

## Contents

1. Literature
2. Functions of money
3. Liquidity of assets
4. Reasons for keeping assets with examples for individual types of assets
5. Different money aggregates
6. The relation between the net foreign exchange positions, budget balances, bank loans, and the monetary position of the Monetary Financial Institutions and of the private, domestic non-banks
7. Price-dividend-ratio at different discount rates ( $i$ ) and different rates of growth of the dividend ( $\mathbf{T}$ )
8. 1 Burden of debt at different rates of growth and interest  
2. Burden of debt at different rates of growth and interest with inflation
9. About the connection between the deficit quota, growth rate, interest quota and the rate of price increase
10. 1. US Receipts and disbursements and National defence of the United States  
2. General Government financial balance, rates of growth and debts in % of the
11. Covered interest parity 1
12. Covered interest parity 2
13. Covered interest parity 3
14. The development of the consumers prices in the area of the German Reich between 1900-1944 and in the German Federal Republic between 1948-1995
15. Rates of increase of consumers prices, growth of the monetary base and of the money volume M1 in % compared to the preceding year in the United States between 1950 - 1994
16. Indexes of the consumer's prices of selected countries 1950 – 1990
17. Relation between the average, annual rate of growth of the money volume M1 ( $m$ ) and of the nominal gross national product (GNP) in selected countries between 1966 and 1991
18. Relation between the average, annual rate of growth of the central bank money and the consumer's prices ( $P$ ) in selected countries between 1966 and 1991
19. Relation between the average rates of growth of the central bank money and of the gross national product (GNP) in selected countries between 1966 and 1991
20. Change in the velocity of circulation of the central bank money in selected countries between 1966 and 1991
21. Selection of base at relative real exchange rates: DM/US-\$ Exchange rate, inflation differentials and relative real exchange rate

22. Exchange rate of the Dollar and purchasing power parity
23. Nominal-and Real interest rates 1960 - 1996
24. Discount Rate and:... long term interest rate,... inflation, and....growth of GDP in Germany
25. Put-Call-Parity
26. Relation between the distribution function and expected value
27. Transformation of Risks
28. Gresham's law
29. The respective increasing tenfold of the exchange rate of the Dollar since the outbreak of the German War
30. Gold price
31. The respective increasing tenfold of the exchange rate of the Dollar since the outbreak of the German War
32. Financial balance of the Deutsche Bundesbank and the Banque de France before and after the wave of speculation against the Franc in the context of the plebiscite over the treaty of the European Union in France at September 20th 1992
33. The finances of the European Union and the German contribution to it 1980-2003
34. The way the exchange rate mechanism of the EMS works
35. Short description of the Economic and Monetary Union
36. Present Value, Compound Interest, Present Value of Annuity, Capital Recovery Factor
37. Sources of EU Law
38. Prisoner's Dilemma

Bagehot, Walter: Lombard Street. Homewood 1962 (1873).

Bresciani-Turroni, C.: The Economics of Inflation. New York o.J. (ca. 1937).

Burda, Michael C.; Wyplosz, Charles: Makroökonomik. Franz Vahlen: München 1994. (Engl. Oxford University Press: 1993).

Conolly, Bernhard: The Rotten Heart of Europe. Faber and Faber: London, New York 1995.

Davis, Andrew McFareland: A historical Study of Law's System. In: Quarterly Journal of Economics. Bd. 1 (1886/87), S. 289-318 und 420-452.

De Grauwe, Paul: The Economics of Monetary Integration. Oxford University Press: Oxford, New York, Toronto 1992.

Deutsche Bundesbank (Hrsg.): Wahrung und Wirtschaft in Deutschland 1876-1975. Frankfurt 1976.

Dewey, Davis Rich: Financial History of the United States. 6th Ed. 1918 (1903).

Dornbusch, Rüdiger; Draghi, Mario: Public Debt Management: theory and history. Cambridge University Press: Cambridge, New York und Oakleigh, Victoria 1990.

Eichengreen, Barry: European Monetary Unification in: The Journal of Economic Literature. Vol. XXXI (September 1993) No. 3, S. 1321-1357.

Europaische Zentralbank: Die Geldpolitik der EZB. Europaische Zentralbank 2001.

Feavearyear, Sir Albert: The Pound Sterling. A History of English Money. 2nd. Ed. Rev. by Morgan, E. Victor. Oxford 1961 (1931).

Feldman, Gerald D.: The great disorder: politics, economics, and society in the German inflation, 1914 -1928. Oxford University Press: New York 1993.

Friedman, Milton; Schwartz, Anna Jacobson: A Monetary History of the United States 1867-1960. 5th Printing. Princeton 1971 (1963).

Galbraith, John Kenneth: Geld. Woher es kommt, wohin es geht. München/Zürich 1976 (Money. Whence it comes, where it goes. Boston 1975).

Guiseppe, John: The Bank of England from its foundaton in 1694. London 1966.

History of the Principle Public Banks. Collected by J.G. van Dillen. New York 1964 (1934).

Issing, Otmar: Einführung in die Geldpolitik. Franz Vahlen: München. WISO Kurzlehrbücher, neueste Auflage.

Issing, Otmar: Einführung in die Geldtheorie. Franz Vahlen: München. WISO Kurzlehrbücher, neueste Auflage.

Keynes, John Maynard: The Economic Consequences of Peace. London 1920 (1919).

Keynes, John Maynard: The General Theory of Emoloyment Interest and Money. MacMillan: London 1936. 10th Reprint 1960.

Keynes, John Maynard: Vom Gelde. Berlin 1955. Englisch: A Treatise on Money. 1930.

Arbeitsunterlage 1: Literaturauswahl

---

Kommission der EG. Generaldirektion Wirtschaft und Finanzen. Nr.44: Ein Markt - eine Wahrung. Europaische Wirtschaft (Oktober 1995).

McKinnon, Ronald M.: The Rules of the Game: International Money in Historical Perspective. In: The Journal of Economic Literature. Vol. XXI (1993), S. 1 - 44.

NAIRU: Sechs Artikel von: Stiglitz; Gordon; Staiger/ Stock/Watson; Blanchard/Katz; Rogerson; Galbraith, James. K. In: The Journal of Economic Perspectives. Vol 11 Nu. 1, Winter 1997.

Neumann, Wolfgang: Auf dem Weg zu einer Europaischen Wirtschafts- und Wahrungunion. Deutscher Sparkassenverlag GmbH. Stuttgart 1991.

Niehans, J.: Theorie des Geldes. Bern 1980.

Niehans, Jurg: Internationale Kredite mit undurchsetzbaren Forderungen. In: Die internationale Schuldenkrise. Ursachen- Konsequenzen- Historische Erfahrungen. Schriften des Vereins fur Sozialpolitik. Gesellschaft fur Wirtschafts- und Sozialwissenschaften. Neue Folge. Band 155. Duncker & Humblodt: Berlin 1986, S.151-179

Nogaro, Bertrand: La Monnaie et les Systèmes Monétaires. Paris 1948.

Nußbaum, Arthur: Money in the Law. National and International. 2nd Ed. Brooklyn 1950.

Richter, Rudolf: Geldtheorie. Vorlesung auf der Grundlage der Gleichgewichtstheorie und der Institutionenonomik. Springer Verlag: Berlin u.a.O. 1987.

Rogoff, Kenneth: The Purchasing Power Parity Puzzle. In: The Journal of Economic Literature. Vol. XXXIV Nu. 2 (1996), S. 647-668.

Seater, John J.: Ricardian Equivalence. In: The Journal of Economic Literature. Vol. XXXI (1993), S. 142 - 190.

Stutzel, Wolfgang: Volkswirtschaftliche Saldenmechanik. J.C.B. Mohr (Paul Siebeck): 2. Aufl. Tubingen 1978 (1958)

Stutzel, Wolfgang: Bankpolitik - heute und morgen. 3. Aufl. Fritz Knapp Verlag: Frankfurt 1983 (1964).

Taylor, Mark P.: The Economics of Exchange Rate. The Journal of Economic Literature. Vol. XXXIII (1995), S. 13 - 47.

The Political Economy of Government Debt. Hrsg.: Verbon, Harry A.A.; van Winden, Frans A.A.M. Contributions to Economic Analysis Hrsg.: Tinbergen, J. Jorgenson, D.W.; Laffont, J.-J.; Persson, T. North Holland: Amsterdam , London, New York, Tokyo 1993.

Theurl, Theresa: Eine gemeinsame Wahrung fur Europa. sterreichischer Studienverlag: Innsbruck 1992.

Welcker, Johannes; Nerge, Carsten: Die Vertrage von Maastricht - Zum Scheitern verurteilt? Verlag Moderne Industrie: Landsberg 1992.

White, Andrew Dickson: Fiat Paper Money in France. In: Cato-Paper no. 11. San Francisco 1980 (1959).

Willms, Manfred: Internationale Wahrungspolitik. 2. Aufl. Franz Vahlen: Munchen: Munchen 1995 (1992).

Where do amounts of money appear	functions of money
<ol style="list-style-type: none"> <li>1. in accountancy and cost accounting</li>   <li>2. in the context of purchase-and barter arrangements               <ol style="list-style-type: none"> <li>a. to express prices</li> <li>b. in return for something</li> </ol> </li>   <li>3. in the context of credit contracts (arrangements)               <ol style="list-style-type: none"> <li>a. to define the amount to be paid</li> <li>b. to define the content of the owed payment</li> </ol> </li>   <li>4. in donations and tax payments</li>   <li>5. as a hoard</li> </ol>	<ol style="list-style-type: none"> <li>1. as a unit for calculation</li> <li>2. as an inter-temporal measure of wealth</li> <li>3. as a standard to define risks and uncertainties</li>   <li>4. as a standard of value, numeraire</li> <li>5. as a general medium of exchange</li>   <li>6. as a standard of deferred payment</li> <li>7. as away to transfer deposits</li> <li>8. as a mean to pay debts</li>   <li>9. as a general means of payment</li>   <li>10. as a store of value</li> <li>11. as a way to obtain social prestige/status</li> <li>12. as reserve assets</li> </ol>

**Reasons for keeping assets with examples for individual types of assets**

Type of asset Stock Satisfies the following need	Non-monetary assets	Cash	Means of payment	Net financial assets	Net wealth
Utility of a good	Machines flats	Money to show off	Window-dressing	-	To exert power
Buffer needs a) caused exogenously Continuous out-flow Discontinuous in-flow	Harvest stocks	Holidays, holiday trips	Stocks kept because of periodical payment of wages	-	Life -cycle- determined savings
Discontinuous out-flow Continuous in-flow	Stocks of coal for the household		Stocks kept for the tax payment date		So called target- saving
b) Need of a decline of unit costs at an increasing lot size	Stocks because of fixed costs of acquisition of independent of lot size	Way to the bank	"Baumol" -case, Borrowing or Liqui- dation of assets cause considerable fixed cost independent of lot size	-	
c) caused by caution - risk of abnormal decrease of in-flow	Panic/hoarded stocks because of expected bad harvests	run at the danger of insolvency of a bank (1931)	Danger of credit stop = Precautionary money holdings	-	Risk-determined savings
- risk of abnormal increase of out-flows	Spare tyres, weapons	cash holdings of banks	because of accident or illness during holidays		Risk-determined savings
Value store (=need of an inter temporal transport of assets, reason for speculation	Stocks of gold, provisions of food because of possible crop shortfalls		Expected increase of interest = speculation holdings	Escape into money values, if interest is higher than those of non-monetary real sets	

## Liquidity of assets

Determinants of Liquidity...	...of goods		...of claims	
	Higher degree of liquidity	Lower degree of liquidity	Higher degree of liquidity	Lower degree of liquidity
Self-liquidation period	Stock of produced goods provision	buildings	3-month bill of exchange	Mortgage bond
-Shiftability Risk of change in quality	Gold	Strawberries	Deposits with bank	Claims against a private construction company
Risks of fluctuation of price	Wheat (agricultural market order in EU)	Copper	Short-term credits	Long-term credits
Market elasticity, market dept	Cars	Antics	Tatneft shares Obligations	Rostowenergo shares
Transaction costs	Goods traded on the exchanges	Real estate	Bonds	Shares and stocks

---

**Different money aggregates**

Banknotes + Sight deposits with banks	+ Coins = cash, hand to hand money
+ Central bank money + Coins	- Holdings of national public households of money of highest liquidity = <b>high powered money</b>
= Money of highest liquidity - Sight deposits with the central bank	
= Money in circulation - Cash balance of the monetary financial institutions (I M F)	
= Money in circulation outside of the banking system (with the cash balance of the IMFs) + Sight deposits of national non-banks and of foreigners with banks	+ Sight deposits of banks with other banks = money in account
= Money volume of national non-banks and of foreigners - Money volume of foreigners - Money volume of the government	
= Money volume of <u>private</u> national non-banks + Over night deposits of regional and local communities	
<b>= Money volume M1</b> (according to the definition of the European Central Bank (ECB)) + Fix-term deposits of national non-banks with a maturity up to two years + Saving deposits of national non-banks redeemable at a period of notice up to and including three month	
<b>= Money volume M2</b> (according to the definition of the ECB) + Marketable instruments, i.e. repurchase agreements, money market fund shares, and debt securities with an agreed maturity of up to and including two years issued by MFIs	
<b>= Money volume M3</b> (according to the definition of the ECB)	

**The relation between the net foreign exchange positions, budget balances, bank loans, and the monetary position of the Monetary Financial Institutions and of the private, domestic non-banks**

		Foreign Exchange Position	Budget balance	Bank loans		
CB-money level	Increase of CB-money of MFIs	Increase of CB net - claims on foreigners (FER A);= balance of payments surplus affecting changes in central bank money	Increase of CB net - claims on government (government deficit financed by CB)	Increase of the CB-claims on MFIs (open market purchases)	Decrease of the CB-money of private non-banks (cash in circulating outside the banking system)	Increase of other assets minus the increase of the total equity and liabilities of CB
=	Billions of €	Billions of €	Billions of €	Billions of €	Billions of €	Billions of €
		+ Increase of net- claims of MFIs on foreigners (net short and long term capital export of the MFIs)	+ Increase of net - claims of MFIs on government (government deficit financed by the MFIs)			
		€ Billions of	€ billions of			
Money volume M1, M2, or M3 level	Increase of the money volume M1, M2, or M3 of domestic, private non-banks	Increase all banks net - claims on foreigners (FER B) = balance of payments surplus affecting Money volume M1, M2, or M3	Increase of net - claims of all banks on government (government deficit financed by all banks)	Increase of gross claims of all banks on private non-banks	Decrease of domestic, private deposits (over night, fix term and saving accounts), and debt securities issued by banks	Balance of increase of other assets and decrease of total equity and liabilities
	Billions of €	Billions of €	Billions of €	Billions of €	Billions of €	Billions of €
		+ Increase of net claims of all domestic non-banks on foreigners (net short and long term capital export of the non banks)	+ Increase of net - claims of all non-banks on government (government deficit financed by all non-banks)			
		Billions of €	Billions of €			
				<b>Abbreviations:</b> CB = Central bank MFI = Monetary financial institution FER = Foreign Exchange Reserves		
Net- financial asset level	Increase of net financial assets of all private, domestic subjects	Increase of net financial assets of all domestic subjects (surplus on current accounts)	Decrease of net financial assets of government (total government deficit )			
	Billions of €	Billions of €	Billions of €			

**Price-dividend-ratio at different discount rates (i) and different rates of growth of the dividend (T)**

i \ T	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
3	17	20	25	33	50	100	∞	∞	∞	∞	∞	∞	∞	∞
4	14	17	20	25	33	50	100	∞	∞	∞	∞	∞	∞	∞
5	13	14	17	20	25	33	50	100	∞	∞	∞	∞	∞	∞
6	11	13	14	17	20	25	33	50	100	∞	∞	∞	∞	∞
7	10	11	13	14	17	20	25	33	50	100	∞	∞	∞	∞
8	9	10	11	13	14	17	20	25	33	50	100	∞	∞	∞
9	8	9	10	11	13	14	17	20	25	33	50	100	∞	∞
10	8	8	9	10	11	13	14	17	20	25	33	50	100	∞
11	7	8	8	9	10	11	13	14	17	20	25	33	50	100
12	7	7	8	8	9	10	11	13	14	17	20	25	33	50
13	6	7	7	8	8	9	10	11	13	14	17	20	25	33
14	6	6	7	7	8	8	9	10	11	13	14	17	20	25
15	6	6	6	7	7	8	8	9	10	11	13	14	17	20

$$PV/PMT = 1/(i-T)$$

**PV** := Present Value

**PMT** := permanent cash flow

Present value of a permanent cash flow, which increases by a constant rate of growth  $\theta$ :

$$PV = PMT \frac{(1+\theta)^t - 1}{(1+i)^t (\theta - i)}$$

For  $t \rightarrow \infty$  and  $\theta > i$  this moves towards  $\infty$  and for  $i > \theta$  towards  $1/(i - \theta)$ .

### 8.1 Burden of debt at different rates of growth and interest

Symbol: B = (Bonds), [DM]

$\theta$  = Rate of growth of the GNP, [1/Period]

$i$  = interest rate, [1/Period]

I = Interests [DM/Period]

Y = Gross domestic product (GNP) [DM/Period]

$\theta_n, \theta_r$  = nominal respectively real rate of growth

$i_n, i_r$  = nominal respectively real interest rate

$\dot{b}$  = deficit quota =  $\Delta B/Y$  [ ]

**Table 1:** Limiting value of national debt (for  $t \rightarrow \infty$ ) in percent of gross domestic product (GDP)

( $B/Y = \dot{b}/\theta$ ) at a growth rate of GDP  $\theta$  and a deficit quota  $\dot{b} = \Delta B/Y$

$\dot{b}$		0,001	0,010	0,020	0,030	0,050	0,100	0,200	0,500	1,000
$\theta$		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
0,0001	A	10	100	200	300	500	1000	2000	5000	10000
0,0167	C	0,060	0,600	1,200	1,800	3,000	6,000	12,000	30,000	60,000
0,0333	D	0,030	0,300	0,600	0,900	1,500	3,000	6,000	15,000	30,000
0,0500	E	0,020	0,200	0,400	0,600	1,000	2,000	4,000	10,000	20,000
0,0833	F	0,012	0,120	0,240	0,360	0,600	1,200	2,400	6,000	12,000
0,1667	G	0,006	0,060	0,120	0,180	0,300	0,600	1,200	3,000	6,000
0,3333	H	0,003	0,030	0,060	0,090	0,150	0,300	0,600	1,500	3,000
0,8333	I	0,001	0,012	0,024	0,036	0,060	0,120	0,240	0,600	1,200
1,6667	K	0,001	0,006	0,012	0,018	0,030	0,060	0,120	0,300	0,600

The national debt converges for  $t \rightarrow \infty$  towards the amounts in the table: Field E4 for instance indicates that,  $\dot{b} = 3\%$  and  $\theta \geq 5\%$ , so that the rate of debt after an infinite number of periods is not higher than 60%. Here it is insignificant, if the actual rate of debt is bigger or smaller than 60%. Table 1 says also that the deficit quota can be the higher; the higher the rate of growth is, before a critical rate of debt is exceeded. Is the rate of growth of the real GDP for example 0,02 p.a., the difference  $\theta - 0,02$  indicates the rate of inflation, which is at least required, to keep the condition  $B/Y = 60\%$

**Table 2:** Interests on the government bond as percentage of the GDP (I/Y) at a rate of interest of 4% p.a.:  $I/Y = 0,04 \dot{b}/\theta$  after an infinite number of periods

$\dot{b}$		0,0125	0,0250	0,0500	0,1000	0,2000	0,4000	0,8000	1,0000
$\theta$		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
0,0100	A	0,0500	0,1000	0,2000	0,4000	0,8000	1,6000	3,2000	4,0000
0,0200	B	0,0250	0,0500	0,1000	0,2000	0,4000	0,8000	1,6000	2,0000
0,0400	C	0,0125	0,0250	0,0500	0,1000	0,2000	0,4000	0,8000	1,0000
0,0800	D	0,0063	0,0125	0,0250	0,0500	0,1000	0,2000	0,4000	0,5000
0,1600	E	0,0031	0,0063	0,0125	0,0250	0,0500	0,1000	0,2000	0,2500
0,3200	F	0,0016	0,0031	0,0063	0,0125	0,0250	0,0500	0,1000	0,1250
0,4000	G	0,0013	0,0025	0,0050	0,0100	0,0200	0,0400	0,0800	0,1000

The table shows analogously to table 1 in the diagonal that the deficit quota can be all the higher the higher is the rate of growth, before the interest quota (I / GDP) has reached a certain amount, for example the amount 0.1 in the diagonal. The columns show that the interest quota at a constant rate of (0,04), is decreasing with an increasing rate of growth. Row C indicates that the interest quota moves towards the deficit quota, if the rate of interest and the rate of growth of GDP are equal ( $i = \theta$ ). The interests are then covered by new borrowings. Taxes can be used for primary government expenditures. The primary expenditure quota (= expenditure quota - interest quota) is then equal with the tax quota. Differently said: the primary deficit quota (= deficit quota - interest quota) then equals 0.

