PICTET
1805

The Performance

of Shares and Bonds in Switzerland

An empirical study covering the years since 1925
Original study from January 1988 updated to end-1997

Pictet & Cie, Zurich
July 1998

CONTENTS

* Translated from German

PREFACE

In January 1988, Pictet & Cie first published its long-term study comparing the performance of shares and CHF-bonds since end-1925. The study drew its inspiration from a broader-based analytical study produced by Ibbotson Associates for the US market. Similar empirical studies have also been conducted for the UK market (by Barclays de Zoete Wedd) and Japan (by Hamao in 1989).

Ten years have now elapsed since the original study was first published. The recent updating of the series of indices provided no significant new information, but interest in comparative performance of investments over the long term has shown no signs of diminishing. Moreover, in the interim, a scientific discussion on investment horizons, risk and performance has been taking place in Switzerland (see the Zimmermann article on this topic in 1991).

We, therefore, decided to produce an update to the original 1988 study - which is reproduced in its unamended original version in Part II - taking the study up to end-1997 (the update is presented in Part I). The tables and charts in Part I will be updated on an annual basis. The conclusions can be ordered from the Pictet & Cie's Institutional Investment department.

July 1998, Daniel Wydler

PART I

UPDATED STUDY FROM JULY 1998 (PERIOD 1926-97)

By Daniel Wydler (Pictet Asset Management, Zurich)

(July 1998)

1. Introduction

This update is based on the empirical study of the performance of shares and bonds in Switzerland first published by Pictet & Cie in 1988 (refer also to Wydler 1989). The 1988 original study is reproduced in Part II. The original series of data covering the period from end-1925 to end-1987 has now been extended to encompass the period up to and including 1997.

2. Content of update

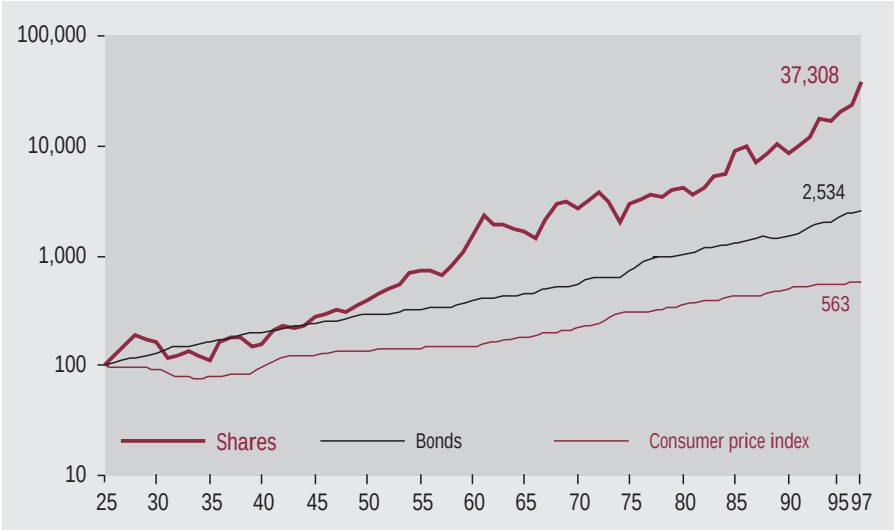
The updating process, which will be repeated regularly in the future, comprises two charts (Exhibits 1 and 2) and three tables (Exhibits 3 to 5). These are described in brief below.

2.1 Increase in nominal values 1926-1997 (Exhibit 1)

The chart in **Exhibit 1** shows how the nominal values of CHF-bonds and Swiss equities, together with the consumer prices index, have changed since the end of 1925. From the chart, we can see that an initial investment of CHF100 in a diversified portfolio of Swiss shares at end-1925 would have been worth CHF37,308.– by end-1997 whereas a similar sum invested in CHF-bonds would "only" have reached CHF2,534.–. The higher fluctuation in the value of shares over time compared to bonds illustrates clearly the higher risk associated with equities. Both types of investments produced a positive real return over the period as can be seen from the fact that both curves for shares and bonds lie above that for the consumer price index.

A logarithmic scale has been chosen for the vertical axis so that the rising gradient reflects the value of the return for any period. The chart in **Exhibit 1** corresponds to Figure 1 in the original 1988 study (see Part II).

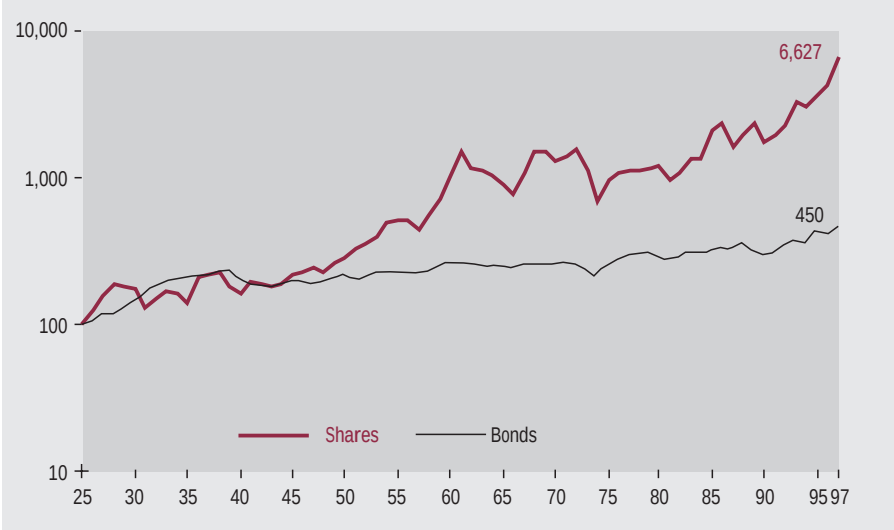
Exhibit 1: Nominal value of shares and bonds together with the consumer price index in Switzerland from 1926 to 1997



2.2. Increase in real values 1926-1997 (Exhibit 2)

The chart in **Exhibit 2** shows how real values – i.e. nominal values adjusted to take inflation into account – of CHF-bonds and shares have changed over the period. As can be seen from the chart, the initial investment in bonds, with interest earned being re-invested, has multiplied 4.50 times in terms of the comparable purchasing power of money over the 72-year period from end-1925. A similar investment in shares would have increased by a factor of 66.30 in real terms. The chart in **Exhibit 2** corresponds to Figure 2 in the original 1988 study (see part II).

Exhibit 2: Real value of shares and bonds in Switzerland from 1926 to 1997



2.3 Statistical data (Exhibit 3)

Exhibit 3 presents statistical data relating to the annual performance of shares and bonds in Switzerland from 1926 to 1997. The statistics give the average yearly return, the standard deviation (volatility) as a measure of the risk involved, the heaviest loss and gain in value in a year as well as the correlation between the return on shares and bonds. All the statistics are given in both nominal and real terms.

