - relative and absolute - magnitudes)
- ▶ Significant results in 31 of our total of 42 crisis cases.
- ▶ Strongest crisis influence for the case of the small denominations in the US (Y2K, Covid-19)
- ▶ **Nature of the crisis** determines which denominations are affected and how
 - Payment uncertainties → small denominations
 - Uncertainties in the financial sector → large denominations
- ▶ Additional dummy variables with crisis relevance (Y2K decrease, Asian and Russian crises, introduction of Euro cash, EMS crisis)

Transactional vs. non-transactional demand for cash: The long run



Data refer to the following banknotes in circulation: USD, DEM/EUR, JPY, CHF, GBP, SEK, AUD. Data in USD billion.

Results on long-run cash demand

- ▶ **Global trend shift** from small **towards large denominations**
- ▶ **Trend shift** largely **unaffected by crises**
- ▶ **Cash as an insurance** against uncertainties

Summary, conclusion

- ▶ **In times of crisis, total cash demand increases** independent of the type of crises
- ▶ However, **type of crisis has an influence on** cash demand for **small** or **large denominations**
- ▶ The impact of **crises** on the general **trend** in cash demand towards more non-transactional balances seems to be limited
- ▶ **Cash** as **insurance** device and **save haven**

Thank you very much for your attention!

Any questions?

References

Rösl, G. & F. Seitz, "[Cash and Crises: No surprises by the virus](#)", *IMFS Working Papers*, No 150, Institute for Monetary and Financial Stability, Frankfurt, 2021.