## 8.2: Burden of debt at different rates of growth and interest with inflation

**Table 3:** Payments of interest as percentage of GDP at a real growth rate of 2%p.a., a real interest rate of 4 % p.a., and a nominal interest rate  $i_n = (1+i_r)*(1+\theta_n)/(1+\theta_r) - 1$  Rate of inflation  $\pi = (1+\theta_n)/(1+\theta_r)$

$\dot{b}$		0,0125	0,0250	0,0500	0,1000	0,2000	0,4000	0,8000	1,0000	Interes $i_n$	Rate of in- flation $\pi$
$\theta_n$		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
0,01	A	0,0373	0,0745	0,1490	0,2980	0,5961	1,1922	2,3843	2,9804	0,03	-0,01
0,02	B	0,0250	0,0500	0,1000	0,2000	0,4000	0,8000	1,6000	2,0000	0,04	0,00
0,04	C	0,0189	0,0377	0,0755	0,1510	0,3020	0,6039	1,2078	1,5098	0,06	0,02
0,08	E	0,0158	0,0316	0,0632	0,1265	0,2529	0,5059	1,0118	1,2647	0,10	0,06
0,16	F	0,0143	0,0286	0,0571	0,1142	0,2284	0,4569	0,9137	1,1422	0,18	0,14
0,32	G	0,0135	0,0270	0,0540	0,1081	0,2162	0,4324	0,8647	1,0809	0,35	0,29
0,40	H	0,0134	0,0267	0,0534	0,1069	0,2137	0,4275	0,8549	1,0686	0,43	0,37
1,00	I	0,0130	0,0260	0,0520	0,1039	0,2078	0,4157	0,8314	1,0392	1,04	0,96
1000,00	J	0,0127	0,0255	0,0510	0,1020	0,2039	0,4079	0,8157	1,0196	1019,63	980,37

The table shows in column 3,  $\dot{b} = 0,05$ , that the interest quota is sinking even at an increasing rate of nominal GNP if the interests are calculated according to the Fischer equation, but a lot weaker than at a constant interest in table 2. Apart, the interest quotas in the diagonal are higher at inflation and lower at a deflation compared to table 2.

But further table 3 shows:

- that higher deficit quotas can be realised with an increasing rate of inflation at a constant interest quota, (compare cell A4 (0,298)  $\cong$  cell C5 (0,302)),
- but that rates of inflation have to move towards infinite for the interest quota to sink to the level of the deficit quota (column 3, respective last row).

About the connection between the deficit quota, growth rate, interest quota and the rate of price increase

$$B \quad \text{Bonds,} = B_0 + \dot{b}Y_0 \int_0^T e^{\theta t} dt = B_0 + \frac{\dot{b}Y_0}{\theta} (e^{\theta T} - 1).$$

Sign regulation for B: positive net financial assets have the sign +

Negative net financial assets have the sign -

Y National income (including interests) = Net social product

i Interest rate

$\theta$  Rate of growth of the disposable national income

$\dot{B}$  Budget balance;  $\dot{B} < 0$ : deficit,  $\dot{B} > 0$ : surplus

$P\dot{B}$  Primary budget balance;  $P\dot{B} < 0$ : deficit

$P\dot{B} > 0$ : surplus;  $P\dot{B} = \dot{B} - iB$

$p\dot{b}$  Primary deficit quota  $P\dot{B}/Y$

$\dot{b}$  Deficit quota  $\dot{B}/Y$ ;

$(\cdot)_r$  Real amounts

$(\cdot)_n$  Nominal amounts

1. Under which circumstances is the debt quota ( $B_t/Y_t$ ) permanently increasing?

Answer: when  $\Delta B/B > \Delta Y/Y$ , that is, if B is growing at a higher rate than Y

If you extend the first fraction with  $1/Y$ , you can write as well:

$$(1) \quad \dot{b}/(B_t/Y_t) > \theta, \text{ oder } \dot{b}/(B_t/Y_t) - \theta > 0.$$

*Proposition 1: If the rate of growth of the debt quota is bigger than the rate of growth of the national income, the debt quota is rising beyond all bounds.*

2. Are permanent budget deficits leading to a debt quota rising beyond all bounds?

In the case,  $\dot{b} = \Delta B/Y$  is not depending on the period of time, this reflection leads to the determining equation for the amount of the debt quota, which occurs after an infinite number of periods (long-term equilibrium), if the deficit quota ( $\dot{b}$ ) and the rate of growth ( $\theta$ ) are given

**(Domar, Evsey D.: The "Burden of the Debt" and the National Income. In: AER vol. 34 (1944), S. 798-827.)**

$$\text{If you divide the debts } B_t = B_0 + \frac{\dot{b}Y_0}{\theta} (e^{\theta T} - 1)$$

by the national income,  $Y_T$

$$\text{you get } \frac{B_T}{Y_T} = \frac{B_0}{Y_0 e^{\theta T}} + \frac{\dot{b}}{\theta} (1 - e^{-\theta T}).$$

For  $\lim_{t \rightarrow \infty}$  results

$$(2) \quad B/Y = \dot{b}/\theta.$$

*Proposition 2: Is the rate of growth 0, even the smallest permanent deficit quota is leading to a debt quota rising beyond all bounds.*

*However, if the rate of growth is positive, every deficit quota is leading permanently to a stable value for the debt quota regardless, if the starting point of the debt quota is higher or lower than this value.*

*Proposition 3: At a constant deficit quota, the debt quota is sinking with an increasing rate of growth and moves for  $\theta \rightarrow \infty$  towards zero.*

*Application: A deficit quota of 1% leads with a growth rate of 1,67% p.a. , to a debt quota of 60%, a deficit quota of 3% leads at a growth rate of 5% to a debt quota of 60%.*

3. Under which circumstances, the interests can be paid only by a new credit, without that the debt quota is rising beyond all measurements?

We are asking under which circumstances, the debt quota is rising beyond all measurements and draw then the argumentum e contrarium (from the contrary).

The interests are calculated as  $iB$ , and the interest quota is calculated as  $iB/Y = i\dot{b}/\theta$ . Is the inequality (1),  $\dot{b}/(B/Y) - \theta > 0$ , multiplied with  $B/Y$ ; you have to distinguish 2 cases  $B$  positive und  $B$  negative. We are only looking at the more important case:  **$B$  in  $B/Y$  is negative** (that means a government bond exist). We obtain:

$$\dot{b} - \theta B/Y < 0.$$

The multiplication of an inequality with a negative number is turning the inequality sign around.

Further we add to  $0 = iB/Y - iB/Y$  Then we can, under the consideration of

$$3) \quad \dot{B} = P\dot{B} + iB, \text{ or } \dot{b} = P\dot{B}/Y + iB/Y = p\dot{b} + iB/Y$$

(Verbal: The budget deficit is equal with the primary budget deficit (budget deficit without the consideration of the interest expenditures) plus interest payment), examine:

$$(4) \quad \dot{b} - iB/Y - \theta B/Y + iB/Y < 0, \text{ or:} \\ (B/Y)(i-\theta) + p\dot{b} < 0$$

Permanent primary deficit means that  $p\dot{b}$  is negative. Is as well  $i - \theta$  positive, so is the inequality (4) always fulfilled (since  $B$  is negative). That means, that the debt quota is permanently increasing, as the inequality (4) is the condition for an increasing debt quota.

Should the debt quota not increase beyond all measurements, the following has to be valid

$$(5) \quad (B/Y)(i-\theta) + p\dot{b} \geq 0.$$

The possibility to reach a permanent primary deficit, without that the debt quota moves towards infinite, is only given, if  $i < \theta$

Is  $B$  negative and  $i > \theta$  and should the debt quota not rise beyond all measurements, the following should be valid:

$$(5) \quad (B/Y)(i-\theta) + p\dot{b} \geq 0,$$

So  $p\dot{b}$  has to be positive in the long-term equilibrium, a primary excess has to be obtained. Should the debt quota not increase, the primary quota of excess has to be equal or bigger as the debt quota multiplied with minus  $(i-\theta)$ .

$$(6) \quad p\dot{b} \geq -B/Y (i-\theta), \text{ for } i > \theta \text{ and.}$$

Under consideration of (2), this is

$$p\dot{b} \geq - (i-\theta) \dot{b} / \theta, \text{ für } i > \theta.$$

A permanent primary deficit quota in the long-term equilibrium with a public deficit, can only exist, if  $\theta > i$ , whereby has to be valid:

$$p\dot{b} \geq (\theta-i) \dot{b} / \theta.$$

The primary deficit quota should not be smaller (oder absolut nicht größer) as the deficit quota multiplied with the difference of  $(\theta - i)/\theta$ .

*Proposition4: For every deficit quota is valid, that the interests can be covered by new borrowings, if the rate of interest is not bigger than the rate of growth. (Equation4). The taxes can then be used completely for the primary national expenditures (expenses without interests).*

*Proposition 5: For every deficit quota is valid, that the interest quota at a constant deficit quota with increasing  $\theta$  is getting smaller and for  $\theta \rightarrow \infty$  moves towards zero.*

4. Which deficit quota can be maintained at a given primary excess quota  $p\dot{b}$  and given rate of growth  $\theta$ , if  $i > \theta$ ?

Inequality (5) turns at a long-term equilibrium into:

$$(\dot{b}/\theta)(i-\theta) + p\dot{b} \geq 0.$$

Solved by  $\dot{b}$  results for  $i > \theta$ :

$$\dot{b} \geq - p\dot{b} \theta / (i-\theta).$$

*Proposition 6: At a given primary excess quota, the permanently possible deficit quota moves towards the primary excess quota weight with  $\theta/(i-\theta)$*

*Application: If you assume realistically, that the solvency of a government depends on the maximally realisable primary excess quota  $p\dot{b}$ , so is the permanently realisable deficit quota at  $\theta=0,015$  and  $i=0,04$  equal  $0,6 p\dot{b}$ . Is the primary excess quota for example  $0,05$  (a very high amount, which would be considered insupportable) or  $0,02$  (a just about tolerable amount), the deficit quota takes on minimally the value  $-0,03$  respectively.  $-0,012$ .*

5. How high the primary deficit quota has to be respectively can be, if  $\dot{b}$ ,  $i$ , and  $\theta$  are given?

Inequality (5) turns at the long-term equilibrium into:

$$(\dot{b}/\theta)(i-\theta) + p\dot{b} \geq 0.$$

Solved by  $p\dot{b}$ , it results:

$$p\dot{b} \geq -\dot{b}(i-\theta)/\theta.$$

*Proposition 7: the primary excess quota should not be smaller than the deficit quota, multiplied with  $(i - \theta)/\theta$ . Is  $\theta > i$ , the inequality is the condition for primary deficit quota that is possible maximally in the in long-term equilibrium*

5. How have the propositions three, four and five to be modified, if  $i$  and  $\theta$  are not independant from each other.

The independence of  $i$  und  $\theta$ , could be assumed, if  $i$  and  $\theta$  are interpreted as real variables. Are  $i_n$  and  $\theta_n$  however dependant as such that

$i_n = i_r + \pi + i_r\pi$  and  $\theta_n = \theta_r + \pi + \theta_r\pi$ , the interest quota  $i$  B/Y at long-term equilibrium turns into:

$$(7) iB/Y = \dot{b} \frac{i_r + \pi + i_r\pi}{\theta_r + \pi + \theta_r\pi}.$$

$$\text{for } \pi \rightarrow \infty, iB/Y = \dot{b} \frac{\frac{i_r}{\pi} + (1 + i_r)}{\frac{\theta_r}{\pi} + (1 + \theta_r)} \text{ moves towards } \dot{b} \frac{1 + i_r}{1 + \theta_r}.$$

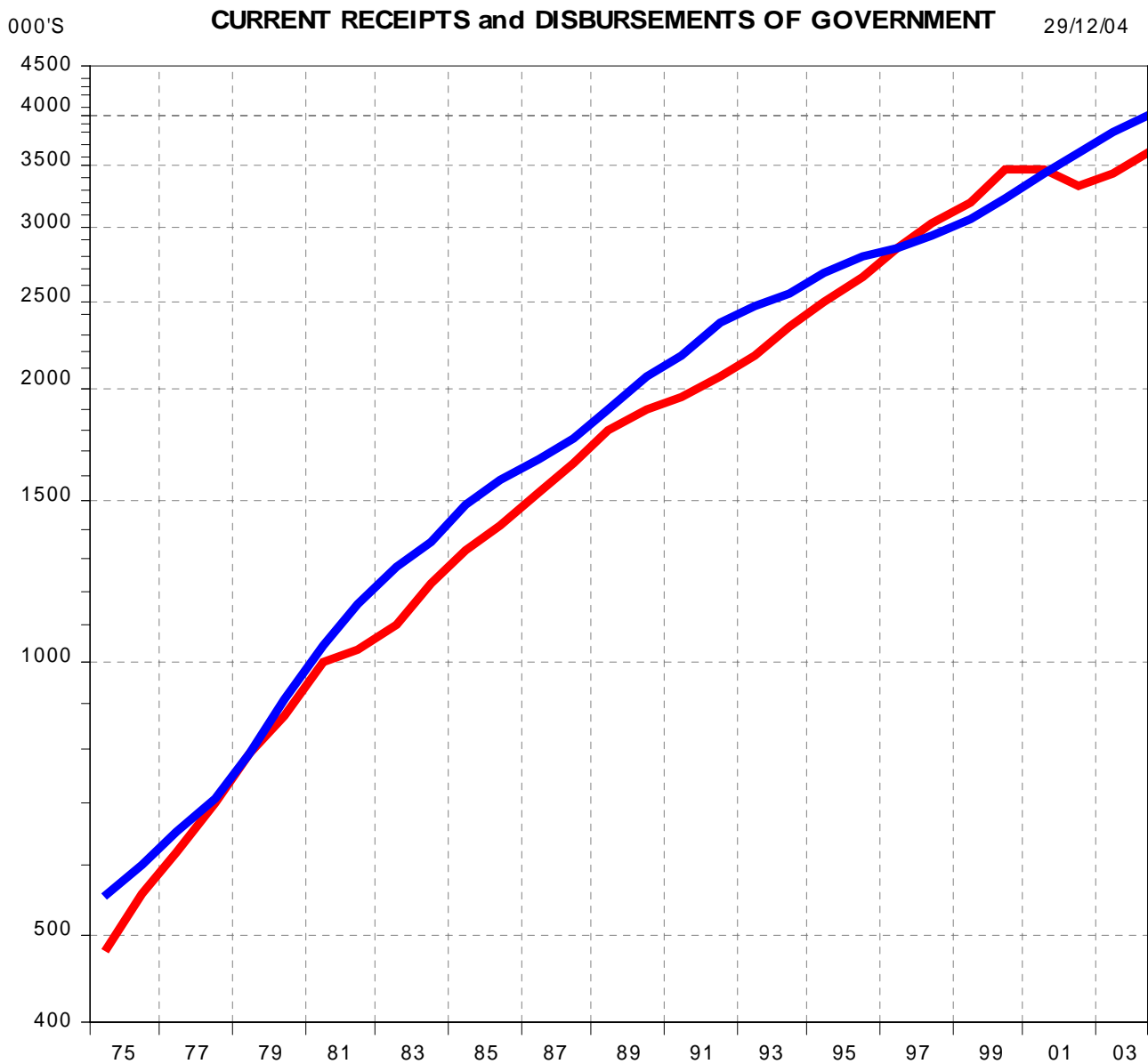
Is the difference between  $i_r$  und  $\theta_r$  very small, the interest quota moves towards the deficit quota, if  $\pi \rightarrow \infty$  is valid.