The figures illustrate the potential for higher returns as well as the higher risk of shares compared with bonds. Interestingly, the risk factor – measured as the standard deviation of the annual return – associated with bonds is smaller in nominal terms (3.7%) than it is once the data are adjusted for inflation (5.5%). The effect of inflation on real bond returns can be seen clearly from the fact that the high/low years in terms of yearly returns are different depending on whether we are looking at real or nominal data. The worst return for bonds in nominal terms was -4.0% in 1989, but, in real terms, it occurred in 1973 (-10.9%). The inflation risk as far as equities are concerned is not so significant. The standard deviation in the annual return is just over 20% in both nominal and real terms.

The calculations in **Exhibit 3** are based on an arithmetical mean which looks at performance from a short-term view (in this case, yearly). The figures correspond to Table 3 in the original 1988 study (see Part II).

Exhibit 3: Statistical data relating to the annual return on shares and bonds in Switzerland in the years from 1926 to 1997

	Shares	Bonds	Shares	Bonds
	Nominal		Real	
Return: average annual total return	10.49%	4.66%	7.93%	2.26%
Risk: standard deviation	20.78%	3.73%	20.51%	5.51%
Worst performance	-33.14%	-3.99%	-37.83%	-10.93%
(Year)	(1974)	(1989)	(1974)	(1973)
Best performance	61.36%	16.58%	56.24%	14.87%
(Year)	(1985)	(1975)	(1985)	(1976)
Correlation	37.21%		35.77%	

Pictet & Cie

NOTE: The calculations are based on an arithmetical mean which looks at performance from a short-term view (in this case, yearly). The figures correspond to Table 3 in the original 1988 study. Annual data are used as base.

2.4 Annualised performance (Exhibit 4)

As calculations using an arithmetic mean are not suited to the long-term view (where periods of several years are taken into account), further calculations have been made taking a geometric mean. This provides an annualised performance for bonds and shares on the basis of a passive buy-and-hold strategy over any period.

Exhibit 4 presents the annualised return of bonds and shares for various periods up to end-1997 as well as the outperformance of shares over bonds. Data in both real and nominal terms are given. Thanks to shares' outstanding performance over the three years 1995-1997, with an average gain in nominal terms of over 18% each year, in not one single investment period chosen do equities come out worse than bonds in terms of performance.

It should be borne in mind, however, that this consistent outperformance of shares over bonds does not necessarily mean that over the medium term (for instance over a 10-year investment period) shares will always yield better returns than bonds. The original 1988 study showed (see Part II, Figures 4 and 5) that, in the past, there have been certain 10- or 20-year periods over which bonds have produced better returns than shares (see also paragraph 4 in Part I).

Exhibit 4: Annualised return of shares and bonds in Switzerland for various investment periods during the years from 1926 to 1997

Investment period	No. of years	Return on shares (nominal)	Return on bonds (nominal)	Out-performance by shares (nominal)	Return on shares (real)	Return on bonds (real)	Out-performance by shares (real)	Inflation (CPI)
1997	1	55.19%	5.67%	49.52%	54.58%	5.25%	49.33%	0.40%
1996 - 1997	2	35.49%	5.52%	29.97%	34.68%	4.89%	29.79%	0.60%
1995 - 1997	3	31.21%	7.73%	23.48%	29.86%	6.62%	23.24%	1.04%
1994 - 1997	4	20.19%	5.59%	14.60%	19.13%	4.66%	14.47%	0.89%
1993 - 1997	5	25.77%	7.03%	18.75%	24.27%	5.75%	18.52%	1.21%
1988 - 1997	10	18.21%	5.61%	12.60%	15.12%	2.86%	12.27%	2.68%
1983 - 1997	15	15.86%	5.31%	10.55%	13.07%	2.77%	10.30%	2.47%
1978 - 1997	20	12.54%	5.07%	7.47%	9.31%	2.05%	7.25%	2.96%
1968 - 1997	30	10.04%	5.64%	4.40%	6.24%	1.99%	4.25%	3.58%
1958 - 1997	40	10.57%	5.19%	5.38%	6.95%	1.75%	5.20%	3.38%
1948 - 1997	50	9.97%	4.70%	5.27%	6.85%	1.73%	5.12%	2.91%
1938 - 1997	60	9.30%	4.50%	4.80%	5.86%	1.21%	4.65%	3.25%
1928 - 1997	70	8.16%	4.56%	3.61%	5.48%	1.97%	3.52%	2.54%
1926 - 1997	72	8.57%	4.59%	3.98%	6.00%	2.11%	3.89%	2.43%

Pictet & Cie

Note:
The returns are calculated using a geometric mean and therefore give the annualised return achieved through a buy-and-hold strategy implemented over a longer period (in this instance, for longer than 1 year).

2.5 Series of indices (Exhibit 5)

Exhibit 5 presents the series of total return indices for Swiss equities and CHF-bonds as well as the consumer price index plus the real (inflation-adjusted) series for shares and bonds. The value of the index taken is its level at the corresponding year-end. All the figures include yearly gains and losses as well as re-invested income.

Full acknowledgement of the sources of data for these indices are included in Annex 1 of the original 1988 study (see Part II). Some of the more important features are outlined below.

- Share index: Reflects a diversified portfolio of Swiss shares. Data from Rätzer (1983) for the years from 1926 to 1959 and from Huber (1986) for the years from 1960 to 1983, itself drawn from the SBC Index adjusted for dividends, form the foundations of the indices. For the succeeding years from 1984 to 1991, the Pictet Index with dividends incorporated has been used and, from 1992 onwards, the Swiss Performance Index (SPI) including dividends has been used as the benchmark.

- Bond index: Represents a diversified index of CHF-denominated bonds issued by various domestic borrowers. Data from Rätzer (1983) for the years from 1926 to 1959 and from Huber (1986) for the years from 1960 to 1983 form the foundations of the indices. Since 1984, the Pictet Sub-index "Domestic Bond Total Return Index" has been employed.

- Real indices: Result from total return indices adjusted for inflation. The nominal series of indices are adjusted using the index for consumer prices in Switzerland.

3. Findings from the updated study

The expanded data series, produced by the update, unearthed no new findings by comparison with the results from the original 1988 study. The main features are summarised below:

- Over the whole period in question, an annualised total return of 8.6% (real 6.0%) would have been earned on an investment in Swiss shares. By comparison, the annual return on Swiss bonds would have been 4.6% (real 2.1%) (see **Exhibit 4**).

- The nominal as well as the real share index doubled from end 1994 to 1997.

- Extending the period under research by 10 years increased the outperformance of shares over bonds (see part II for 1926-1987 period). The long-term average return on shares in real terms increased by 1.5 percentage points to 7.9% p.a. whereas the annualised return on bonds rose to 2.3%. The degree of volatility was only marginally higher (compare **Exhibit 4** with Table 3 in Part II).

- The return on shares in 1997 in both nominal and real terms was the second highest in a single year. This meant that for every investment period in **Exhibit 4** the return on shares (nominal and real) was higher than that earned on bonds.

• This consistent outperformance does not, however, mean that shares are unlikely to underperform bonds at some stage in the future. According to the statistical data, the nominal returns for shares in single years are lower than those for bonds in roughly two out of every five years.

4. Conclusions for investors

• Generally speaking, the conclusions outlined in the original 1988 study remain valid (see Part II, pages 25-26).

• The performance of a broadly diversified portfolio of Swiss shares will, in both real and nominal terms, tend to be better than the return on bonds over a long investment period. In cases where investors with long-term goals can tolerate short-term dips in the value of their portfolios, a relatively high proportion of shares is justifiable.

• The higher degree of risk associated with investments in equities by comparison with bonds means that those investors with shorter-term investment goals or with payment commitments would be better suited to fixed-income investments.

• Fluctuations in real returns of bonds and, as a corollary, the risk associated with bonds were somewhat higher than the return's volatility in nominal terms. Investors must, therefore, bear in mind that bonds are a riskier investment in relation to a potential loss in purchasing power than their nominal performance might seem to suggest.

Exhibit 5: Series of indices (based at 100 as of December 1925), including reinvestment of income

Year	Equities index nominal	Bond index nominal	Consumer price index	Equities index real	Bond index real
25	100.00	100.00	166.8	100.00	100.00
25	100.00	100.00	166.80	100.00	100.00
26	121.69	106.20	160.90	126.15	110.09
27	153.45	111.90	162.00	158.00	115.22
28	185.85	117.47	162.20	191.12	120.80
29	174.36	123.32	161.50	180.08	127.37
30	164.67	131.02	156.20	175.84	139.91
31	115.12	139.28	144.80	132.61	160.44
32	121.06	146.39	134.40	150.24	181.68
33	132.61	152.06	131.30	168.46	193.17
34	123.00	157.41	128.80	159.29	203.85
35	109.07	163.58	130.00	139.95	209.89
36	166.35	172.98	132.00	210.21	218.58
37	179.30	180.40	137.80	217.03	218.37
38	182.52	191.18	136.90	222.38	232.94
39	152.41	194.55	142.00	179.03	228.53
40	157.93	198.05	159.90	164.74	206.60
41	212.67	210.91	184.30	192.48	190.88
42	226.34	218.40	199.60	189.15	182.51
43	222.72	226.00	205.30	180.95	183.62
44	235.13	232.89	208.20	188.38	186.58
45	272.86	239.11	206.70	220.19	192.95
46	293.57	247.41	212.00	230.98	194.66
47	322.54	255.07	223.30	240.93	190.53
48	305.72	261.33	224.60	227.04	194.08
49	348.71	273.30	220.30	264.03	206.93
50	382.47	289.95	220.30	289.59	219.54
51	457.18	291.87	234.30	325.47	207.78
52	495.44	298.37	234.60	352.26	212.14
53	547.34	310.36	233.30	391.33	221.89
54	690.43	320.47	236.80	486.33	225.74
55	731.78	325.28	238.20	512.43	227.78
56	747.29	332.23	243.40	512.11	227.67
57	670.66	334.88	248.30	450.53	224.96
58	823.33	344.55	250.50	548.23	229.42
59	1063.71	368.60	249.00	712.56	246.92
60	1536.64	391.49	253.40	1011.49	257.70
61	2295.59	406.38	262.30	1459.80	258.42
62	1888.94	416.00	270.80	1163.50	256.24
63	1885.96	421.09	281.30	1118.30	249.69
64	1755.23	430.05	287.80	1017.28	249.24
65	1632.37	450.80	302.00	901.59	248.98
66	1434.94	461.23	315.80	757.91	243.61
67	2112.10	488.36	326.90	1077.69	249.18
68	2946.26	519.25	334.10	1470.93	259.24
69	3078.38	521.27	341.80	1502.26	254.38
70	2750.54	541.14	360.40	1273.00	250.45

Year	Equities index nominal	Bond index nominal	Consumer price index	Equities index real	Bond index real
71	3176.88	603.07	384.30	1378.88	261.75
72	3835.42	627.06	410.60	1558.08	254.73
73	3068.38	625.18	459.60	1113.59	226.89
74	2051.58	637.13	494.30	692.30	215.00
75	3010.83	742.77	511.30	982.21	242.31
76	3248.25	864.26	517.90	1046.16	278.35
77	3511.09	941.77	523.80	1118.08	299.90
78	3493.12	1019.84	527.80	1103.93	322.30
79	3874.88	998.91	555.10	1164.35	300.16
80	4109.96	1022.09	579.50	1182.99	294.19
81	3620.66	1041.81	617.70	977.70	281.32
82	4100.60	1166.84	651.40	1050.02	298.79
83	5219.84	1206.46	665.10	1309.08	302.57
84	5455.78	1247.12	684.60	1329.28	303.86
85	8803.26	1319.63	707.00	2076.92	311.34
86	9658.27	1397.08	707.00	2278.64	329.61
87	7003.98	1467.90	720.90	1620.56	339.64
88	8657.62	1531.75	735.00	1964.75	347.61
89	10613.00	1470.63	771.75	2293.81	317.85
90	8563.13	1488.72	812.70	1757.51	305.55
91	10076.24	1610.80	855.00	1965.75	314.25
92	11853.69	1804.42	884.30	2235.89	340.36
93	17876.55	2038.63	906.40	3289.73	375.16
94	16514.36	2026.81	910.30	3026.03	371.39
95	20322.57	2275.70	927.87	3653.32	409.09
96	24039.56	2398.13	935.32	4287.09	427.67
97	37307.63	2534.07	939.04	6626.88	450.12

Pictet & Cie

PART II

ORIGINAL STUDY FROM JANUARY 1988 (PERIOD 1926-87)

By

Daniel Wydler
Institutional Department
Pictet & Cie, Geneva

(January 1988)

Assessing how much of the overall portfolio should be allocated to shares and how much to bonds is one of the key decisions an investor has to make. It does not matter whether the approach to investment policy is active or passive, the decision is crucial as it will have a major impact on the performance of the portfolio.

Even though the decision to allocate assets is of paramount importance, it is often made on arbitrary grounds; information which would help investors in their decisions on asset allocation is all too often piecemeal as invariably much less is available than when investors have to choose an individual security from a class of investment instruments. As a corollary, the balance between shares and bonds in a portfolio is not necessarily optimal.