*Proposition 8: For the deficit quota is valid, that permanently the interests can mainly paid by new borrowings, if  $\pi \rightarrow \infty$ , regardless if  $i_r > \theta_r$  or  $i_r < \theta_r$  assumed that  $i_r \approx \theta_r$ . The taxes can be almost completely used for primary national expenditure is  $i < \theta$ , a permanent deficit of the primary household can be realised which is becoming more and more small compared to  $Y$ , and is  $i > \theta$  an excess of the primary household has to be realised, which is also becoming more and more small compared to  $Y$ , if  $\theta \rightarrow \infty$  is valid.*

*Proposition 9: For every deficit quota is valid, that the interest quota is getting smaller at a constant deficit quota with an increasing  $\theta$  and for  $\theta \rightarrow \infty$  moves towards*

$$\dot{b} \frac{1 + i_r}{1 + \theta_r}.$$

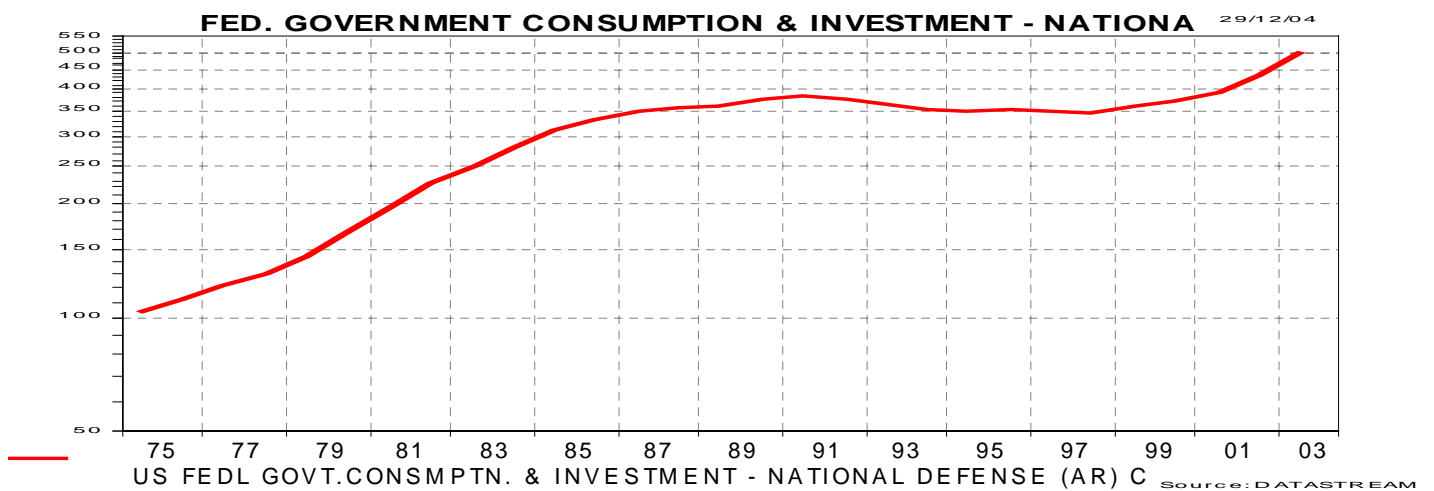
### US Receipts and disbursements and National defence of the United states



— US CURRENT RECEIPTS OF GOVERNMENT CURA  
— US CURRENT DISBURSEMENTS OF GOVERNMENT CURA

HOCH 3624649 30/6/04, TIEF 485435 30/6/75, SCHLUSS 3624649 30/6/

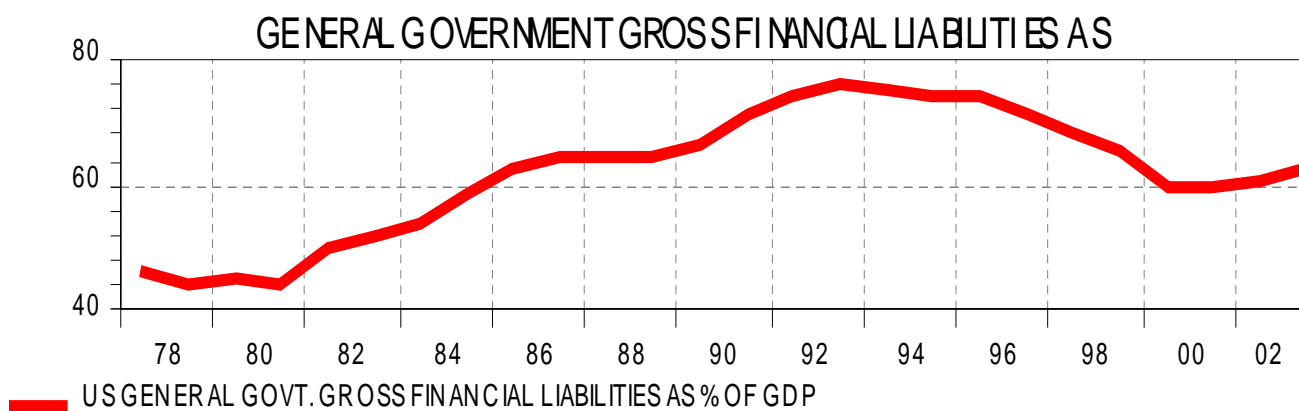
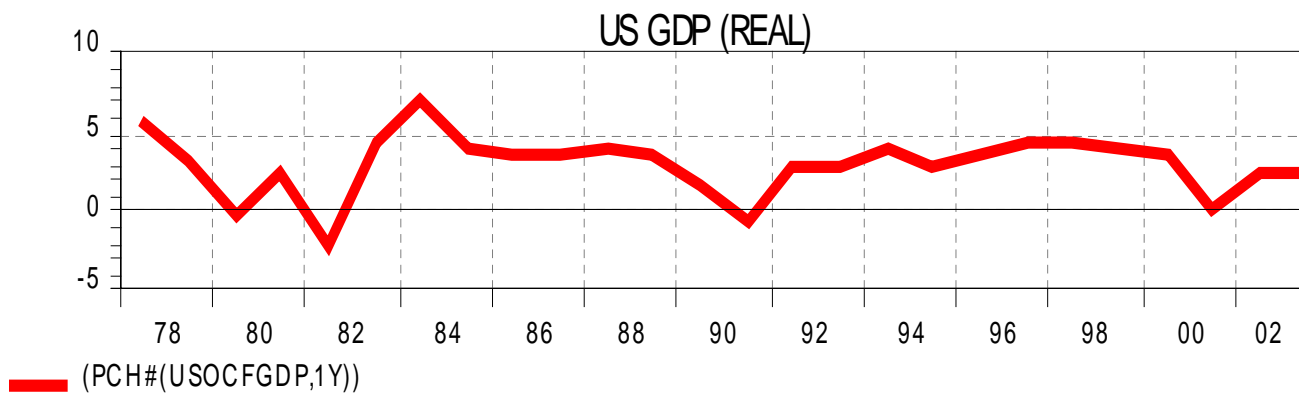
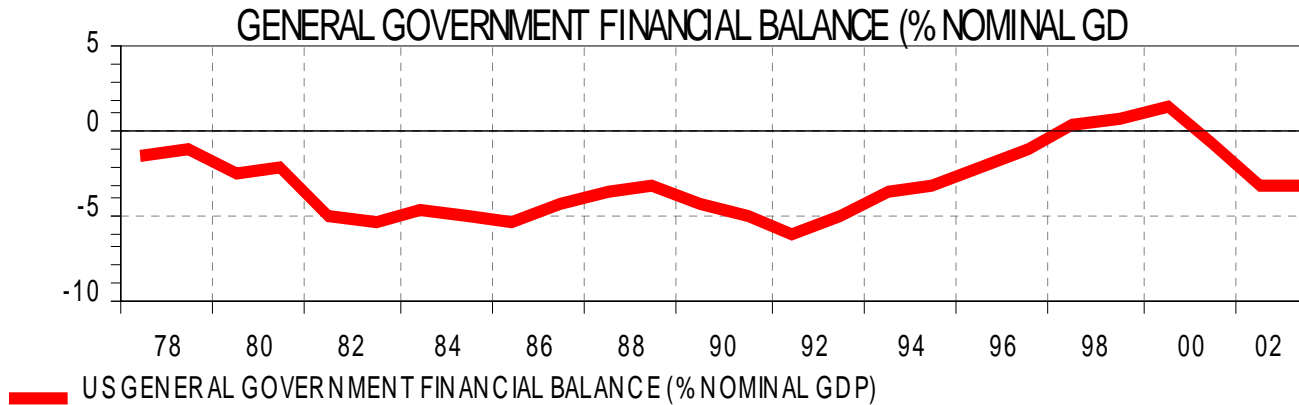
Source: DATASTREAM



— US FEDL GOVT. CONSMPTN. & INVESTMENT - NATIONAL DEFENSE (AR) C Source: DATASTREAM

**General Government financial balance, rates of growth and debts in % of the GDP of the United States 1978 until the first quarter of 2003**

10/1/03



Source: DATASTREAM

**Covered interest parity**

1. Definitions:

$S_{\$}$  = Spot price of \$ (price quotation [units of domestic currency/units of foreign currency])

$F_{\$,t}$  = Future price of \$ (price quotation [units of domestic currency/units of foreign currency]) for the date  $T_0+t$ ;

$$\frac{F - S}{S} = \text{Swap rate of \$};$$

$F-S > 0$ : Report fr. ge., Contango en.;  $F-S < 0$ : Deport fr. ge., Backwardation en;

$q_{\$(DM)}$  = interest factor of the \$ (of the DM);

$S_{\$,t}^{\text{exp}} S_{\$,t}^{\text{exp}}$  = expected spot price of the\$ for the date  $T_0+t$ ;

$(1+\pi)_{\$(DM)}^t$  = Factor of increase of prices abroad (at home) for the date  $T_0+t$ .

2. Covered interest parity

$$\frac{q_{DM}^t}{q_{\$}^t} - 1 = \frac{F_{\$,t}}{S_{\$,t}} - 1 = \frac{S_{\$,t}^{\text{exp}}}{S_{\$}} - 1 = \frac{(1 + \pi)_{DM}^t}{(1 + \pi)_{\$}^t} - 1$$

Difference between the lower interest rate of the harder currency and the higher interest rate of the softer currency (interest rate differentials)	Contango or Backwardation of the softer currency (Swap rate)	Expected devaluation of the softer currency (expected change of the exchange rate)	Expected excess inflation of the softer currency compared to the harder currency (expected inflation differences)
---	--	--	---



Covered interest rate



Interest parity including expected exchange rate



Interest parity including inflation differences

Literaturhinweise

STÜTZEL, W.: Monetäre Risiken im Außenhandel - Eine wirtschaftswissenschaftliche Problemskizze, in: Monetäre Probleme im internationalen Handel und Kapitalverkehr. Hrsg.: N. Horn. Baden-Baden 1976, p. 41-52.

Giddy, J.H.: An Integrated Theory of Exchange Rate Equilibrium. Journal of Financial and Quantitative Analysis 11 (1976), p. 883-892.

Pippenger, J.: Spot Rates, Forward Rates and Interest Rate Differentials. Journal of Money, Credit and Banking 4 (1972), p. 375-383.

Wentz, R.-C.: Unternehmerische Devisenkurssicherung. Frankfurt/M. 1979, p. 96-121.



### Working sheet 12.2: Intuitive Derivation of the Formula

#### How can this formula be derived easily?

Investments at home and covered investments abroad have to bring in the same return.

$$\begin{array}{lcl} \text{Investments at home} & = & \text{Covered investments abroad} \\ 100 \text{ DM} \cdot (1+i_d)^T & = & 100 \text{ DM} / S \cdot (1+i_f)^T \cdot F \end{array}$$

$$\frac{(1+i_d)^T}{(1+i_f)^T} = \frac{F}{S}.$$

**Calculation example:** How high the futures price of the ¥ have to be per three month if

$i_d = 4,5 \%$  p.a. ,  $i_f = 1 \frac{6}{16} \%$  p.a. (=1,375 % p.a.) and  $S = (1,6597 \text{ Geld} + 1,6627 \text{ Brief}) / 2 = 1,6612 / 100 \text{ ¥}$ ;

$(1,045^{0,25} / 1,01375^{0,25}) * 1,6612 = 1,6739$ . The exchange rate of 1,6739/100 ¥ is within the bid-ask spread of the futures price for three month (0,25 years).

**Working sheet 13.1: International covered interest parity**

Conditions:

- 1.) no risk of solvency
- 2.) no bid ask spread at
  - a) Foreign exchange rates
  - b) loan money (borrowing rates = lending rates)

**Reflection.** Risk-free transactions, which cost nothing today, can't bring in a return in the future, as they would be made on a huge scale. The sum of the following transactions is risk-free regarding the exchange rate risk:

First arbitrage table to prove the equilibrium conditions of the international covered interest parity

at an insecure rate of exchange (S) for the period T in case that  $F > S * \frac{(1+i_d)^T}{(1+i_f)^T}$ :

Transactions	Payments	
	Today	In Future
Borrowing of 1 DM in $t_0$		
Repayment of the borrowed 1 DM $(1+i_d)^T$ in $t_1$	+ 1 [DM]	- 1 $(1+i_d)^T$ [DM]
Purchase of ¥ for 1 DM at an exchange rate S in $t_0$	- 1 [DM] + 1/S [¥]	-
Investment of 1/S ¥ at a rate of interest $i_f$	- 1/S [¥]	+ 1/S $*(1+i_f)^T$ [¥]
Futures sale of 1/S $(1+i_f)^T$ ¥ at the futures price F	-	- 1/S $(1+i_f)^T$ [¥] + 1/S $*(1+i_f)^T * F$ [DM]
Sum	-	$(F/S) * (1+i_f)^T$ [DM] - $(1+i_d)^T$ [DM]

Is the sum of the future payments of these transactions positive, so that

$(F/S) * (1+i_f)^T \text{ DM} - (1+i_d)^T \text{ DM} > 0$ , which corresponds to the above mentioned condition, then the transactions listed in the table are made on a huge scale. This has the following effects on the variables of the formula:

$$i_d \uparrow, i_f \downarrow, S \uparrow, F \downarrow$$

Variables change in the direction to fulfil the equation or even they overshoot, so that:

$$\text{Until } 0 \geq \frac{F}{S} * (1+i_f)^T - (1+i_d)^T \text{ oder } S * \frac{(1+i_d)^T}{(1+i_f)^T} \geq F$$

see next sheet 13.2.

**Working sheet 13.2: International interest parity**

Second arbitrage table to prove the conditions for the equilibrium of the international covered interest parity at insecure exchange rates for foreign currency (S)

For the period T in case that  $F < S * \frac{(1+i_d)^T}{(1+i_f)^T}$ :

Transactions	Payments	
	Today	In future
Borrowing of 1 ¥		
Repayment of the loan 1 DM $(1+i_f)^T$ in $t_1$	+ 1 [¥]	- 1 $(1+i_f)^T$ [¥]
Sale of 1 ¥ for DM at the rate of exchange S in $t_0$	- 1 [¥] + S [DM]	-
Investment of S DM at The rate of interest $i_d$	- S [DM]	+ S $(1+i_d)^T$ [DM]
Futures purchase of ¥ for $S*(1+i_d)^T$ DM at the future price F	-	- S $(1+i_d)^T$ [DM] + $1/F * S * (1+i_d)^T$ [¥]
Sum	-	$(S/F) * (1+i_d)^T$ [¥] - $(1+i_f)^T$ [¥]

Is the sum of the future payments of these transactions positive, so that

$(S/F) * (1+i_d)^T ¥ - (1+i_f)^T ¥ > 0$ , which corresponds to the above mentioned condition, than the transactions listed in the table are made on a huge scale. This has the following effects on the variables of the formula:

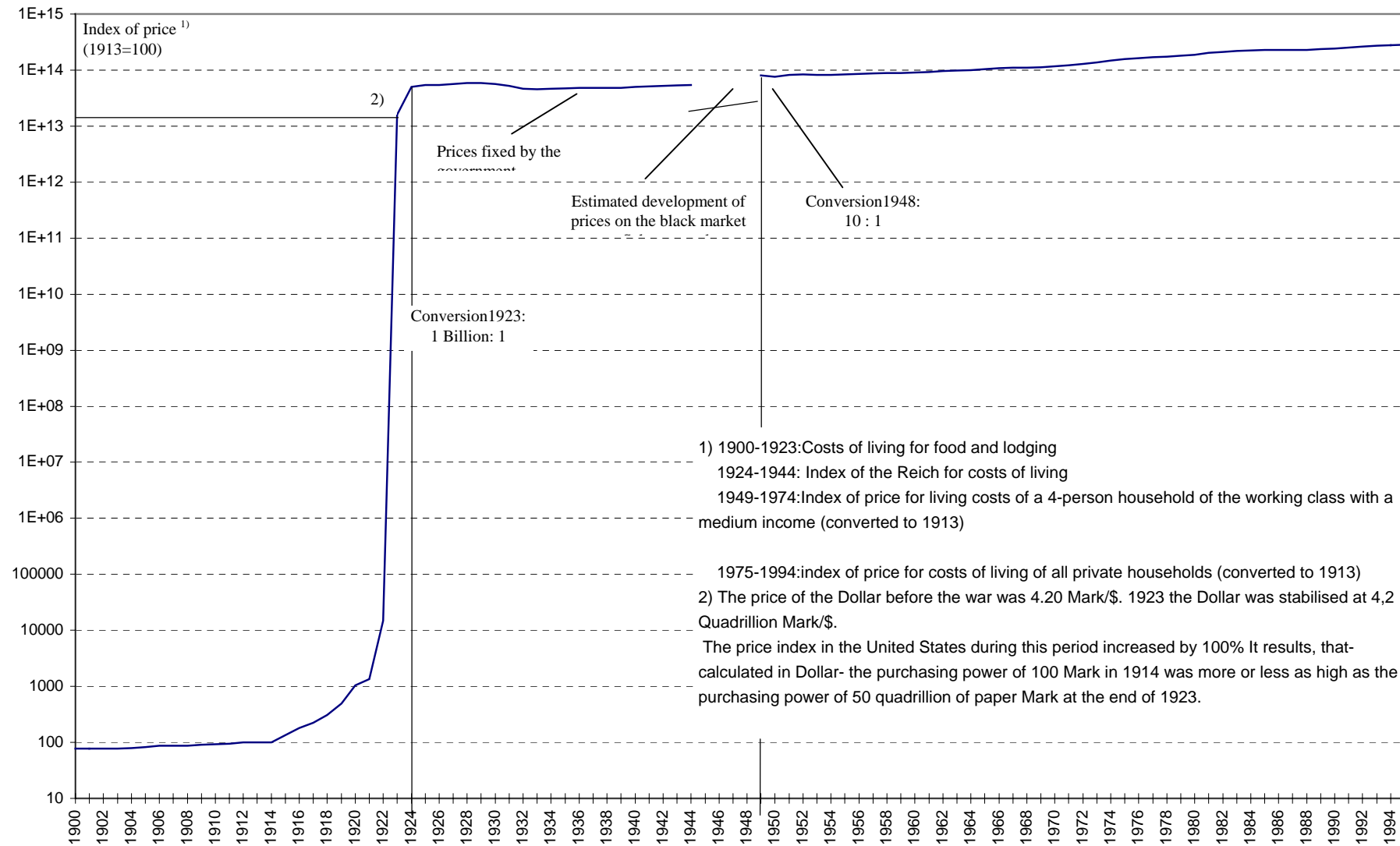
Effect:  $i_d \downarrow$ ,  $i_f \uparrow$ ,  $S \downarrow$ ,  $F \uparrow$

Variables change in the direction to fulfil the equation or even they overshoot, so that:

Until  $0 < \frac{F}{S} * (1+i_f)^T - (1+i_d)^T$  oder  $S * \frac{(1+i_d)^T}{(1+i_f)^T} < F$

See again working sheet 13.1.

The development of the consumers prices in the area of the German Reich between 1900-1944 and in the German Federal Republic between 1948-1995



Sources: 1900-1974 with the exception of 1923, Deutsches Geld- und Bankwesen in Zahlen, 1876-1975; Hrsg.: Deutsche Bundesbank, Frankfurt am Main 1976, p.. 6-7.  
1923 Statistisches Jahrbuch für das Deutsche Reich. Hrsg.: Statistisches Reichsamts, Berlin 1925, S. 259.  
1975-1994 Monatsberichte der Deutschen Bundesbank, Februar 1995, S. 72\*.

**Working sheet 15:** Rates of increase of consumers prices, growth of the monetary base and of the money volume M1 in % compared to the preceding year in the United States between 1950 - 1994.