Outline of this study

An historical survey of how shares and bonds performed over the 62-year period running from the end of 1925 to the end of 1987 will provide the investor with a useful basic tool. Research work by Rätzer (1983) and Huber (1986) provided the underlying foundation for the more thorough analysis in this study; the scope of the original research work has also been extended by covering trends in the past four years (1984-1987).

The purpose of this study is not to forecast how shares and bonds will behave in the years to come. With the benefit of hindsight over a lengthy period of time, in which virtually all economic scenarios possible have been played out, several fundamental patterns can be pinpointed. At one and the same time the risk of blowing up dramatic events, such as the share price collapse in autumn 1987, out of all proportion is averted.

What conclusions can be drawn from the study?

This study contains a welter of informative statistics and provides answers to the following series of questions:

Which investment instrument - shares or bonds - yields the higher return?

Shares quite clearly yield the higher return. The annual performance of shares (capital gain plus dividend) amounts on average to 8.9% - 4.4 percentage points better than the average yearly performance of bonds which stands at 4.5% (arithmetical averages).

How large is the risk factor associated with shares and bonds?

The risk factor (likelihood of making a loss) can be assessed using the standard deviation of annual performance. The estimated risk factor shows that the fluctuation in share values is roughly six times greater than that for bonds. However, the degree of risk is above all contingent

on the time factor for investments: the longer the period over which the investment is made, the lower the risk of a loss being registered on shares.

Do shares afford a cushion against inflation?

Neither shares nor bonds provide a hedge against inflation. It cannot be ruled out that both shares and bonds might, over one or more years, see their value cut in real terms. Over a much lengthier period, however, the requirement that the intrinsic value of the investment should be safeguarded is fulfilled in the case of both bonds and shares. The average yearly performance in real terms over the 62-year period came to 6.4% for shares and 2.1% for bonds. Moreover, it can be seen that, if inflation is entered into the calculations, a far higher degree of risk attaches to bonds than one would think just by looking at the low level of fluctuation in their nominal value.

Has the collapse in share prices in the last quarter of 1987 had a major impact on the fundamental risk/return relationship between shares and bonds ?

The consequences of the 1987 October stock market crash on yearly performance have not been the most dramatic ever known. The year 1987, in which a nominal loss in value of 27.5% was registered, ranks as the third worst year in terms of annual performance in the 62 years covered by this study. It should be pointed out that in the preceding five years shares posted an increase in value in both real and nominal terms; in each of these years, shares also outperformed bonds. The year 1987 can be counted as an extreme case in that the slump in prices occurred in a very short space of time.

What conclusions can be drawn to guide investors in their decisions on asset allocation?

The proportion of shares held in a portfolio depends largely on what time scale is adopted for investments. For those who have a long-term approach to investment, for instance pension funds, a sizeable weighting in shares is to be recommended. Investors thus stand to gain from the higher increase in value in real terms, while the risk inherent in yearly fluctuations is not as significant for such investors.

On the other hand, investors who opt for the short-term investment approach or who have to meet liquidity commitments should give a heavier weighting to bonds in their portfolios. A sizeable holding in shares could lead to a substantial loss in value in the short term, a risk which should not be overlooked.

The performance can be enhanced considerably through an appropriate active strategy. For the investor with a long-term perspective, a long-term anti-cyclical investment policy should be implemented.

Organisation of this study

Many other empirical conclusions can be drawn from the data contained in this study. The methods of analysis and the statistical data used are dealt with in Chapter 2. The comparative performances of bonds and shares are examined in Chapter 3, while the relationship between risk and return is investigated in Chapter 4. The final chapter is concerned with the implications of this study for investment policy.

2. Statistical data

As no series of price indices going way back in history is available, this study uses previous research work as a starting-point. Series of yearly price indices for Swiss shares and bonds together with consumer price indices for Switzerland have been constructed using statistical data collated in previous studies.

Statistical data in this study are based on the following sources:

1. For the 1926-1959 period: Ernst Rätzer (1983)

2. For the 1960-1983 period: Gérard Huber, Pictet & Cie (1986)

3. For the 1984-1987 period: Pictet Swiss Share Index and Pictet Swiss Franc Domestic Bond Index.

A detailed description is given in Annex 1.

The series of indices track how the values of "Swiss shares" and "Swiss franc domestic bonds", including dividends and coupon payments, have changed year by year. The series of indices expressed in real terms can be calculated by adjusting for inflation using the consumer price index. These series are tabulated in Annex 2.

3. How shares and bonds have performed over the years

Increase in nominal value

Increases in value of Swiss shares and Swiss franc domestic bonds over the 62 years running from the end of 1925 to the end of 1987 (see Note 1) are illustrated in graph form in Figure 1; dividends and coupon payments have been included in the calculations. Price trends in Switzerland are also shown. The following observations are worth highlighting:

- During the Depression years in the Thirties (with deflation) the performance of shares was worse than that of bonds.

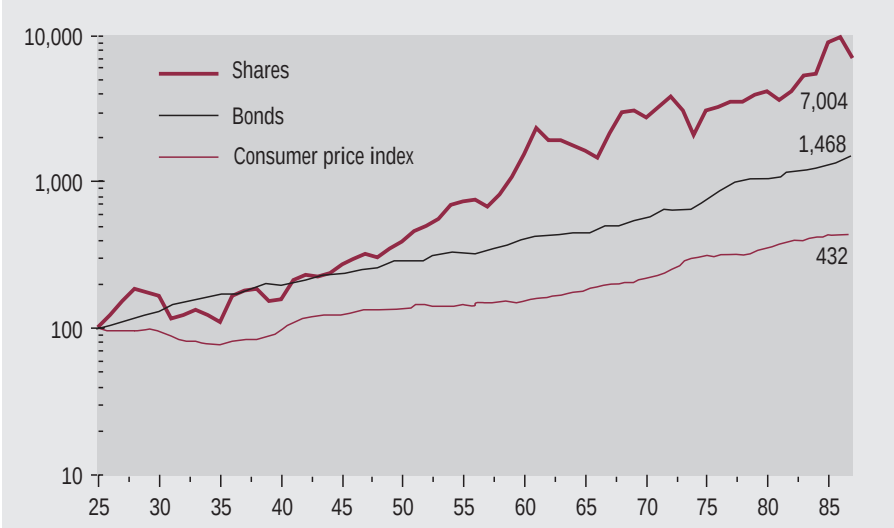
- Throughout the Forties and Fifties the nominal value of shares continued to rise almost non-stop.

- Shares posted a slump in nominal value over two spells: the first (-37%) from the end of 1961 to 1966; the second (-47%) between 1973 and 1974. The recent 1987 crash is nothing out of the ordinary in the light of these two previous falls.

- A portfolio built up entirely of bonds would have achieved an almost steady, but lower increase in value over the whole period in question.

- The nominal performance of bonds over the 62 years is considerably less impressive than that of shares.