Year	Rate of increase of consumers - prices	Growth of real GNP <sup>1)</sup>	Monetary Base growth rate	Money volume M1 growth rate
1970	5,8	0,0	5,7	3,8
1971	4,3	2,9	6,8	6,8
1972	3,3	5,1	6,8	7,2
1973	6,2	5,1	8,4	7,3
1974	11,0	-0,6	8,5	5,0
1975	9,2	-0,8	6,9	4,7
1976	5,8	4,9	7,9	5,6
1977	6,5	4,5	8,2	7,6
1978	7,6	4,8	9,3	8,2
1979	11,2	2,5	8,5	7,7
1980	13,6	-0,5	8,9	6,2
1981	10,4	1,8	6,2	7,1
1982	6,2	-2,2	6,3	6,6
1983	3,2	3,8	9,6	11,1
1984	4,3	6,2	7,7	7,0
1985	3,6	3,2	7,3	9,2
1986	1,9	2,9	8,9	12,4
1987	3,7	3,1	9,0	11,5
1988	4,1	3,9	7,5	4,3
1989	4,8	2,5	4,9	0,9
1990	5,4	1,2	8,2	3,7
1991	4,3	-0,6	9,4	5,9
1992	3,0	2,2	8,7	12,4
1993	3,0	3,3	10,7	11,6
1994	2,6	4,0	9,5	6,1
50 - 69	2,4	3,5 <sup>2)</sup>	2,9	3,0
70 - 79	7,1	2,8	7,7	6,4
80 - 89	5,5	2,5	7,6	7,6
90 - 94	3,6	2,0	9,2	7,9

1) GNP = Gross National Product (Gross National Product)

2) 1951 - 1969

Quelle: IFS Yearbook 1980, S. 59 and 431  
Data for GNP and since 1970: DATASTREAM

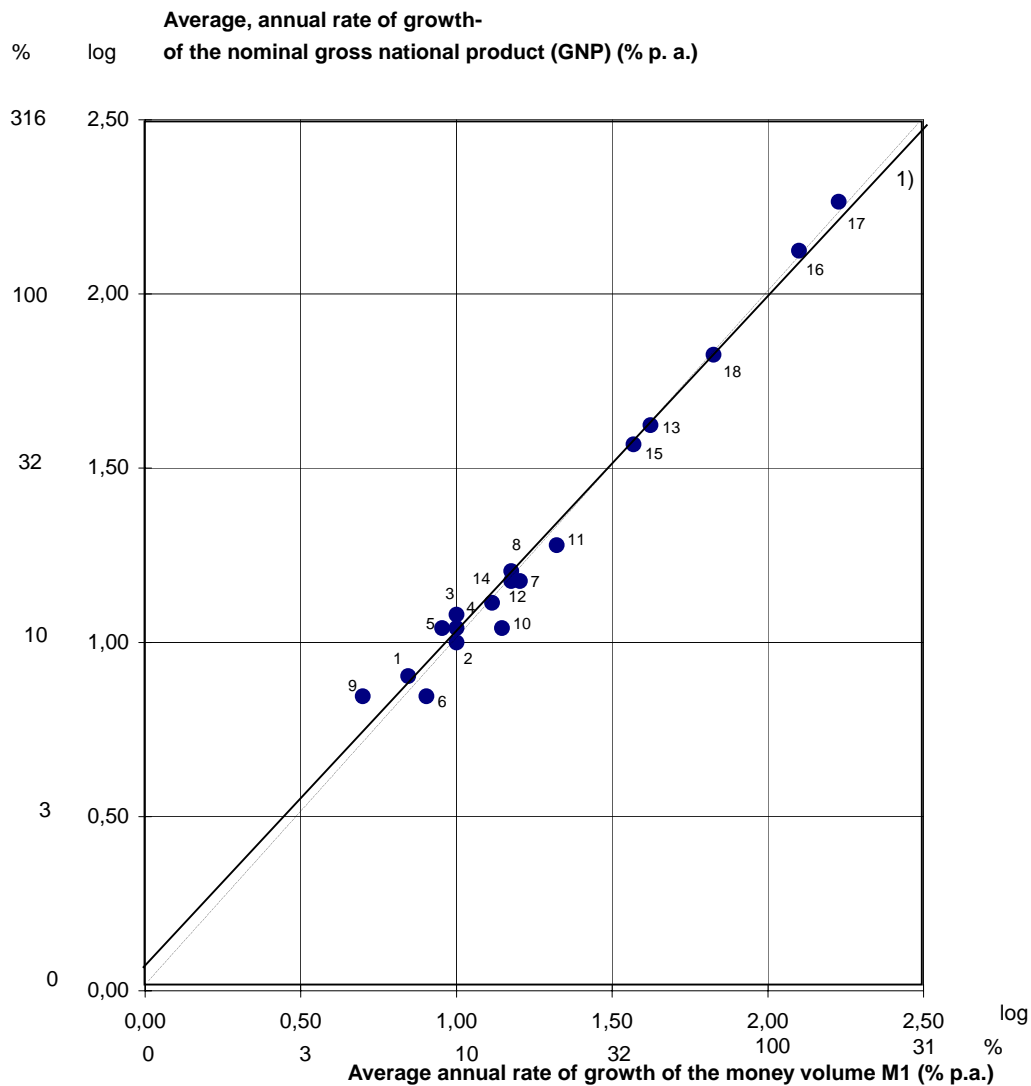
**Working sheet 16: Index of the consumer's price of selected countries 1950 - 1990**

available	Index of the consumer prices				index of consumer prices, average- Rate of increase in % p. a			period of time, for which data is
	1950	1970	1980	1990	1951-1970	1971-1980	1981-1990	excluding 1950 - 1990
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b>Industrial countries</b>								
Australia	27,4	61,4	165,4	360,9	4,1	10,4	8,1	
Belgium	41,0	66,9	136,1	212,2	2,5	7,4	4,5	
German Federal Rep	47,7	74,2	122,0	157,8	2,2	5,1	2,6	
Denmark	26,4	64,2	164,1	291,2	4,5	9,8	5,9	
Finland	22,1	57,5	166,6	319,9	4,9	11,2	6,7	
France	25,6	65,4	164,1	302,2	4,8	9,6	6,3	
Great Britain	26,2	54,2	195,6	369,6	3,7	13,7	6,6	
Ireland	23,3	53,7	193,2	405,0	4,3	13,7	7,7	
Island	5,9	32,7	558,6	2441,9	8,9	32,8	15,9	
Italy	29,6	58,4	213,2	542,5	3,5	13,8	9,8	
Japan	22,4	58,0	137,2	168,2	4,9	9,0	2,1	
Canada	43,2	70,2	152,1	270,7	2,5	8,0	5,9	
New Zealand	27,3	61,4	199,6	550,2	4,1	12,5	10,7	
Netherlands	32,7	66,0	133,8	170,2	3,6	7,3	2,4	
Norway	27,7	66,8	149,5	311,7	4,5	8,4	7,6	
Austria	29,8	70,3	129,3	182,6	4,4	6,3	3,5	
Schweden	29,1	68,2	164,7	341,8	4,4	9,2	7,6	
Switzerland	43,2	69,1	112,2	156,6	2,4	5,0	3,4	
Spain	18,7	56,7	229,5	558,6	5,7	15,0	9,3	
United States	44,7	72,1	153,1	242,6	2,4	7,8	4,7	
<b>Developing Countries</b>								
<b>-Countries exporting oil</b>								
Iraq	52,7	73,8	128,8	----	1,7	5,7	----	1950-1978
Iran	26,5	63,7	211,0	1129	4,5	12,7	18,3	
Nigeria	26,6	52,8	204,9	1255,0	3,5	14,5	19,9	1953-1990
Venezuela	57,4	75,8	169,7	1378,6	1,4	8,4	23,3	
<b>- Countries not exporting oil</b>								
<b>Afrika</b>								
Burkina Faso	44,9	72,6	166,4	238,3	4,1	8,6	3,7	
Chad	32,3	67,4	112,0	142,6	5,8	7,5	3,5	1957-1990
Ivory Coast	47,3	69,7	215,7	327,1	4,0	12,0	4,3	1960-1990
Ghana	18,1	45,9	1355,4	4,8E04	4,8	40,3	43,0	
Kenya	48,8	59,3	183,9	499,5	1,8	12,0	10,5	1959-1990
Congo	34,7	68,3	156,7	177,2	5,0	8,7	1,4	1956-1989
Morocco	35,3	71,0	158,9	320,6	3,6	8,4	7,3	
Sierra Leone	41,9	66,5	170,7	8,4E04	3,4	11,0	67,9	1960-1990
Somalia	36,4	69,0	273,8	5543,4	3,8	14,8	45,6	1953-1988
South Africa	34,4	64,1	175,3	687,0	3,2	10,6	14,6	
Sudan	26,9	48,2	233,3	6305,4	3,1	17,1	39,1	1951-1990
Tunisia	40,6	77,6	141,6	309,4	3,3	6,2	8,1	
Uganda	23,7	35,6	377,1	1,3E05	3,2	34,3	107,0	1957-1990

	Index of consumer prices				consumer prices, average- rate of increase in % p. a			period of time for which data is available, excluding 1950 - 1990
	1950	1970	1980	1990	1951-1970	1971-1980	1981-1990	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
<u>Asia</u>								
Bangladesh	12,9	24,8	144,0	227,6	4,2	19,2	4,7	1954-1990
Burma	35,4	44,1	120,8	261,9	1,1	10,6	8,0	
India	25,5	57,9	121,5	283,8	4,2	7,7	8,9	
Corea	0,9	49,1	221,3	406,4	23,4	16,2	6,3	1951-1990
Malaysia	55,9	70,3	124,7	171,1	1,2	5,9	3,2	1950-1990
Pakistan	28,8	45,8	153,9	301,4	2,9	12,9	7,0	1956-1990
Philippines	26,8	48,0	172,6	620,7	3,0	13,7	13,7	
Singapur	54,4	60,6	119,6	149,6	1,1	7,0	2,3	1960-1990
Sri Lanka	48,8	69,7	160,5	508,7	1,8	8,7	12,2	
<u>Europe</u>								
Greece	25,9	56,0	212,5	473,0	3,9	14,3	8,3	
Yugoslavia	11,2	41,4	228,1	1,7E06	7,1	18,6	144,1	1951-1990
Malta	47,3	75,2	143,7	179,3	2,3	6,7	2,2	
Portugal	28,9	49,6	266,3	1285,6	2,7	18,3	17,1	
Turkey	9,7	42,5	761,1	3,5E04	7,7	33,4	46,6	
Cypruss	50,7	69,8	148,8	239,4	2,2	7,9	4,9	1955-1990
<u>Middle East</u>								
Egypt	53,2	74,9	183,1	873,1	1,7	9,4	16,9	
Israel	5,9	33,9	1097,1	8,0E05	9,1	41,6	93,3	
Syria	39,0	59,0	163,0	1164,3	2,1	10,7	21,7	1950-1990
<u>Western Hemisphere</u>								
Argentina	0,2	8,3	21524	1,3E10	23,0	119,5	340,1	1952-1989
Bolivia	0,2	39,2	219,8	1,4E06	30,2	18,8	141,5	
Brazil	0,5	38,5	790,2	5,3E06	39,7	35,3	141,5	1957-1990
Chile	0,1	0,4	1511,3	9624,8	31,1	127,9	20,3	1963-1990
Columbia	7,9	44,2	297,6	2487,5	9,0	21,0	23,7	
Costa Rica	34,9	52,7	147,4	1434,7	2,1	10,8	25,6	
Domin.Republic	46,3	59,6	160,5	1448,2	1,3	10,4	24,6	
Ecuador	32,2	53,2	174,1	3867,8	2,7	12,6	36,4	1951-1990
El Salvador	46,1	66,2	184,4	1053,0	1,8	10,8	19,0	
Guatemala	56,2	66,6	166,1	638,9	0,9	9,6	14,4	1950-1990
Guyana	52,5	69,2	182,6	936,4	2,0	10,2	14,8	1953-1990
Mexico	21,4	56,7	262,1	4,0E04	5,0	16,5	65,2	
Netherl.Antillen	55,2	63,0	153,3	223,5	1,2	9,3	3,8	1959-1990
Panama	60,5	70,7	139,2	166,7	0,8	7,0	1,8	1950-1990
Paraguay	3,0	57,9	198,2	1415,7	16,0	13,1	21,7	1950-1990
Peru	0,7	55,2	772,0	1,3E10	8,5	30,2	428,4	1954-1990
Surinam	39,5	67,5	172,3	440,3	3,4	9,8	14,3	1952-1990
Trinidad/Tobago	33,2	53,9	183,6	523,2	2,7	13,0	11,0	
Uruguay	0,0	7,2	939,6	1,1E05	29,6	62,8	60,3	

Source: Own calculation, data taken from: International Financial Statistics, Different Yearbooks.

**Working sheet 17:** Relation between the average, annual rate of growth of the money volume M1 (m) and of the nominal gross national product (GNP) in selected countries between 1966 and 1991



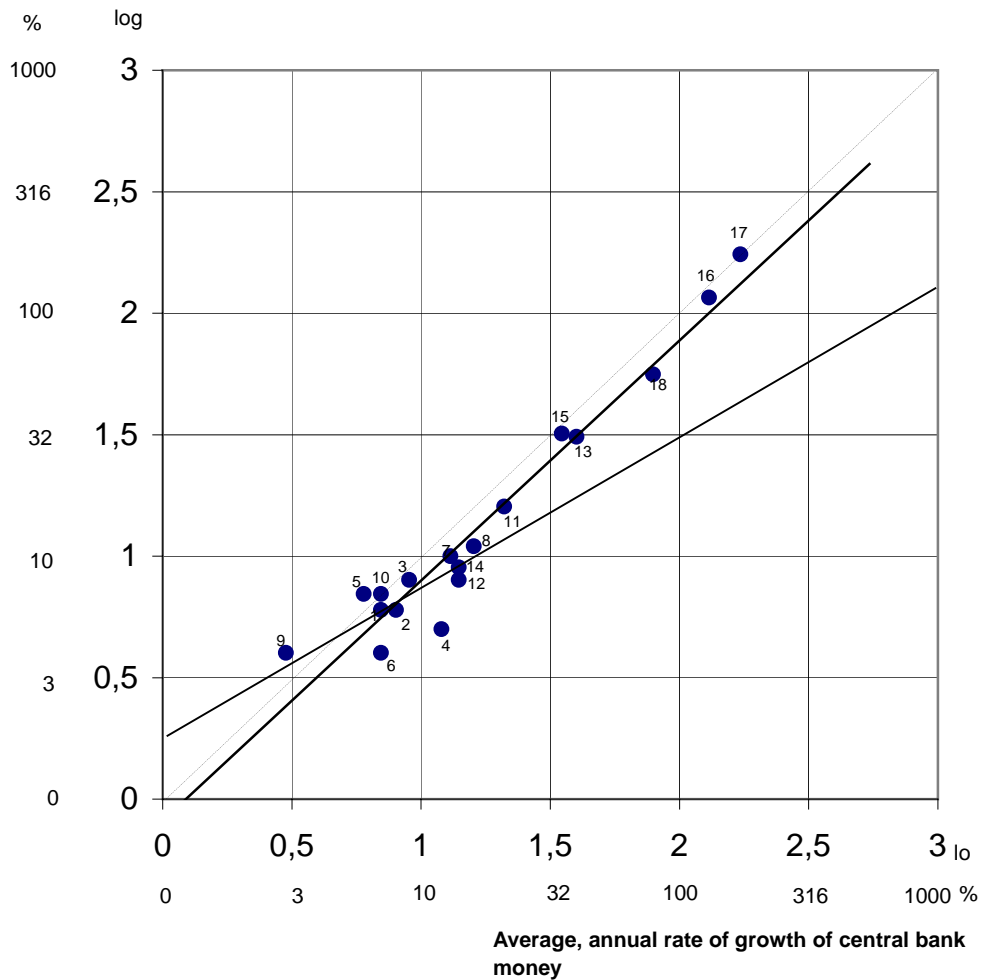
1) Estimated rate of regression:  $Y=0,97385 X + 0,048$   $R = 0,98229506$

- |                           |                   |              |
|---------------------------|-------------------|--------------|
| 1 United States           | 7 Italia          | 13 Indonesia |
| 2 Canada                  | 8 Spain           | 14 Pakistan  |
| 3 Australia               | 9 Switzerland     | 15 Mexico    |
| 4 Japan                   | 10 United Kingdom | 16 Brazil    |
| 5 France                  | 11 Nigeria        | 17 Argentina |
| 6 Federal German Republic | 12 India          | 18 Chile     |

Quelle: IFS Yearbook 1995, lines 14, 34, 64 und 99a.

**Working sheet18:** Relation between the average, annual rate of growth of the central bank money and the consumer's prices (P) in selected countries between 1966 and 1991

Average, annual rate of increase of the index of the consumer's price (%p.a.)



1) Estimated rate of regression:  $Y = 0,9878 X - 0,0876$ .  $R^2 = 0,9401$

2) Estimated rate of regression without Argentina, Brazil Chile, Mexico und Indonesia:  
 $Y = 0,6113 X + 0,2628$ .  $R^2 = 0,5675$

1 United States  
 2 Canada  
 3 Australia  
 4 Japan  
 5 France  
 6 German Federal Republic

7 Italia  
 8 Spain  
 9 Schwitzerland  
 10 United Kingdom  
 11 Nigeria  
 12 India

13 Indonesia  
 14 Pakistan  
 15 Mexico 1)  
 16 Brazil  
 17 Argentina  
 18 Chile

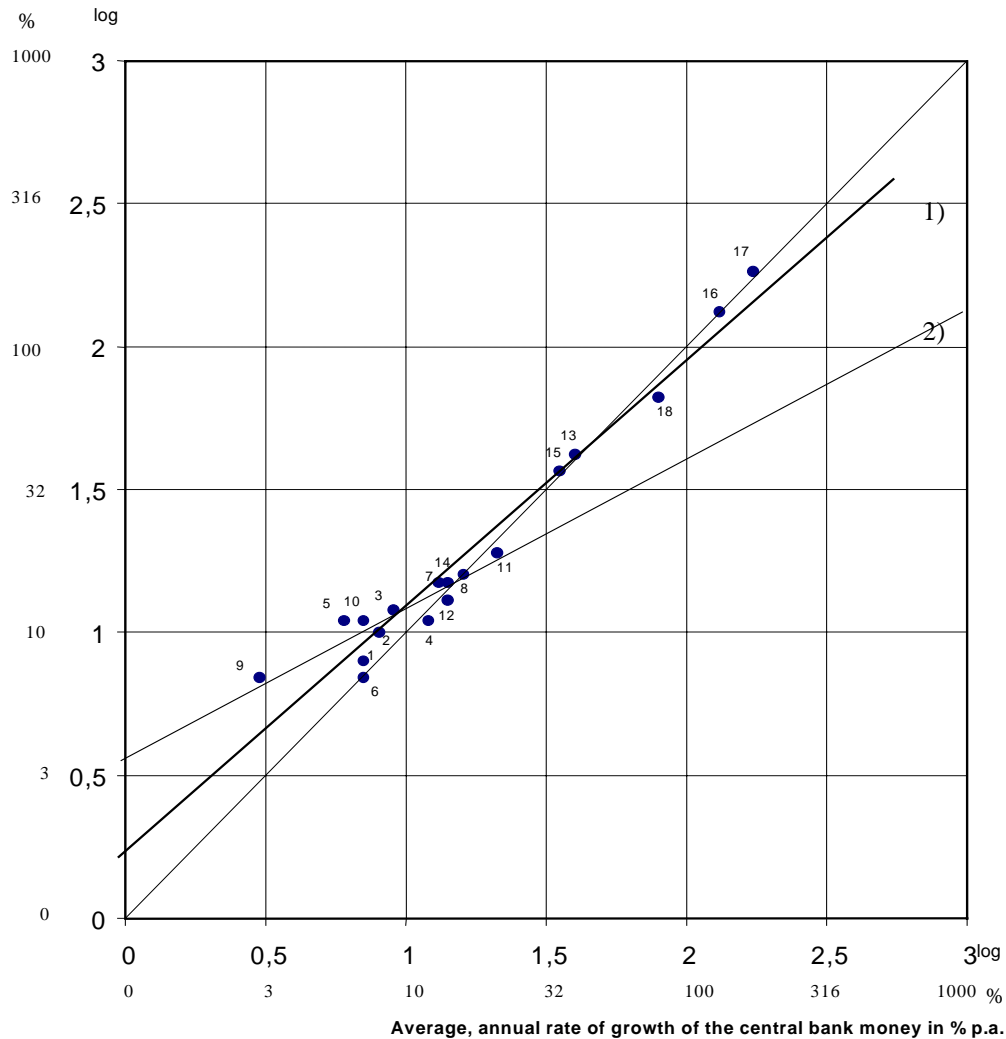
2)

Quelle: IFS Yearbook 1995, lines 14, 34, 64 und 99a.

**Working sheet 19:**

Relation between the average rates of growth of the central bank money and of the gross national product (GNP) in selected countries between 1966 and 1991

Average annual rate of growth of the nominal GNP  
in (% p.a.)