Figure 1: Nominal value of shares and bonds together with the consumer price index from 1926 to 1987



Increase in real value

A graph showing increases in value of shares and bonds, adjusted for inflation, is given in Figure 2. In real, just as in nominal, terms, the performance of shares in the long run is substantially better than that of bonds.

- Bonds above all appreciated in real value during the deflationary period in the Thirties; in succeeding years bonds have, on average, just about held their own in real terms.

- Shares soared in real value in the post-war years from 1945 to 1960; since then they have alternated periods of gain with periods of loss. In the Eighties Swiss shares leapt up to all-time high levels.

- The stock market collapse in the last quarter of 1987 brought real share prices back down to their 1968-1972 levels.

- The value of shares, in real terms, over the 62 years from the end of 1925 to 1987 rose five times higher than the equivalent increase in value in bonds.

Figure 2: Real value of shares and bonds from 1926 to 1987

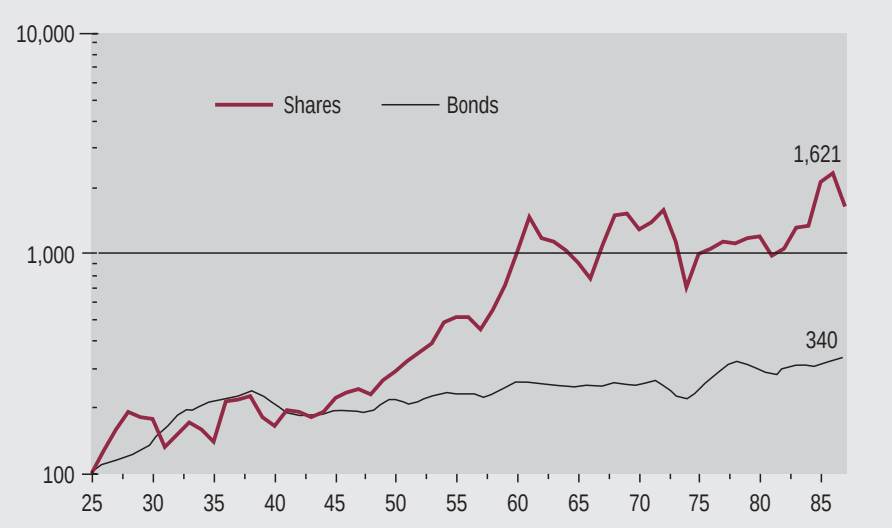


Table 1 shows how an investment of 1 Swiss franc would have matured since the end of 1925 (see Note 2). The value of shares in nominal terms surged most impressively in the latter half of this century and by the end of 1987 had climbed up to CHF70.04, which is equivalent to an annual performance of 7.1%. The slump in share prices late in 1987 did not alter the fact that the value of 1 franc invested in bonds had appreciated substantially less as it would have stood at CHF14.68 by the end of 1987, yielding an annual performance of 4.4%.

If inflation is taken into account, a 1 franc investment at the close of 1987 would have been worth 16.19 "real" Swiss francs (4.6% annual return) if it had been sunk into shares and 3.39 "real" Swiss francs (2.0% annual return) if it had been invested in bonds.

Table 1: Value of 1 Swiss franc invested in shares and bonds at the end of 1925

	Value of CHF 1, in nominal terms, if invested in		Percentage monetary depreciation since 1925	Value of CHF 1, in real terms, if invested in		Number of years
	Shares	Bonds		Shares	Bonds	
Dec. 1925	CHF 1.00	CHF 1.00	–	CHF 1.00	CHF 1.00	–
Dec. 1950	CHF 3.82	CHF 2.90	- 24.3%	CHF 2.89	CHF 2.19	25
Dec. 1975	CHF 30.11	CHF 7.43	- 67.4%	CHF 9.82	CHF 2.42	50
Dec. 1986	CHF 96.58	CHF 13.97	- 76.4%	CHF 22.79	CHF 3.30	61
Dec. 1987	CHF 70.04	CHF 14.68	- 76.9%	CHF 16.19	CHF 3.39	62

Medium-Term Performance

It is undoubtedly shown that, over a long stretch of time, shares did consistently yield better returns than bonds.

Table 2 shows that this phenomenon is just as true if the medium-term perspective is taken; the percentage increases in value (performance) of shares and bonds are tabulated for 10-year slices. Barring the years from 1926 to 1935, a period which covers the Depression, the gains made on an investment in shares were considerably higher than those for bond investments; the situation is unchanged even when adjustments are made for inflation.

In none of the 10-year periods did shares lose real value. However, that was not the case for bonds: between 1966 and 1975 a bond portfolio would have had 2.68% trimmed off its value in real terms and in the 10 years from 1936 to 1945 it would have lost 8.07% of its value. In both periods there were years when inflation climbed into double figures. Even though neither shares nor bonds can be considered as being fully inflation-proof investments, shares are better in the medium term at fulfilling the requirement that investments should grow in real terms.

Table 2: Performance (increase in value) of shares and bonds in Switzerland over 10-year periods (not annualised)

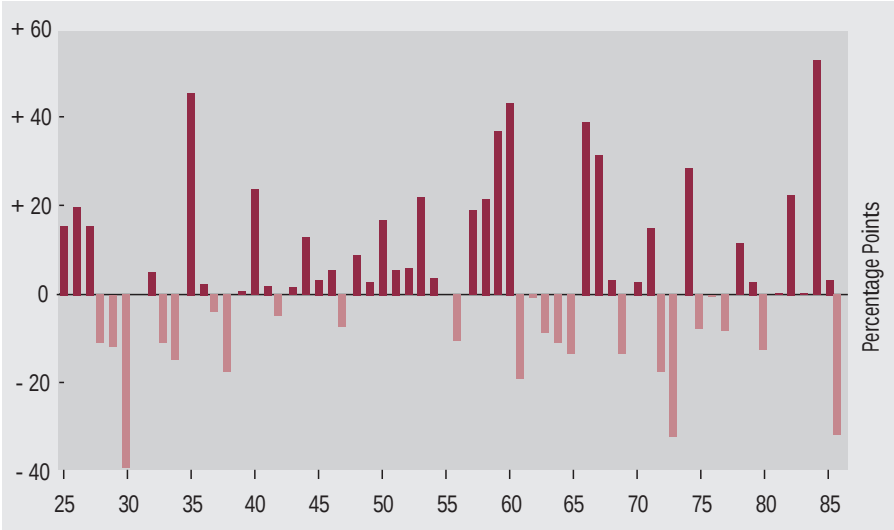
Period	Nominal terms		Real terms		Years
	Shares	Bonds	Shares	Bonds	
1926-35	9.07%	63.58%	39.95%	109.89%	10
1936-45	150.17%	46.17%	57.33%	- 8.07%	10
1946-55	168.19%	36.04%	132.72%	18.05%	10
1956-65	123.07%	38.59%	75.94%	9.31%	10
1966-75	84.45%	64.77%	8.94%	- 2.68%	10
1976-85	192.39%	77.66%	111.45%	28.49%	10
1978-87	99.48%	55.87%	44.76%	13.11%	10

4. Risk/return trade-off

The invariably better performance of shares in relation to bonds, as has been amply illustrated in the foregoing chapter, is only one aspect of this analytical study. It is a well-established fact of financial life that higher-yielding investments are also riskier investments. The positive correlation between return and systematic risk has been proven on many occasions in recent scientific research work the world over (see Note 3).

The risk factor related to the comparative performances of shares and bonds in Switzerland is clearly discernible in Figure 3. The graph in Figure 3 illustrates the yearly excess performance of shares over bonds in real terms. Over a longer time-span, shares almost always outperformed bonds, whereas that is clearly not the case if the year-by-year performances are compared. In 24 out of 62 years in question (almost two-fifths of total) the increase in value in real terms of bonds was higher than that of shares.

Figure 3: Excess performance, in real terms, of shares over bonds per year during the 1926-1987 period



Volatility as a risk factor

Shares manifestly display more erratic behaviour as far as their value is concerned; it is precisely in these fluctuations in value that the risk inherent in shares lies. The risk factor can be estimated using the standard deviation of yearly performances: the higher the standard deviations, the greater the divergence of annual returns from the expected average increase in value and, consequently, the higher the likelihood of making a loss.

The main statistical data relating to the annual performances of shares and bonds covering the whole period from 1926 to 1987 are presented in Table 3. These statistics underline the earlier findings: the yearly performance of shares - in both nominal and real terms - was on average better than that of bonds by roughly 4.4 percentage points (440 basis points) (see Note 4). This consistently better performance by shares has to be "paid for" through more varied fluctuations in their value. Whereas in 1974 shares registered their heftiest loss in nominal value of 33.1%, just 11 years later they recorded their highest gain of 61.4%; the worst loss (-2.1% in 1979) and the best gain (+16.6% in 1975) recorded by bonds pale in comparison with the figures for shares.

Table 3: Statistical data relating to the annual performance of shares and bonds in the years from 1926 to 1987

	Nominal terms		Real terms	
	Shares	Bonds	Shares	Bonds
Return:				
average yearly performance	8.9%	4.5%	6.4%	2.1%
Risk: standard deviation	20.3%	3.3%	19.9%	5.5%
Heaviest loss in value	-33.1%	-2.1%	-37.8%	-10.9%
(Year)	(1974)	(1979)	(1974)	(1973)
Largest increase in value	61.4%	16.6%	56.2%	14.9%
(Year)	(1985)	(1975)	(1985)	(1976)
Correlation	33.6%		31.7%	

The standard deviation can, as has been outlined previously, be considered as a measure of the risk factor; it is, in nominal terms, six times higher in the case of shares (20.3%) than the standard deviation for bonds (3.3%). That means that in roughly one third of the total number of years in question the annual performance of shares will be either worse than -11.4% or better than +29.2% and that of bonds will lie below +1.2% or above +7.8%. Closer scrutiny of the figures for the intervening periods reveals that the risk factor for bonds has been steadily rising since 1925, whereas the risk attached to shares has remained more or less constant.

Real risk

If the degree of risk is assessed after adjustment for inflation, the gap between the two different securities narrows. The standard deviation for shares in real terms is, at 19.9%, only three and a half times higher than the figure of 5.5% for bonds; this clearly shows that the risk/return trade off changes when purchasing power is taken into account. The risk inherent in shares stays just about the same in either real or nominal terms, while bonds are substantially riskier in real terms than in nominal terms.

This inflation-linked risk for bonds is highlighted in **Table 4**. The probability that bonds or shares will turn in a negative annual performance can be computed on the strength of the statistical data calculated (see Note 5). A share-invested portfolio would accordingly suffer, on average, a loss in nominal value in every third year (probability of 33%), whereas bonds would only make a loss in nominal terms once in every eleven years (probability of 9%).

The likelihood of recording a loss in value in real terms is, however, almost exactly the same for both shares and bonds: every 2.7 years for shares; every 2.9 years for bonds. It should be pointed out that these figures give no indication whatever as to how great the loss in value might be; it goes without saying that any expected loss on shares would be substantially higher. In spite of that, it can be concluded that bonds, in real terms, should be considered a riskier venture than their performance in nominal terms would suggest.

Table 4: Probability of a negative yearly performance

	Nominal terms		Real terms	
	Shares	Bonds	Shares	Bonds
Probability per year	33%	9%	37%	35%
Frequency of	Every	Every	Every	Every
negative performances	3.0 years	11.1 years	2.7 years	2.9 years

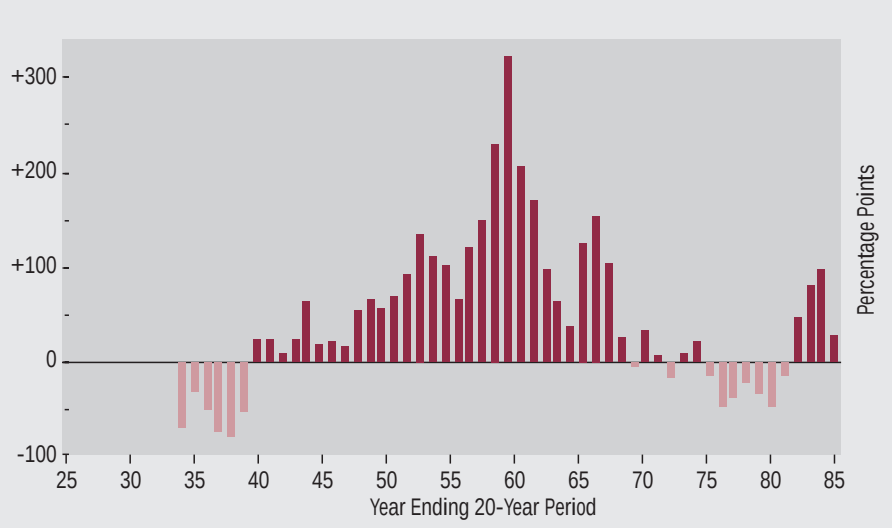
Variable correlation

The correlation between the annual performance of shares and that of bonds is also given in **Table 3**. The estimated values for correlation lie somewhere between 30% and 35%: this figure indicates the likelihood that in years when shares increase in value, on average bonds will also appreciate - and vice versa. The correlation factor exhibits wild fluctuations on closer inspection of the various intervening periods. For instance, if the first 10-year period (1926-1935) is taken, no dependence could be detected in nominal terms (correlation -0.45%), while, in real terms, the dependence was even negative (correlation -18.54%). At the other end of the scale, during the 1966-1975 period, shares and bonds increased in value virtually pari passu (correlation of 68.20% in nominal and 80.41% in real terms).