1) Estimated rate of regression:  $Y = 0,8591 X + 0,2337$ .  $R^2 = 0,9532$

2) Estimated rate of regression without Argentina, Brazil, Chile, Mexico und Indonesia:  
 $Y = 0,5251 X + 0,546$ .  $R^2 = 0,5675$

1 United States

2 Canada

3 Australia

4 Japan

5 France

6 German Federal Republic

7 Italia

8 Spain

9 Switzerland

10 United Kingdom

11 Nigeria

12 India

13 Indonesia

14 Pakistan

15 Mexico

16 Brazil

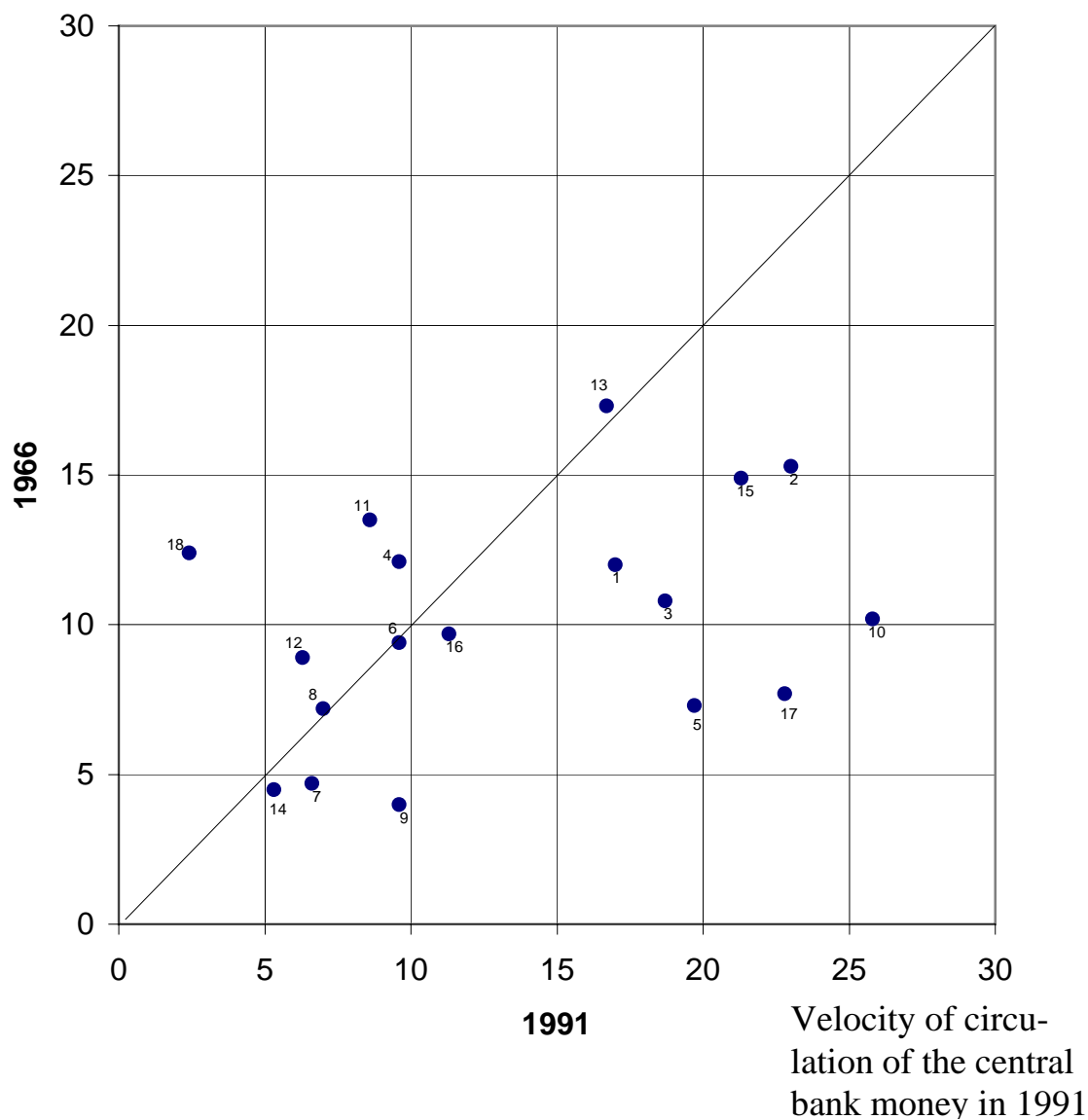
17 Argentina

18 Chile

Source: IFS Yearbook 1995, lines 14, 34, 64 and 99a.

**Working sheet 20:** Change in the velocity of circulation of the central bank money  
in selected countries between 1966 and 1991

Velocity of circulation  
of central bank money  
1966



1 United States

2 Canada

3 Australia

4 Japan

5 France

6 German Federal Republic

7 Italia

8 Spain

9 Switzerland

10 United Kingdom

11 Nigeria

12 India

13 Indonesia

14 Pakistan

15 Mexico

16 Brazil

17 Argentina

18 Chile

Source: IFS Yearbook 1995, lines 14, 34, 64 und 99a.

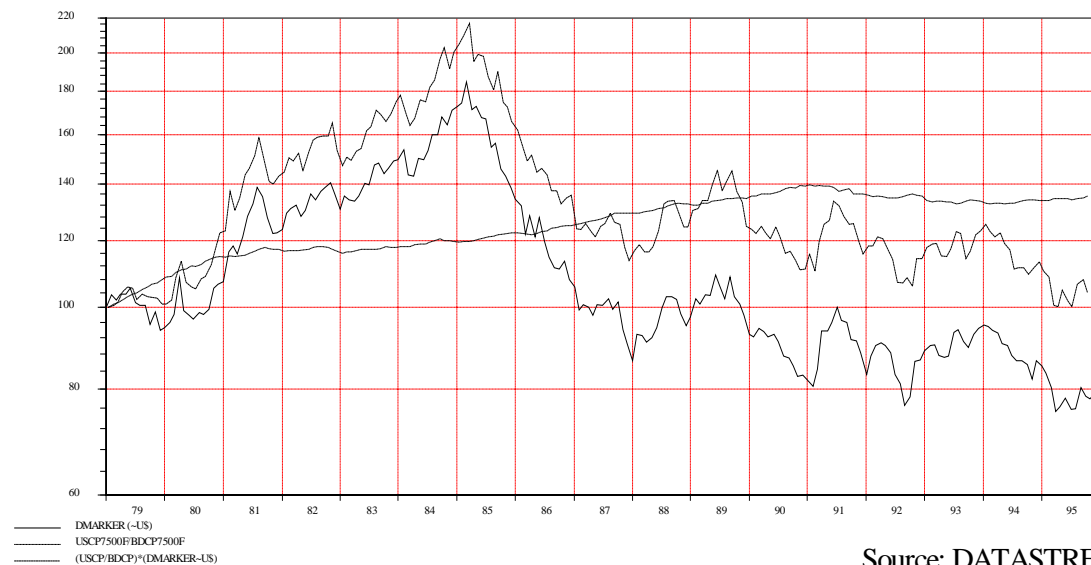
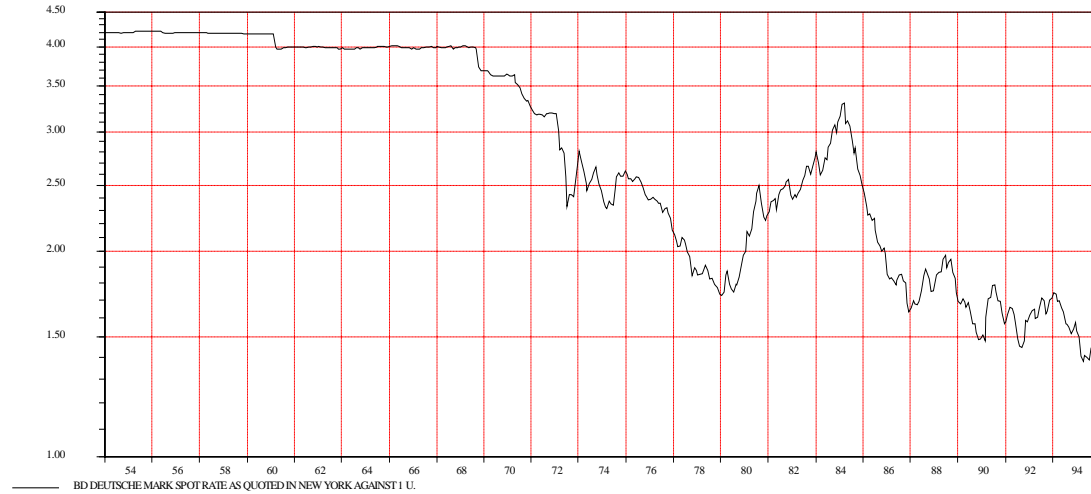
**Selection of base at relative real exchange rates**

**Graphic 1:**

**Exchange rate of the US-\$ in DM 1954-95;**

**Graphics 2 and 3:**

**Excess inflation of US-\$ compared to DM, Real exchange rate and exchange rate of US-\$ in DM on the base of 1972 respectively 1979**



Source: DATASTREAM

**Exchange rate of the Dollar and purchasing power parity**

**BDOCFPPP\*1.95583**

3/1/05

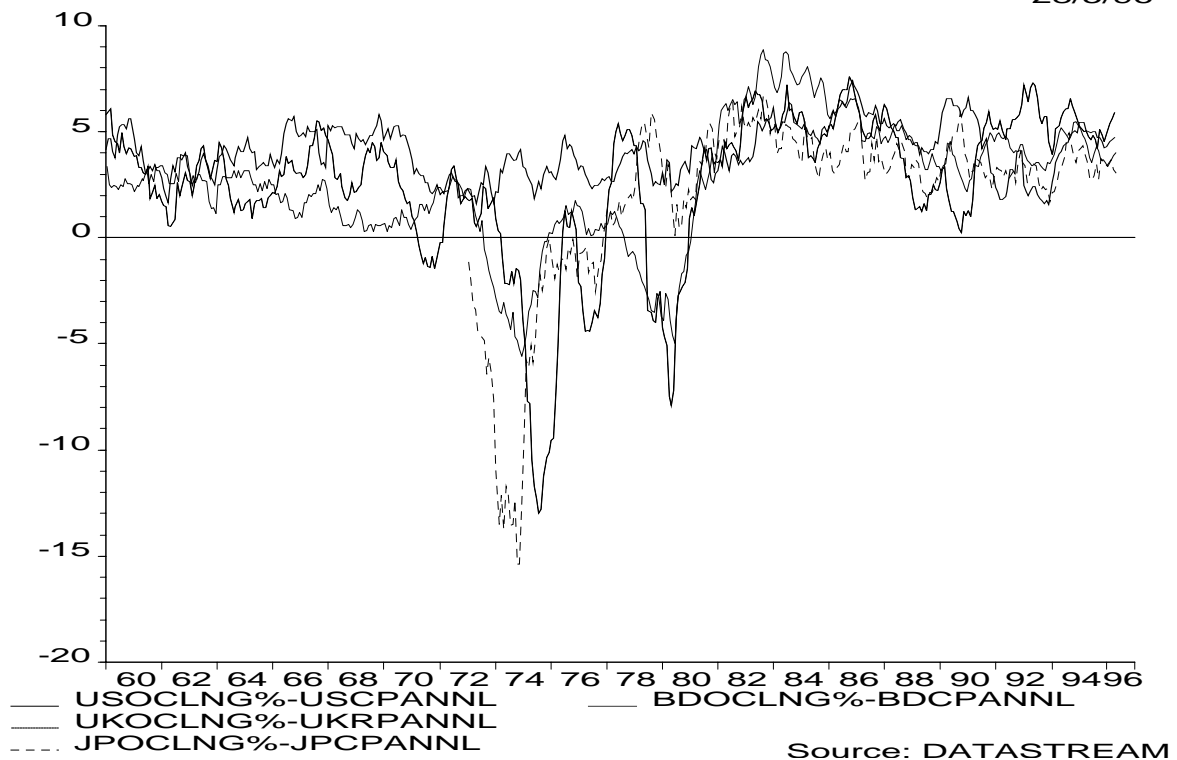


HOCH 2.71 29/6/73, TIEF 1.91 27/6/03, SCHLUSS 1.91 27/6/03

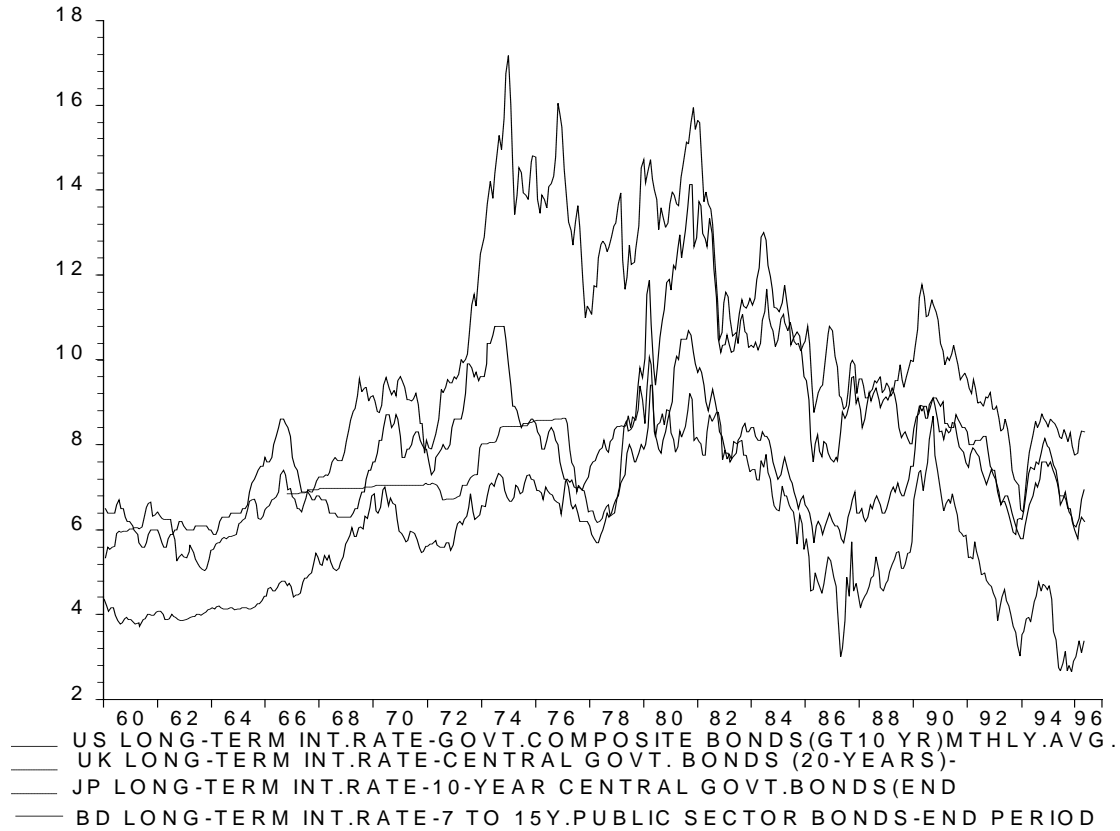
Source: DATASTREAM

**Nominal-and Real interests 1960 - 1996**

28/5/96

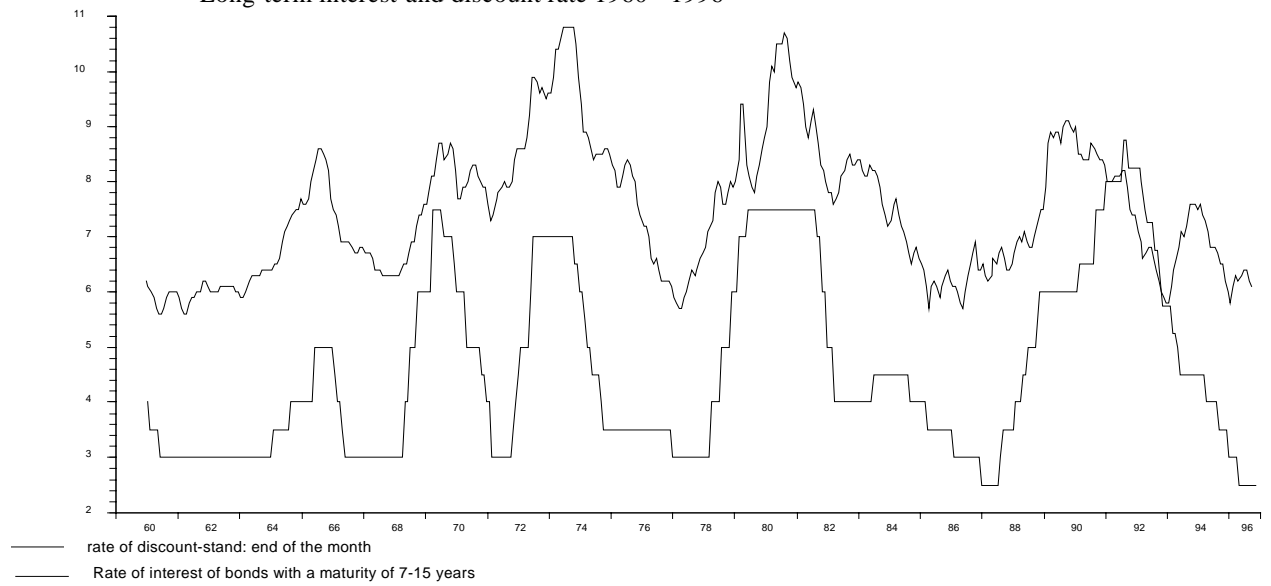


28/5/96



**Discount Rate and...Long term interest rate...Inflation...Growth of GNP**

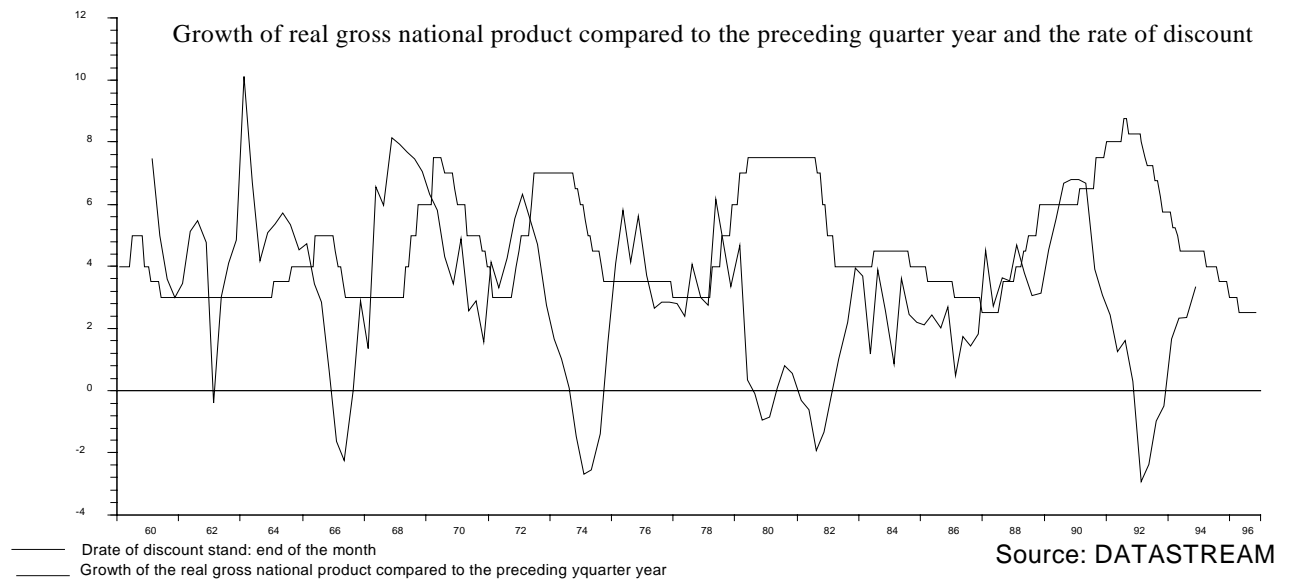
Long-term interest-and discount rate 1960 - 1996