The risk is relative

One consequence of the consistently better performance of shares is a higher degree of risk; the risk is translated into yearly fluctuations in market value which see-saws more markedly. Investors with short-term goals in mind are more vulnerable to risks of this nature; shares, from their viewpoint, "blow hot and cold". **Figure 3** illustrates graphically the dilemma facing the short-term investor: bonds, in real terms, outperformed shares in 23 years out of the 62 studied!

Figure 4: Excess performance, in real terms, of shares over bonds for all possible 10-year periods between 1926 and 1987



As the investment time-scale chosen by the investor lengthens, so the risk inherent in shares shrinks. The likelihood of a loss in real terms being made by an investor with a 10-year investment approach is already significantly less. The difference between the performance, in real terms, of a passively-managed share investment over 10 years and the performance of bonds is shown in **Figure 4** for every possible period of 10 years between 1925 and 1987. The following comments are worth making:

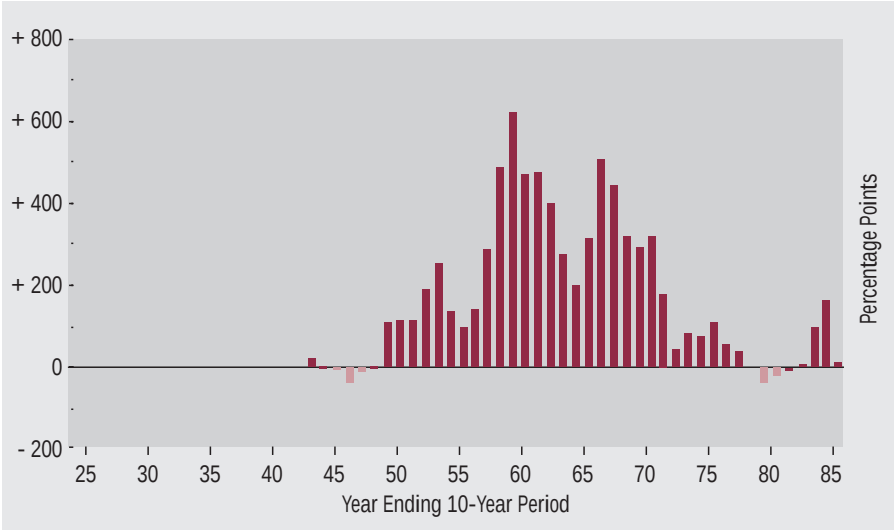
- Bonds performed better than shares in only a few of the 10-year periods under consideration (15 out of the grand total of 53 periods). The relative risk of shares is consequently much lower if the investment approach is focused on 10-year goals rather than being geared to yearly targets.

- The margin by which bonds outshone shares is relatively slim (a maximum of 80 percentage points in the 10 years running from 1930 to 1939) compared with the margin by which shares outperformed bonds (up to 324 percentage points in the period from 1952 to 1961).

- In the last decade the increase in the real value of shares has been only slightly higher than that for bonds.

If an even longer-term investment strategy is taken into consideration, the element of risk inherent in shares almost pales into insignificance. The comparative performances - with due account being taken of inflation - for periods of 20 years are illustrated in **Figure 5**. Bonds yielded a better return than shares in just 6 out of all the 43 possible periods.

Figure 5: Excess performance, in real terms, of shares over bonds for all possible 20-year periods between 1926 and 1987



Active or passive strategy

All the comparisons drawn have been made on the basis of a passive approach to investment, i.e. performance results are the fruits of a "buy-and-hold" strategy and reinvestment year after year of derived income. Patently the performance could be substantially improved if an appropriate active investment strategy were implemented.

5. The consequences for investment

The intention of this study is not to forecast how shares and bonds are going to behave in the future; however, the period of study covering 62 years is easily long enough for several generalisations to be made. The results obtained in this study confirm to a large extent findings of similar research work carried out in the United States.

The findings outlined below can have a bearing on investment strategy:

1) A diversified share portfolio, over a longer period, will make more gains, in both nominal and real terms, than a portfolio comprising bonds denominated in Swiss francs. The respective yearly performances of shares and bonds (arithmetically) average out to 8.9% (6.4% in real terms) and 4.5% (2.1% in real terms) - a premium of shares over bonds amounting to 4.4 percentage points (4.3 percentage points in real terms).

2) The risk associated with securities corresponds to the range of fluctuations in their market values. The degree of risk is relative and depends essentially on the period of time for which the investment is made. Investors who have a one year target date should be aware that the risk factor for shares is in the region of 6 times (3.6 times in real terms) higher than that for bonds. The degree of risk can be measured using the standard deviation of the annual performance: the risk in the

case of shares is 20.3% (19.9% in real terms) and for bonds 3.3% (5.5% in real terms). As the time-span for investment stretches, so the likelihood of the increase in value of shares - in either nominal or real terms - lagging behind the increase for bonds recedes.

3) Neither shares nor bonds are fully inflation-proof in terms of their precluding the likelihood of their value shrinking. A loss was incurred in 23 out of the 62 years in question by investments in shares and in 22 of those years for bonds. The risk of an annual fall in the real value of investments in bonds is, in contrast to the risk associated with shares, two thirds as high again as the risk of a drop in the nominal value of bonds. Consequently, bonds are much less well-suited to meeting the requirement that the real value of an investment should not shrink than their performance in nominal terms, i.e. before inflation is taken into account, would suggest.

4) Investors would do well to bear in mind the lessons to be learnt from the findings outlined in points 1) to 3) above: investors with a long-term approach, such as pension funds, should build up their holdings in shares where possible. There is a high probability, particularly in the wake of slumps in prices, that the performance of shares, in real or nominal terms, over a longer period for the longer-term investor is a diversified anti-cyclical strategy focused on long-term goals.

5) Shares constitute a much higher risk investment for investors who have either short-term goals or commitments in the short term. Should the liabilities be in real terms, i.e. inflation-adjusted, then even bonds should be considered as risky investments. In cases such as these, the asset mix between shares and bonds will depend largely on the individual investor's risk preference.

6) If a suitable active policy on asset allocation is pursued, performance in both the short and the long terms can be improved considerably.

ANNEX 1: RESEARCH WORK CONSULTED

A description is given below of research work and data for the different periods which were consulted during the preparation of this analytical study.

1926-59: Study by Ernst Rätzer (1983)

Period researched: 1926-79

Data: Shares: Randomly selected portfolio comprising 50 shares listed in Zurich. Replacement of issues (for instance following liquidation) was also decided on a random basis. The return, including the dividend, was calculated on the basis of equally-weighted initial investments per share at the end of 1925 and with re-investment each year of annual income. Prices were adjusted if share capital was increased or similar changes occurred.