Rate of inflation and of discount between 1960 and 1996



Growth of real gross national product compared to the preceding quarter year and the rate of discount



Source: DATASTREAM

## Put - Call – Parity

For European options on futures contract  
(both options are at the money)

Sum transaction	Payments today	Payments at the exercise day	
		$S^* = < K$	$S^* > K$
<del>KO<sub>v</sub> - Sale Call</del>	+c	-	- (S* - K)
VO <sub>k</sub> - Purchase	-p	K - S*	-
Put			
T <sub>k</sub> - Forward buying	-	S* - F	S* - F
Sum	c - p	K - F	K - F

$e^{i_d t} (c - p) = F - K$  otherwise arbitrage is possible

from  $F = K \Rightarrow c = p$ ;

from  $F = S e^{i_d t} = S (1 + i_d^*)^t$  results:

$$e^{i_d t} (c - p) = S (1 + i_d^*)^t - K;$$

$$c - p = S - K (1 + i_d^*)^{-t}$$

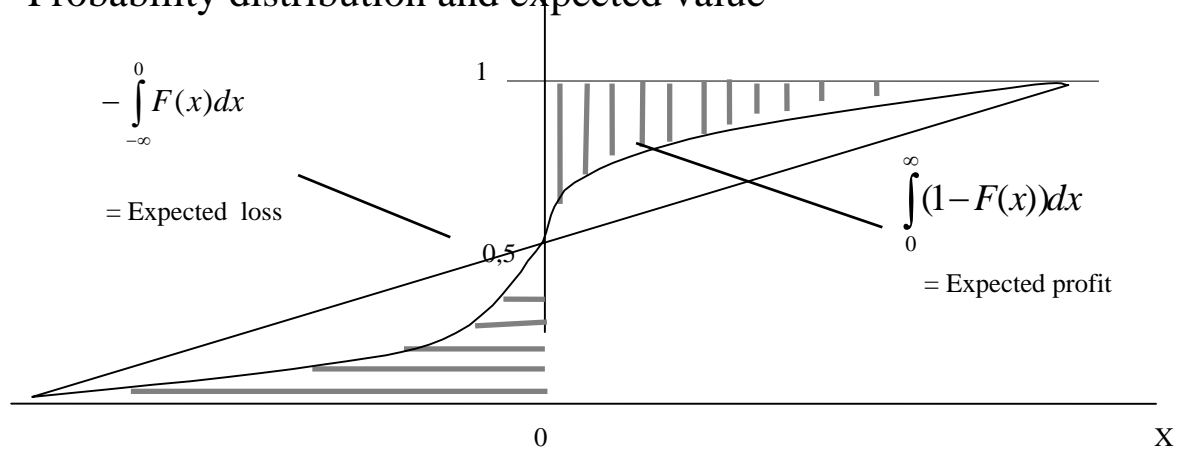
from  $S = K$  results  $c > p$

### Symbols:

- F = Futures - Price
- S = Spot - Price
- S\* = Spot - Price at the exercise day
- K = Exercise price
- $i_d^*$  = decursive rate of interest
- $i_d$  = continuous rate of interest
- c = Price of the Call
- p = Price of the Put
- t = Time

## Relation between the distribution function and expected value

### - Probability distribution and expected value -



The sum of the areas under the curve  $-F(x)$  in the sector  $-\infty$  until 0 and the area between the horizontal lines in the level of 1 and the curve  $F(x)$  in the sector 0 until  $+\infty$  shows the mathematical expected value  $E(x)$  of the random variable  $X$ .

that means: 
$$E(x) = \int_{-\infty}^{\infty} xf(x)dx = -\int_{-\infty}^0 F(x)dx + \int_0^{\infty} (1-F(x))dx$$

#### Proof:

The mathematical expected value  $E(x)$  of density function of random variable  $X$  is defined as:

$$E(x) = \int_{-\infty}^{\infty} xf(x)dx$$

Hereby  $x$  is the possible values of the random variable  $X$ , and  $f(x)$  is the density function of  $X$ .

#### The Integral

$$E(x) = \int_{-\infty}^{\infty} xf(x)dx$$

can be taken apart into

$$E(x) = \int_{-\infty}^0 xf(x)dx + \int_0^{\infty} xf(x)dx$$

This term will now be integrated. The formula for partial integration is used for this.

Formula for partial integration:  $\int u' v dx = uv - \int v' u dx$

You put:  $u' = f(x) \Rightarrow u = F(x)$

And  $v = x \Rightarrow v' = 1$

it results then:

$$E(x) = [xF(x)]_{-\infty}^0 - \int_{-\infty}^0 F(x)dx + [xF(x)]_0^{\infty} - \int_0^{\infty} F(x)dx.$$

*The first term*

$$[xF(x)]_{-\infty}^0 = 0,$$

because when putting in the upper limit  $x = 0$  and when putting in the lower limit  $F(x)$  moves faster towards zero than  $x$  towards  $-\infty$ .<sup>1</sup>

*The second term* is added unchanged into the following formula.

*The third term* converges towards infinite when putting in the upper limit, as

$$\lim_{x \rightarrow \infty} F(x) = 1 \text{ und } \lim_{x \rightarrow \infty} x = \infty$$

When putting in the lower limit, it results 0. The third term can therefore be written as follows

$$[xF(x)]_0^{\infty} = [x]_0^{\infty} = \int_0^{\infty} 1dx.$$

*The fourth term* is added unchanged into the formula

$$E(x) = - \int_{-\infty}^0 F(x)dx + \int_0^{\infty} 1dx - \int_0^{\infty} F(x)dx$$

If the second and third terms are reduced in the limits 0 until  $\infty$  in the preceding formula, it results:

$$E(x) = \int_{-\infty}^{\infty} xf(x)dx = - \int_{-\infty}^0 F(x)dx + \int_0^{\infty} (1 - F(x))dx.$$

---

<sup>1</sup>Theorem of L'Hospital:  $\lim_{x \rightarrow \infty} xF(x) = \lim_{x \rightarrow \infty} \frac{F(x)}{1/x} = \lim_{x \rightarrow \infty} \frac{F'(x)}{-1/x^2} = \lim_{x \rightarrow \infty} -e^{-x^2} x^2 = 0$

### Transformation of Risks

Assumption: every individual credit has the frequency distribution:

Probability of failure	1/10
Probability of repayment of the credit (including interests)	9/10,
Rate of interest :	10% p.a.
Maturity of the credit:	1 year.

**Result and probability of individual positions compared to the combined position, which consists of three credits, which are independent of each other. (whose results are not correlated to each other)**

Result of granting a credit					Probability				
Event	Success of credit 1	Success of credit 2	Success of credit 3	Overall result	Probability of the event at credit 1	Probability of the event at credit 2	Probability of the event at credit 3	Combined probability	Combined probability of events
1	2	3	4	5	6	7	8	9	10
Three credits are failing	-100	-100	-100	-300	1/10	1/10	1/10	1/1000	0,001
Two credits are failing	-100 -100 +10	-100 +10 -100	+10 -100 -100	-190	1/10 1/10 9/10	1/10 9/10 1/10	9/10 1/10 1/10	9/1000 9/1000 9/1000	0,027
One credit is failing	-100 +10 +10	+10 -100 +10	+10 +10 -100	- 80	1/10 9/10 9/10	9/10 1/10 9/10	9/10 9/10 1/10	81/1000 81/1000 81/1000	0,243
No credit is failing	+10	+10	+10	+ 30	9/10	9/10	9/10	729/1000	0,729

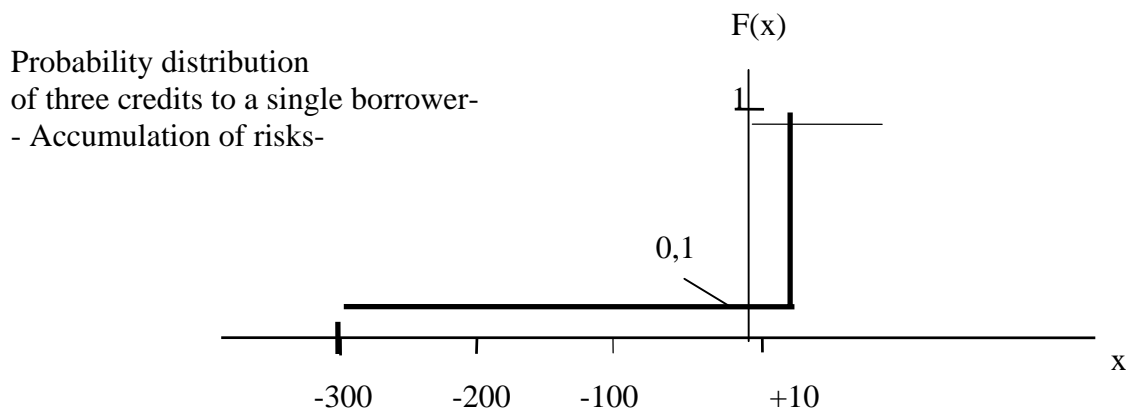
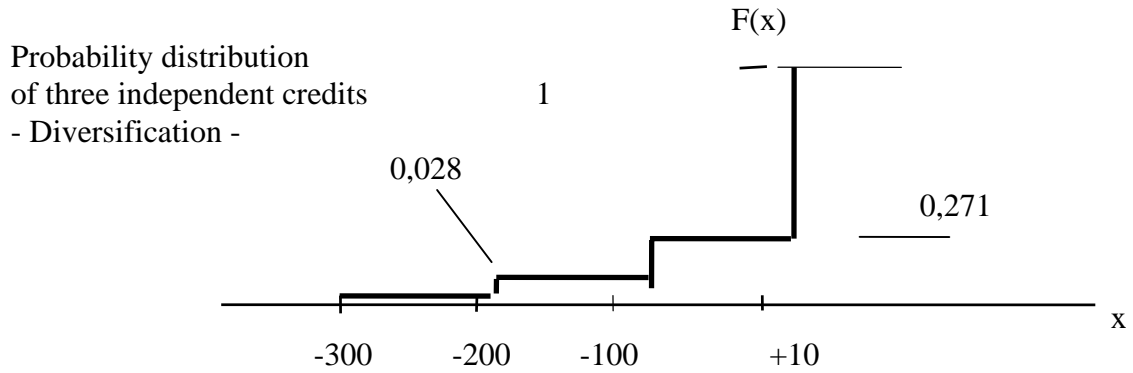
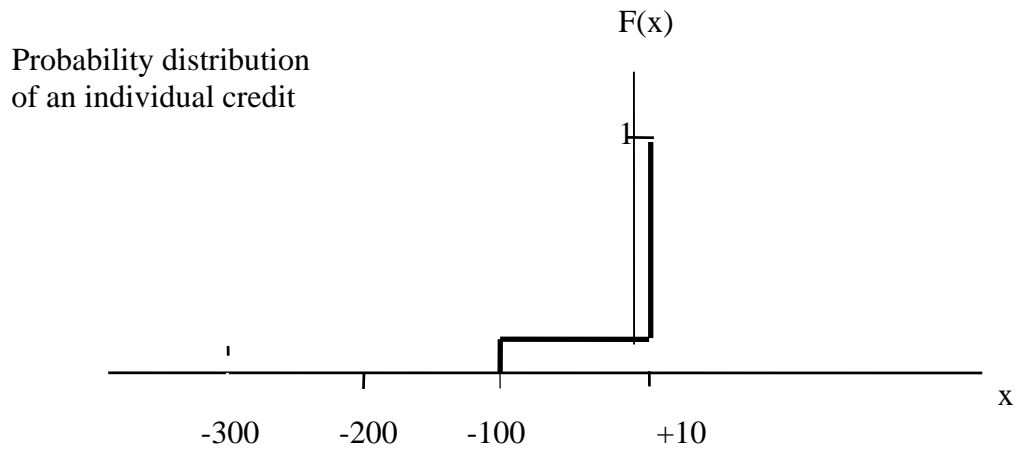
Are the reasons for the failing of credits completely independent from each other, and is the probability of failure of every credit 10% and the probability of a correct repayment with 10% interests per year 90%, for the four events results (event1: failure of all three credits; event 2: failure of two credits; event 3: failure of one credit; event 4: failure of no credit) the outcomes and probabilities described in the table above.

At the independence of the reasons for the failure of different credits, we talk of diversification. Diversification is reached by credits to several borrowers instead of one, by credits to borrowers of different sectors, countries, different groups (of enterprises) instead of credits to one borrower, to borrowers of one sector, one country or one group.

Has the bank an equity capital of 80 € the borrowers escape a failure of *one* credit, has the bank an equity capital of 190 € the failure of one or *two* credits doesn't concern the creditor. The credits become more secure the more equity capital the bank has.

Would the credits be given to the industry directly by the investors, the probability would be 10% for the creditor. Is the bank put in between with equity capital of 80 DM, the probability of failure for the owner of a bank deposit 1%, for the loss of 73 % of its

deposit =  $(300-80)/300$ , and with only 2.7 % probability he suffers a loss of 37% of its  
deposit= $(190-80)/300$ )



### Gresham's law

1. Mint price in England towards the end of the 17th century:

1 ounce of silver: 5 s.2 d.

1 ounce of gold    since 1696: 1696: 89 s,  
                           since 1699: 86 s.11, 7 d,  
                           since 1717: 84 s.11,5 d.

1 £ = 20 s. = 240 d.

2. Based on the mint price that was valid since 1717, it results that out of **1 Ounce of gold** were minted  $84 * 12 + 11,5 = 1019,5$  d., out of **1 Ounce of silver** on the other hand  $5 * 12 + 2 = 62$  d.

The value ratio of 1 Ounce of gold to one Ounce of silver at the redemption of debts was fixed thereby  $1019,5 / 62 = 16,44$ ; 16,44 Ounces of silver = 1 Ounce of gold.

3. In India, the value ratio of gold and silver was about 10.

That means: 10 Ounces of silver=1 Ounce of gold

4. The following transactions were profitable:

a. To mint coins in the nominal value of 1019,5 d out of 1 Ounce of gold.

b. To collect silver coins in the value of 1019,5 d and to melt them down (= 16,44 Ounces of silver).

c. Export of this silver to India.

d. In India, barter of the 16.44 Ounces of silver in 1.644 Ounces of gold.

e. Transport of this gold to England and minting of 1.644 Ounces of gold in  $1,644 * 1019,5 = 1676$  d.; profit of this transaction:  $1676d. - 1019,5 d. = 656,6 d.$

5. The effect was, that silver coins were wanted in England. They were "good" money and were hoarded. Gold coins on the other hand were used for payments. They were "bad" money Silver coins disappeared from the circulation, for payments only gold coins were used.

6. Gresham's law: "The bad money crowds the good one out of circulation."

This is valid under the condition that the government fixes a mint price for two currency metals and so gives the coins a fix nominal value, while in circulation, they are given a different value ratio. The fixation of values of different coins by the mint price is called the system of „double currency“, contrary to a “parallel currency“, where as well coins are minted out of different currency metals, but where their value ratio is not fixed by the state. The value ratio of coins out of different currency metals is then determined by circulation and can change in the course of time.

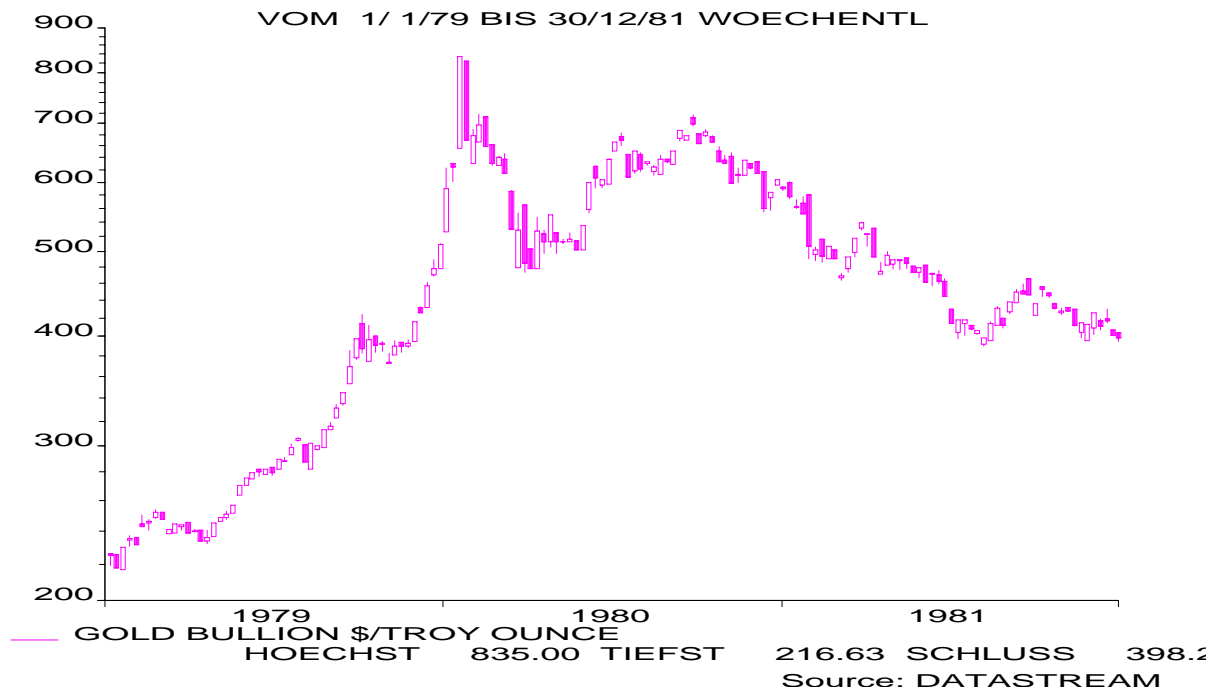
Source: Information of Sir Thomas Gresham, Mercer, touching the fall of the exchange, MDLVIII. To the Queenes most excellent maiestye, in: Burgon, J.W.: The Life and Times of Sir Thomas Gresham. VOL..I, p. 483. London 1839. Also: Laveleye. In: Jahrbücher für Nationalökonomie und Statistik. Vol. 38 (1882), p. 117-119.

**The respective increasing tenfold of the exchange rate of the Dollar since the outbreak of the German War**

1 Gold Mark = 1 Paper Mark	Date	Exchange rate of the Dollar [Mark]	Period of time
1	Juli 1914	4,108	
10	Januar 1920	41,08	5,5 Jahre
100	03 <sup>rd</sup> Jul. 1922	420,00	2,5 Jahre
1 000	21 <sup>st</sup> Oct. 1922	4 430,00	108 Tage
10 000	31 <sup>st</sup> Jan. 1923	49 000,00	101 Tage
100 000	24 <sup>th</sup> Jul. 1923	414 000,00	174 Tage
1 000 000	08 <sup>th</sup> ..... Aug. 1923	4 800 000,00	13 Tage
10 000 000	07 <sup>th</sup> Sep. 1923	53 000 000,00	30 Tage
100 000 000	03 <sup>rd</sup> Oct. 1923	440 000 000,00	26 Tage
1 000 000 000	11 <sup>th</sup> Okt. 1923	5 060 000 000,00	8 Tage
10 000 000 000	22 <sup>rd</sup> Okt. 1923	40 000 000 000,00	11 Tage
100 000 000 000	03 <sup>rd</sup> Nov. 1923	420 000 000 000,00	11 Tage
1 000 000 000 000	20 <sup>th</sup> Nov. 1923	4 200 000 000 000,00	17 Tage

Source: BENTE, Hermann: Die deutsche Währungspolitik von 1914 bis 1924. Weltwirtschaftliches Archiv, 23. Band (1926 I), S. 134.

**Gold price**



**Gold Bullion \$/Troy Ounce**

3/1/05



Source: DATASTREAM

1 Ounce = 31,1gr

### Absolute and relative purchase power parity (PPP)

At basis time (July 1990) is valid:

**Absolute purchasing power parity** (2,02 DM/\$) (= average of a baskets of goods: 2,30 DM/\$ according to the American consumption scheme und 1,74 DM/\$ according to the German consumption scheme).

The exchange rate was in reality: 1,6399 DM/\$.

Rate of increase in price p.a.:	1991	1992	1993	1994	1995
German Federal Republic	4%	4%	4%	3%	2%
United States	5%	5%	5%	5%	5%
Base 1990 = 100					
Index of price Deutschland	104	108	112	116	118
Index of price USA	105	110	116	122	128

#### Average, annual rate of increase in price

##### German Federal Republic

$100 * 1,04 * 1,04 * 1,04 * 1,03 * 1,02 = 118,18$ ;  $\sqrt[5]{118/100} = 1,03366$ ; this corresponds to an average, annual rate of inflation of  $(1,03366 - 1) = 0,03366 = 3,4\%$  p.a.;

##### United States

$100 * 1,05^5 = 127,63$ ;  $\sqrt[5]{127,63/100} = 1,05$ ; this corresponds to an average, annual rate of inflation of  $(1,05 - 1) = 0,05 = 5\%$  p.a.;

If the exchange rate of the US-\$ has decreased in this period of time from 1,6399 DM/\$ to  $1,6399 \text{ DM}/\$ * 118,18/127,63 = 1,6399 \text{ DM}/\$ * 0,926 = 1,5185 \text{ DM}/\$$ , the purchasing power has changed exactly like the exchange rate of the Dollar.

#### Definition of the **relative purchasing power parity**

Exchange rate of a unit of foreign currency measured in domestic currency at time zero (1,6399 DM/\$) \* domestic price index n<sup>th</sup> period / domestic price index at reference period / (foreign price index n<sup>th</sup> period/ foreign price index period of reference)  $((118,18/100)/(127,63/100))$   
 $= 1,6399 \text{ DM}/\$ * 0,926 = 1,5185 \text{ DM}/\$$ .

This corresponds to a \$-devaluation of  $118,18/127,63 - 1 = 0,926 - 1 = -0,074 = -7,4\%$ ;

$1,6399 \text{ DM}/\$ * 0,926 = 1,5185 \text{ DM}/\$$ .

This corresponds to a DM-revaluation of  $127,63/118,18 - 1 = 1,08 - 1 = 8\%$ ;

$0,6098 \text{ \$/DM} * 1,08 = 0,6585 \text{ \$/DM}$ .

**Financial balance of the Deutsche Bundesbank and the Banque de France before and after the wave of speculation against the Franc in the context of the plebiscite over the treaty of the European Union in France at September 20th 1992**

A		Deutsche Bundesbank		P	
		31.12.91		[Billion DM]	
Foreign exchange reserves.....	97	Currency.....	181	Deposits with central bank.....	165
Claims to government.....	14	Capital.....	14		
Claims to banks.....	225				
Others.....	24				
Sum.....	360	Sum.....	360		

A		Deutsche Bundesbank		P	
		23.09.92		[Billion DM]	
Foreign exchange reserves.....	172	Currency.....	186	Deposits with central bank.....	162
Claims to the government.....	16	Capital.....	19		
Claims to banks.....	168				
Others.....	11				
Sum.....	367	Sum.....	367		

A		Banque de France		P	
		31.12.91		[Billion FF]	
Foreign exchange reserves .....	397	Currency .....	264	Deposits with central bank of	
Claims to the government .	109	- Banks (MR).....	57	- Government and other	
Claims to banks.....	188	accounts.....	109	- FECOM, IMF.....	57
Others.....	16	- Foreign banks, institutions and persons .....	9	Capital.....	214
Sum.....	710	Sum.....	710		

A		Banque de France		P	
		24.09.92		[Billion FF]	
Foreign exchange reserves.....	365	Currency.....	254	Deposits with central bank of	
Claims to the government.....	176	- Banks (MR).....	5	- Government and other	
Claims to the government	175	accounts.....	147	- FECOM, IMF.....	58
Others.....	25	- Foreign banks, institutions and persons....	89	Capital.....	188
Sum.....	741	Sum.....	741		

FECOM = European Monetary Co-operation Fund

In the financial balance of the Deutsche Bundesbank, the position „foreign currency reserves increased (from 97 to 172 Billions of DM). The currency inflows were sterilised by a decrease of loans to banks (from 225 to 168 Billions of DM).

In the financial balance of the Banque de France, the loans from foreign banks increased (from 9 to 89 Billions of FF) and the foreign currency reserves decreased (from 397 to 365 Billions of FF).

In total foreign currency in the amount of 112 Billions of FF flew out.

**Working sheet 33**

## The finances of the European Union and the German contribution to it 1980-2003

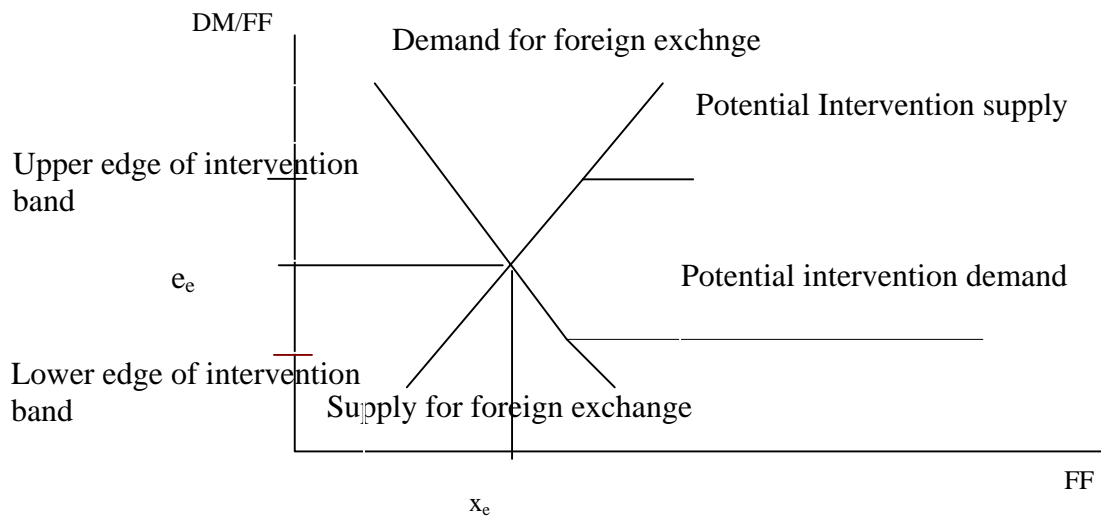
Year	Development of the in-flows of the E.U.		Payments of the GFR			
	absolut	Changes compared to the preceding year in %	Total gross	in % of the total revenues	Total net	in % of the total revenues
	[Billion ECU]		[Billion ECU]		[Billion ECU]	
(1)	(2)	(3)	(4)	(5) = (4)/(2)*100	(6)	(7) = (6)/(2)*100
1980	16,4		4,9	30	1,6	10
1985	28,1	8	8,3	30	3,7	13
1990	46,5	1	11,0	24	5,7	12
1991	56,2	21	16,1	29	9,3	17
1992	59,7	12	17,7	28	10,9	17
1993	65,7	5	20,0	30	12,2	19
1994	66,0	0	22,0	33	14,4	22
1995	75,1	9	22,0	31	13,9	19
1996	81,3	13	22,0	27	11,7	14
1997	80,5	-2	22,0	27	11,5	14
1998	84,5	6	22,0	26	12,2	14
1999	87,0	3	20,7	24	10,8	12
2000	89,4	3	22,7	25	15,4	17
2001	93,8	5	20,4	22	12,8	14
2002	95,7	2	19,3	20	10,6	11
2003	97,5	2				

Quelle: Statistische Beihefte zu den Monatsberichten der Deutschen Bundesbank, Zahlungsbilanzstatistik, September 1993, p. 32.

Statistische Beihefte zu den Monatsberichten der Deutschen Bundesbank, Devisenkursstatistik, Mai 1993, p. 60.

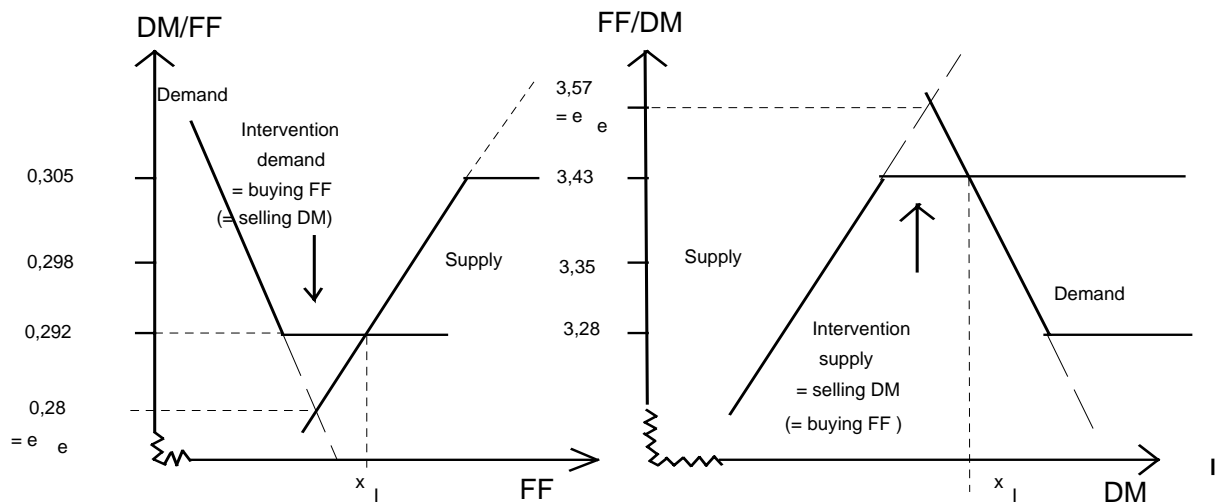
Kommission der Europäischen Gemeinschaften: Haushaltsvademekum 1992. Luxemburg 1992, p. 21. since 1993 Eurostat: Structure of Payments to the EU Budget. Since 1999: [http://europa.eu.int/comm/budget/pubfin/data/x\\_de23.pdf](http://europa.eu.int/comm/budget/pubfin/data/x_de23.pdf). (15. 4. 2003)

**The way the exchange rate mechanism of the EMS works**



$e_e$  = equilibrium exchange rate;  $x_e$  = equilibrium amount

**Picture 1.: No intervention of the central bank at the example of the German Bundesbank: As long as the exchange rate lies in between the intervention points because of supply and demand of non-central banks, no intervention of the central bank is necessary.**



Angle of vision of the Deutsche Bundesbank

Angle of vision of the Banque de France

Abb.: Comparison of the sale of foreign currency of the central bank at the example of the Banque de France and of the purchase of foreign currency at the example of the Deutsche Bundesbank

---

Short description of the Economic and Monetary Union<sup>1</sup>

**Legal sources:**

- (bb) Provisions Amending the Treaty Establishing the European Economic Communities
- (cc) Protocol on the Statute of the European System of the Central Banks (ESCB) and of the European Central Bank
- (dd) Protocol on the statutes of the European Monetary Institute
- (ee) Protocol on the Excessive Deficit Procedure
- (ff) Protocol on the Convergence Criteria Referred to in to Article 109j of the Treaty Establishing the European Community
- (gg) Protocol Amending the Protocol of the privileges and Immunities of the European Communities
- (hh) Protocol on the Transition to the Third Stage
- (ii) Protocol of some regulations concerning the United Kingdom, Great Britain and North Ireland
- (jj) Protocol on Certain Provisions Relating to Denmark
- (kk) Protocol of the irrevocable character of the transition to the third level of the EMU

**Abbreviations:**

**Economic and Monetary Union (EMU)**  
**European Central Bank (ECB),**  
**European System of Central Banks (ESCB),**  
**European Monetary Institution (EMI),**  
**Monetary Committee (MC)**  
**European Currency System (ECS)**  
**Exchange Rate Mechanism (ERM)**  
**European Currency Unit (ECU)**

**Contents**

1. What happened at January 1st 1994?
  - a. Provided measurements
  - b. Condition for the start of the second level
  - c. What is the European Monetary Institute (EMI)?
2. What could have happened at December 31st 1996?
  - (bb) What happened at January the 1st 1999, as the start of the third level of the EMU until 1997 did not occur?
4. Which competences has the council of the EMU?
5. How is the European System of central banks built?

---

<sup>1</sup> Treaty on European Union, Agreed by the European Council in Maastricht December 10<sup>th</sup> 1991. Effective as from December 1993.

**What happened at January 1st 1994?**

a. Provided measurements:

(aa) The article 67 - 73 EEC-treaty<sup>2)</sup> are replaced by article 73 b until g.

(1) 73 c guarantees the further validity of limits of movement capital towards third countries (73 c clause. 1).

(2) Council can control the movement of capital towards thirds countries on proposition of the Commission by a qualified majority (73 c clause. 2). Unanimity should be necessary for measurements, which represent a retrograde step at the liberalisation of movement of capital to or from third parties. (73 c. clause2 sentence2).

(3) Exemptions, which are in force at the end of 1993, can be kept the longest until the end of 1995 (73 e).

(bb) The second stage of the EMU started at January the 1st 1994 (clause. 109e).

(cc) The European Monetary Institute (EMI) was founded.

b. There were no conditions for the beginning of the second stage.

(aa) member states guarantee free movement of capital with third-and member countries (clause. 109 b);

(bb) Credit granting of the Central Bank to states and direct purchase of government bonds is forbidden according to Article 104.

(cc) If necessary multilateral programs for the convergence, which are necessary for the attainment of the EMU

(dd) If these conditions are not fulfilled, the second state still begins. .

c. What is the European Monetary Institute (EMI)?

*Members* are the Central Banks. *Assets* become the assets of the European Monetary Co-operation Fund (FECOM)

*Primary tasks are:*

(aa) Taking over the task of FECOM (EMI-statutes, Art. 4 clause. 1, 5. Dash) and of the Committee of the Governors of the Central Bank (Art. 109f(1) EU-Treaty).

(bb) Coordination of the cooperation and consultation of the Central Banks;

(cc) Preparation of the third stage of the EMU;

(dd) Granting of the status of another holder of ECU

(ee) EMI can administer monetary reserves by request of the national Central Banks

(EWI-statutes, Art. 6 clause. 4.)

<sup>2</sup> BGBl. 1957 II S. 766 (ber. S.1678) und 1928 II S. 64. Effective as from 1.1.1958 gem. Bek. v. 27. Dezember 1957 (BGBl. 1958 II S.1) mit Änderungen und Ergänzungen (Fundstellenverzeichnis S. 128. Zuletzt geändert durch die Einheitliche Europäische Akte (EEA) vom 28. Februar 1968, BGBl. 1986 II S. 1104. Textausgabe bearbeitet und eingeleitet von Läufer, Thomas. Europa Union Verlag: Bonn 1987.

The Council of the EMI comprises the President of EMI, which is appointed by the governments of the member states on the level of the head of states and governments on recommendation of the Committee of the Governors of the Central Banks, respectively of the EMI (after an hearing of the Council and of the European Parliament), the Vice president and the Governors of the national Central Banks. (EMI statutes, Article 9)

The seat should be established by the governments of the member states on the level of the head of states and governments (EMI-statutes, Art. 13). *Losses should be distributed according to quotas* (1/2 population, 1/2 GDP) (EMI, Art. 17 clause. 6 in connection with Art. 16 Abs. 2 und Protocol on ESCB Art. 29)

## 2. What happens at December 31<sup>st</sup> 1996?

December 31<sup>st</sup> 1996 is the latest date, at which the Council meeting in the composition of the heads of states and governments decides with a qualified majority, if a majority of countries

- fulfils the necessary conditions for the adoption of a single currency and
- if the entry in the third level is useful.

and sets a date for it, if necessary. Hereby it considers

- a statement of the European Parliament and
- a decision of the Council (meeting in the composition of the minister) if every individual country and a majority of the countries

fulfils the necessary conditions for the adoption of a single currency. The Council meeting in the composition of the minister considers on its part the opinion of the Commission and of the EMI (Art. 109j clause. 3 in connection with clause. 1 und 2).

## 3. What happened after January 1<sup>st</sup> 1999 if 1997 has not set the beginning of the third level?

As a resolution of the Council over the beginning of the EMU didn't pass, the EMU began automatically at January 1<sup>st</sup> 1999. (Art. 109j Abs. 4 Sentence 1) Hereby the Council decided only (again according to the same procedure as before December 31<sup>st</sup> 1996), which member states fulfilled the conditions for the adoption of a single currency, and had not to decide anymore if a transition to the third level was useful. The Council, on one hand, was not bound to the recommendations and opinions of the institutions participating in this procedure. Denmark, the United Kingdom, and Sweden did not take part in EMU. No country was refused membership in EMU because it didn't fulfil some of the convergence criteria.

Countries, which are not members of EMU, keep their power in the field of the monetary policy. (ESCB, Art. 43 clause 2). By decision of the Council with a qualified majority these countries can become members of EMU. This question is newly decided every two years or on request of the respective country.

#### 4. Which powers has the Council (of EU) in EMU?

The Council has the power over the exchange rate policy, if it decides with unanimity (Art. 109). It can decide general orientations for the ECB with a qualified majority, which it has to comply only within the frame of its general obligations to maintain price stability. The Council can also decide over negotiations over exchange rates. It decides also the ceilings and reference values of the minimum reserves, the introduction of foreign exchange controls (article 73f.) and the use of other instruments of monetary policy for example a loan ceiling, which does not exist at the moment (article 20 Statutes of the ECSB).

#### 5. How is the European System of Central Banks built? (Articles refer to the statutes of the European System of Central Banks (ESCB) and of the European Central Bank)

Institutions:

Governing Council (of ECB) consists of Governors of the Central Banks of the EMU (Art. 43.3 in connection. with 10.1 ESCB-Statutes) and Executive Boards of Directors of the ECB.

Boards of Directors of the ECB consists of the members of the Executive Board of ECB, that is President, the Vice President and four other members, appointed for four years by the Council.

Extended Council: President and Vice- President and Governors of the Central Banks of all EU member countries.

Tasks:

The Governing Council (of ECB) formulates the guidelines for the policy of the ECB (Art. 12 ECSB-Statutes). The individual members are acting independently from each other and from their governments (Art. 108 EU-Treaty). Everyone has one voice. Luxemburg has the same influence on monetary police of ECB as Germany

ECB has the exclusive right, to authorise the issue of bank notes (Art. 16 ECSB-Statutes).

The Governing Council (of ECB) can decide with a 2/3 majority other instruments of credit control (For example credit ceiling), if the Council (of EU) agrees (Art. 20, sentence 1 ECSB-Statutes).

Participation in profits and losses: according to capital shares (Art. 32/33 ECSB-Statutes).

Raising capital: only by Central Banks (Art. 28 clause. 2 ESCB-Statutes); quotas are calculated half by population, half by the gross domestic product (Art. 29 Abs. 1 ESCB-Statutes)

---

In 1996: Treaty of Amsterdam permanently regulates budgetary policy. Criteria for budgetary discipline: budget deficit/GDP  $\leq$  3% and government debt < 60 % is agreed on as stability pact.

Capital recovery factor

$$\frac{(1+i)^t * i}{(1+i)^t - 1} = 1/\text{Present Value of Annuity}$$

1. Present Value											
Discount factors : $\frac{1}{(1+i)^t}$											
Rate of interest i in % p.a.											
	<b>3,00%</b>	<b>4,00%</b>	<b>5,00%</b>	<b>6,00%</b>	<b>7,00%</b>	<b>8,00%</b>	<b>10,00%</b>	<b>12,00%</b>	<b>15,00%</b>	<b>20,00%</b>	
<b>1</b>	0,971	0,962	0,952	0,943	0,935	0,926	0,909	0,893	0,870	0,833	
<b>2</b>	0,943	0,925	0,907	0,890	0,873	0,857	0,826	0,797	0,756	0,694	
<b>3</b>	0,915	0,889	0,864	0,840	0,816	0,794	0,751	0,712	0,658	0,579	
<b>4</b>	0,888	0,855	0,823	0,792	0,763	0,735	0,683	0,636	0,572	0,482	
<b>5</b>	0,863	0,822	0,784	0,747	0,713	0,681	0,621	0,567	0,497	0,402	
<b>6</b>	0,837	0,790	0,746	0,705	0,666	0,630	0,564	0,507	0,432	0,335	
<b>7</b>	0,813	0,760	0,711	0,665	0,623	0,583	0,513	0,452	0,376	0,279	
<b>8</b>	0,789	0,731	0,677	0,627	0,582	0,540	0,467	0,404	0,327	0,233	
<b>9</b>	0,766	0,703	0,645	0,592	0,544	0,500	0,424	0,361	0,284	0,194	
<b>10</b>	0,744	0,676	0,614	0,558	0,508	0,463	0,386	0,322	0,247	0,162	
<b>11</b>	0,722	0,650	0,585	0,527	0,475	0,429	0,350	0,287	0,215	0,135	
<b>12</b>	0,701	0,625	0,557	0,497	0,444	0,397	0,319	0,257	0,187	0,112	
<b>13</b>	0,681	0,601	0,530	0,469	0,415	0,368	0,290	0,229	0,163	0,0935	
<b>14</b>	0,661	0,577	0,505	0,442	0,388	0,340	0,263	0,205	0,141	0,0779	
<b>15</b>	0,642	0,555	0,481	0,417	0,362	0,315	0,239	0,183	0,123	0,0649	
<b>16</b>	0,623	0,534	0,458	0,394	0,339	0,292	0,218	0,163	0,107	0,0541	
<b>17</b>	0,605	0,513	0,436	0,371	0,317	0,270	0,198	0,146	0,093	0,0451	
<b>18</b>	0,587	0,494	0,416	0,350	0,296	0,250	0,180	0,130	0,0808	0,0376	
<b>19</b>	0,570	0,475	0,396	0,331	0,277	0,232	0,164	0,116	0,0703	0,0313	
<b>20</b>	0,554	0,456	0,377	0,312	0,258	0,215	0,149	0,104	0,0611	0,0261	
<b>25</b>	0,478	0,375	0,295	0,233	0,184	0,146	0,0923	0,0588	0,0304	0,0105	
<b>30</b>	0,412	0,308	0,231	0,174	0,131	0,0994	0,0573	0,0334	0,0151	0,00421	
<b>40</b>	0,307	0,208	0,142	0,0972	0,0668	0,0460	0,0221	0,0107	0,00373	0,00068	
<b>50</b>	0,228	0,141	0,0872	0,0543	0,0339	0,0213	0,00852	0,00346	0,00092	0,00011	
The discount factors indicate for the different rates what you get today for 1 Rbl, which you will get at the end of a specified year.											
Example: For 1 Rbl, which you get at the end of the sixth year, you can get today at a rate of interest of 4% p.a. 0.79 Rbl.											

Capital recovery factor

$$\frac{(1+i)^t * i}{(1+i)^t - 1} = 1/\text{Present Value of Annuity}$$

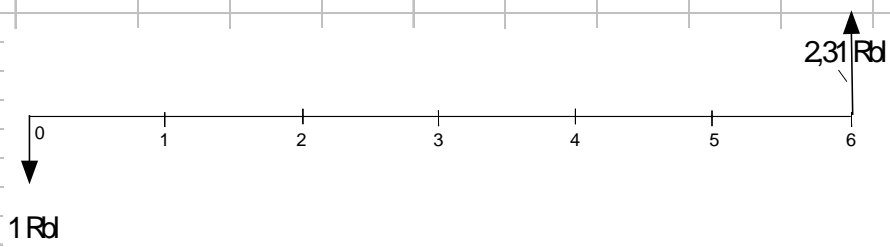
2. Compound Interest

Compound interest:  $(1+i)^t$

		Rate of interest % p.a.									
		3,00%	4,00%	5,00%	6,00%	7,00%	8,00%	10,00%	12,00%	15,00%	20,00%
1		1,03	1,04	1,05	1,06	1,07	1,08	1,10	1,12	1,15	1,20
2		1,06	1,08	1,10	1,12	1,14	1,17	1,21	1,25	1,32	1,44
3		1,09	1,12	1,16	1,19	1,23	1,26	1,33	1,40	1,52	1,73
4		1,13	1,17	1,22	1,26	1,31	1,36	1,46	1,57	1,75	2,07
5		1,16	1,22	1,28	1,34	1,40	1,47	1,61	1,76	2,01	2,49
6		1,19	1,27	1,34	1,42	1,50	1,59	1,77	1,97	2,31	2,99
7		1,23	1,32	1,41	1,50	1,61	1,71	1,95	2,21	2,66	3,58
8		1,27	1,37	1,48	1,59	1,72	1,85	2,14	2,48	3,06	4,30
9		1,30	1,42	1,55	1,69	1,84	2,00	2,36	2,77	3,52	5,16
Y	10	1,34	1,48	1,63	1,79	1,97	2,16	2,59	3,11	4,05	6,19
e	11	1,38	1,54	1,71	1,90	2,10	2,33	2,85	3,48	4,65	7,43
a	12	1,43	1,60	1,80	2,01	2,25	2,52	3,14	3,90	5,35	8,92
r	13	1,47	1,67	1,89	2,13	2,41	2,72	3,45	4,36	6,15	10,7
s	14	1,51	1,73	1,98	2,26	2,58	2,94	3,80	4,89	7,08	12,8
t	15	1,56	1,80	2,08	2,40	2,76	3,17	4,18	5,47	8,14	15,4
	16	1,60	1,87	2,18	2,54	2,95	3,43	4,59	6,13	9,36	18,5
	17	1,65	1,95	2,29	2,69	3,16	3,70	5,05	6,87	10,8	22,2
	18	1,70	2,03	2,41	2,85	3,38	4,00	5,56	7,69	12,4	26,6
	19	1,75	2,11	2,53	3,03	3,62	4,32	6,12	8,61	14,2	31,9
	20	1,81	2,19	2,65	3,21	3,87	4,66	6,73	9,65	16,4	38,3
	25	2,09	2,67	3,39	4,29	5,43	6,85	10,8	17,0	32,9	95,4
	30	2,43	3,24	4,32	5,74	7,61	10,1	17,4	30,0	66,2	237
	40	3,26	4,80	7,04	10,3	15,0	21,7	45,3	93,1	268	1470
	50	4,38	7,11	11,5	18,4	29,5	46,9	117	289	1084	9100

What do you get if you pay 1 Rbl today after a specified period at a specified interest rate of interest.

Exampel:  
1 Rbl you invest at 15 % p.a. grows within 6 years to 2,31 Rbl.



Capital recovery factor

$$\frac{(1+i)^t * i}{(1+i)^t - 1} = 1/\text{Present Value of Annuity}$$

3. Present Value of annuity

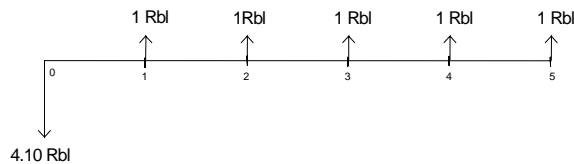
$$\frac{(1+i)^t - 1}{(1+i)^t * i}$$

	2	1,91	1,89	1,86	1,83	1,81	1,78	1,74	1,69	1,63	1,53
	3	2,83	2,78	2,72	2,67	2,62	2,58	2,49	2,40	2,28	2,11
	4	3,72	3,63	3,55	3,47	3,39	3,31	3,17	3,04	2,85	2,59
	5	4,58	4,45	4,33	4,21	4,10	3,99	3,79	3,60	3,35	2,99
	6	5,42	5,24	5,08	4,92	4,77	4,62	4,36	4,11	3,78	3,33
	7	6,23	6,00	5,79	5,58	5,39	5,21	4,87	4,56	4,16	3,60
	8	7,02	6,73	6,46	6,21	5,97	5,75	5,33	4,97	4,49	3,84
	9	7,79	7,44	7,11	6,80	6,52	6,25	5,76	5,33	4,77	4,03
Y	10	8,53	8,11	7,72	7,36	7,02	6,71	6,14	5,65	5,02	4,19
e	11	9,25	8,76	8,31	7,89	7,50	7,14	6,50	5,94	5,23	4,33
a	12	9,95	9,39	8,86	8,38	7,94	7,54	6,81	6,19	5,42	4,44
r	13	10,6	9,99	9,39	8,85	8,36	7,90	7,10	6,42	5,58	4,53
s	14	11,3	10,6	9,90	9,29	8,75	8,24	7,37	6,63	5,72	4,61
t	15	11,9	11,1	10,4	9,71	9,11	8,56	7,61	6,81	5,85	4,68
	16	12,6	11,7	10,8	10,1	9,45	8,85	7,82	6,97	5,95	4,73
	17	13,2	12,2	11,3	10,5	9,76	9,12	8,02	7,12	6,05	4,77
	18	13,8	12,7	11,7	10,8	10,1	9,37	8,20	7,25	6,13	4,81
	19	14,3	13,1	12,1	11,2	10,3	9,60	8,36	7,37	6,20	4,84
	20	14,9	13,6	12,5	11,5	10,6	9,82	8,51	7,47	6,26	4,87
	25	17,4	15,6	14,1	12,8	11,7	10,7	9,08	7,84	6,46	4,95
	30	19,6	17,3	15,4	13,8	12,4	11,3	9,43	8,06	6,57	4,98
	40	23,1	19,8	17,2	15,0	13,3	11,9	9,78	8,24	6,64	5,00
	50	25,7	21,5	18,3	15,8	13,8	12,2	9,91	8,30	6,66	5,00

What you get today for 1 Rbl paid to you at the end of each year for specified period at specified interest.

Example

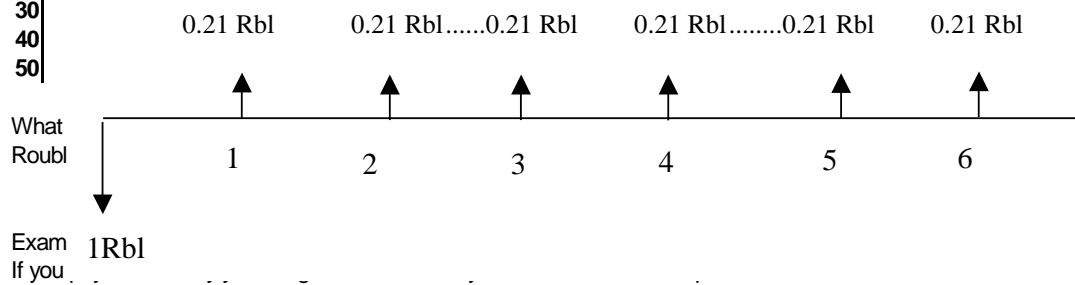
To get 1 Rbl at the end of each year for 5 years at an interest rate of 7 % p.a., today you must pay 4.1 Rbl



Capital recovery factor

$$\frac{(1+i)^t * i}{(1+i)^t - 1} = 1/\text{Present Value of Annuity}$$

		Zinssatz i in %									
		3,00%	4,00%	5,00%	6,00%	7,00%	8,00%	10,00%	12,00%	15,00%	20,00%
1		1,03	1,04	1,05	1,06	1,07	1,08	1,10	1,12	1,15	1,20
2		0,523	0,530	0,538	0,545	0,553	0,561	0,576	0,592	0,615	0,655
3		0,354	0,360	0,367	0,374	0,381	0,388	0,402	0,416	0,438	0,475
4		0,269	0,275	0,282	0,289	0,295	0,302	0,315	0,329	0,350	0,386
5		0,218	0,225	0,231	0,237	0,244	0,250	0,264	0,277	0,298	0,334
6		0,185	0,191	0,197	0,203	0,210	0,216	0,230	0,243	0,264	0,301
7		0,161	0,167	0,173	0,179	0,186	0,192	0,205	0,219	0,240	0,277
8		0,142	0,149	0,155	0,161	0,167	0,174	0,187	0,201	0,223	0,261
9		0,128	0,134	0,141	0,147	0,153	0,160	0,174	0,188	0,210	0,248
J		0,117	0,123	0,130	0,136	0,142	0,149	0,163	0,177	0,199	0,239
a		0,108	0,114	0,120	0,127	0,133	0,140	0,154	0,168	0,191	0,231
h		0,100	0,107	0,113	0,119	0,126	0,133	0,147	0,161	0,184	0,225
r		0,0940	0,100	0,106	0,113	0,120	0,127	0,141	0,156	0,179	0,221
e		0,0885	0,0947	0,101	0,108	0,114	0,121	0,136	0,151	0,175	0,217
14		0,0838	0,0899	0,0963	0,103	0,110	0,117	0,131	0,147	0,171	0,214
15		0,0796	0,0858	0,0923	0,0990	0,106	0,113	0,128	0,143	0,168	0,211
16		0,0760	0,0822	0,0887	0,0954	0,102	0,110	0,125	0,140	0,165	0,209
17		0,0727	0,0790	0,0855	0,0924	0,0994	0,107	0,122	0,138	0,163	0,208
18		0,0698	0,0761	0,0827	0,0896	0,0968	0,104	0,120	0,136	0,161	0,206
19											
20											
25											
30											
40											
50											



**Sources of EU Law**

1. EWG-Vertrag vom 25.3.1957 (ratifiziert in der BRD: 27.7.1957) Art. 57 - 73 und 103 - 109.
2. EntschlieÙung des Rates und der Vertreter der Regierungen der Mitgliedstaaten vom 22.3.1971 über die stufenweise Verwirklichung der Wirtschafts-, Währungsunion in der Gemeinschaft.
3. Entscheidung des Rates vom 22.3.1971 über die Verstärkung der Zusammenarbeit zwischen den Zentralbanken der Mitgliedstaaten der EWG.
4. Entscheidung des Rates vom 22.3.1971 über die Einführung eines Mechanismus für den mittelfristigen finanziellen Beistand (71/143/EWG); ersetzt durch Verordnung (L178) vom 8. Juli 1988.
5. Entscheidung des Rates und der Vertreter der Regierungen der Mitgliedstaaten vom 21.3.1972 betreffend die Anwendung der EntschlieÙung vom 22.3.1971 über die stufenweise Verwirklichung der Wirtschafts- und Währungsunion in der Gemeinschaft.
6. Abkommen der Zentralbanken der Mitgliedstaaten der EWG vom 10.4.1972 in Kraft gesetzt am 27.4.1972 (kurzfristiger Beistand bis zu zwei Monaten).
7. Verordnung (EWG) Nr. 907/73 des Rates vom 3.4.1973 zur Errichtung eines Europäischen Fonds für währungspolitische Zusammenarbeit.
8. EntschlieÙung des europäischen Rates vom 5.12.1978 über die Errichtung des europäischen Währungssystems (EWS) und damit zusammenhängende Fragen.
9. Verordnung (EWG) Nr. 3180/78 des Rates vom 18.12.1978 zur Änderung des Wertes der vom Europäischen Fonds für währungspolitische Zusammenarbeit verwendeten Rechnungseinheit.
10. Verordnung (EWG) Nr. 3181/78 des Rates vom 18.12.1978 über das Europäische Währungssystem.
11. Abkommen zwischen den Zentralbanken der Mitgliedstaaten der EWG
  - a. Abkommen zwischen den Zentralbanken der Mitgliedstaaten der Europäischen Wirtschaftsgemeinschaft über die Funktionsweise des Europäischen Währungssystems (13.3.1979). Geändert mit Wirkung vom 10. November 1987
  - b. Akte über den kurzfristigen Währungsbeistand vom 13.3.1979
  - c. Abkommen vom 9.2.1970 zur Errichtung eines Systems des kurzfristigen Währungsbeistands unter den Zentralbanken der Mitgliedstaaten der EWG.
12. Beschluß (Nr. 12/79) des Verwaltungsrates des EFWZ vom 13.3.1979.
13. Beschluß (Nr. 13/79) des Verwaltungsrates vom 13.3.1979 zur Änderung des kurzfristigen Währungsbeistands.
14. Verordnung (EWG) des Rates vom 16. März 1981 für die Anpassung des Systems der Gemeinschaftsanleihen zur Stützung der Zahlungsbilanz der Mitgliedstaaten (682/81); ersetzt durch Verordnung (L178) vom 8. Juli 1988.
15. Einheitliche Europäische Akte (EEA) vom 28.2.1986, Bundesgesetzblatt 1986 II, S. 1104.

**Sources of EU Law**

16. Pressemitteilung der Präsidenten der Zentralbanken der Mitgliedstaaten der EWG vom 18. September 1987 (Informelle Konferenz der Finanzminister in Nyborg vom 12.9.1978).
17. Verordnung EWG Nr. 1969/88 des Rates vom 24. Juni 1988 zur Einführung eines einheitlichen Systems des mittelfristigen finanziellen Beistands zur Stützung der Zahlungsbilanzen der Mitgliedstaaten.
18. Delors-Bericht (Bericht des Ausschusses zur Prüfung der Wirtschafts- und Währungsunion vom 12.4.1989) aufgrund des Beschlusses des Europäischen Rates vom 27. und 28. Juni 1988.
19. Entscheidung des Rates vom 12.3.1990 über die Verwirklichung einer zunehmenden Konvergenz der Wirtschaftspolitik und der wirtschaftlichen Entwicklung während der ersten Stufe der Wirtschafts- und Währungsunion (90/141/EEC).
20. Entscheidung des Rates vom 12.3.1990 über die Zusammenarbeit zwischen den Zentralbanken der Mitgliedstaaten der EWG (64/300/EEC).
21. Vertrag über die Schaffung einer Währungs-, Wirtschafts- und Sozialunion zwischen der Bundesrepublik Deutschland und der Deutschen Demokratischen Republik vom 18.5.1990. BGBl. II (29.6.1990), S. 517-567.
22. Vertrag zwischen der Bundesrepublik Deutschland und der Deutschen Demokratischen Republik über die Herstellung der Einheit Deutschlands -Einigungsvertrag - vom 31.8.1990. Bulletin der Bundesregierung vom 6.9.1990. Nr. 104, S. 887-1120.
23. Vertrag über die Europäische Union. Vereinbart durch den Europäischen Rat von Maastricht am 10.12.1991. Schlußprotokoll vom 7.2.1992. Presse- und Informationsamt der Bundesregierung: Bulletin, Bonn, den 12.2.1992. Nr. 16, S. 113-184.