Bonds: Annual returns were based on theoretical prices calculated using the published average yields to maturity of new Swiss bond issues. The average life of a new issue was taken to be 10 years.

Results: For the whole period investigated (from 1926 to 1979) Rätzer obtained the following figures for performance projected as an annual rate: shares +8.5% (+6.1% in real terms); bonds +4.3% (+2.0% in real terms).

Comments: For the purposes of this study, only the years up to 1959 in Rätzer's work have been used; the period between 1960 and 1979 is covered in the research project conducted by G. Huber, Pictet (see below), in which the estimations are more reliable. The share portfolio constructed for the end of 1925 by Rätzer is quite different from the structure of market capitalisation nowadays. Furthermore the series of bond indices drawn up by Huber on the basis of actual prices should provide better estimations than those produced by Rätzer based on the yield to maturity of new issues.

Over the period in which the two studies overlap, Huber's study, which was chosen for the purposes of this analysis, shows bonds in a slightly better light; the yearly performances for this period of duplication are as follows:

Rätzer: shares +6.78%; Bonds +4.95%
Huber: shares +6.68%; Bonds +5.11%

1960-83: Unpublished working paper by Gérard Huber, Pictet & Cie, Geneva (1985)

Period researched: 1960-83

Data: Shares: SBC Index adjusted for dividend payments.

Bonds: A Confederation bond index including coupon interest payments was constructed for the period concerned; the index includes all Confederation issues not redeemed in mid-year. The index used in the research projet was corrected to take account of the creditworthiness of bond issuers. The difference was estimated by adding 64 basis points to the average yield of Confederation bonds; this figure corresponds to the average yield spread for the period from 1975 to 1983.

Results: The following average yields per year were obtained for the period researched from 1960 to 1983:

Shares: +6.85% (+2.57% in real terms)
Bonds: +5.06% (+0.85% in real terms)

1984-87: Series of Pictet Indices

Data: Shares: Pictet Index, with dividends incorporated, which is calculated in the same way as the Swiss Performance Index (SPI), except that only 250 shares or so are included. Basis = 100 at the end of 1983 (see Note 6).

Bonds: Pictet Sub-index "Domestic Bond Index" with coupon interest payments incorporated; the index is based on a sufficiently representative random sample covering 5 different classes of bond issuer according to their market capitalisation (see Note 7).

ANNEX 2: SERIES OF INDICES

YEAR	INDEX NOMINAL EQUITIES	INDEX NOMINAL BONDS	INDEX CONSUMER PRICE	INDEX REAL EQUITIES	INDEX REAL BONDS
25	100.00	100.00	166.8	100.00	100.00
26	121.69	106.20	160.9	126.15	110.09
27	153.45	111.90	162.0	158.00	115.22
28	185.85	117.47	162.2	191.12	120.80
29	174.36	123.32	161.5	180.08	127.37
30	164.67	131.02	156.2	175.84	139.91
31	115.12	139.28	144.8	132.61	160.44
32	121.06	146.39	134.4	150.24	181.68
33	132.61	152.06	131.3	168.46	193.17
34	123.00	157.41	128.8	159.29	203.85
35	109.07	163.58	130.0	139.95	209.89
36	166.35	172.98	132.0	210.21	218.58
37	179.30	180.40	137.8	217.03	218.37
38	182.52	191.18	136.9	222.38	232.94
39	152.41	194.55	142.0	179.03	228.53
40	157.93	198.05	159.9	164.74	206.60
41	212.67	210.91	184.3	192.48	190.88
42	226.34	218.40	199.6	189.15	182.51
43	222.72	226.00	205.3	180.95	183.62
44	235.13	232.89	208.2	188.38	186.58
45	272.86	239.11	206.7	220.19	192.95
46	293.57	247.41	212.0	230.98	194.66
47	322.54	255.07	223.3	240.93	190.53
48	305.72	261.33	224.6	227.04	194.08
49	348.71	273.30	220.3	264.03	206.93
50	382.47	289.95	220.3	289.59	219.54
51	457.18	291.87	234.3	325.47	207.78
52	495.44	298.37	234.6	352.26	212.14
53	547.34	310.36	233.3	391.33	221.89
54	690.43	320.47	236.8	486.33	225.74
55	731.78	325.28	238.2	512.43	227.78
56	747.29	332.23	243.4	512.11	227.67
57	670.66	334.88	248.3	450.53	224.96
58	823.33	344.55	250.5	548.23	229.42
59	1063.71	368.60	249.0	712.56	246.92
60	1536.64	391.49	253.4	1011.49	257.70
61	2295.59	406.38	262.3	1459.80	258.42
62	1888.94	416.00	270.8	1163.50	256.24
63	1885.96	421.09	281.3	1118.30	249.69
64	1755.23	430.05	287.8	1017.28	249.24
65	1632.37	450.80	302.0	901.59	248.98
66	1434.94	461.23	315.8	757.91	243.61
67	2112.10	488.36	326.9	1077.69	249.18
68	2946.26	519.25	334.1	1470.93	259.24
69	3078.38	521.27	341.8	1502.26	254.38
70	2750.54	541.14	360.4	1273.00	250.45
71	3176.88	603.07	384.3	1378.88	261.75
72	3835.42	627.06	410.6	1558.08	254.73
73	3068.38	625.18	459.6	1113.59	226.89
74	2051.58	637.13	494.3	692.30	215.00

YEAR	INDEX NOMINAL EQUITIES	INDEX NOMINAL BONDS	INDEX CONSUMER PRICE	INDEX REAL EQUITIES	INDEX REAL BONDS
75	3010.83	742.77	511.3	982.21	242.31
76	3248.25	864.26	517.9	1046.16	278.35
77	3511.09	941.77	523.8	1118.08	299.90
78	3493.12	1019.84	527.8	1103.93	322.30
79	3874.88	998.91	555.1	1164.35	300.16
80	4109.96	1022.09	579.5	1182.99	294.19
81	3620.66	1041.81	617.7	977.70	281.32
82	4100.60	1166.84	651.4	1050.02	298.79
83	5219.84	1206.46	665.1	1309.08	302.57
84	5455.78	1247.12	684.6	1329.28	303.86
85	8803.26	1319.63	707.0	2076.92	311.34
86	9658.27	1397.08	707.0	2278.64	329.61
87	7003.98	1467.90	720.9	1620.56	339.64

NOTES

1) Logarithmic scales have been used for the graphs, which means that the slope corresponds directly to the percentage increase (performance).

2) The performance figures obtained in Chapter 2 are based on a year-to-year re-investment of interest payments.

3) Refer, for instance, to Fisher & Lorie (1977), Ibbotson Associates (1986) or Jones & Wilson (1987).

4) Based in this case on an arithmetical average of simple return (annual performance) which is calculated using the following formula:

$$r_t = (I_{t+1}/I_t - 1)\ 100\%$$

where I_t is the level of the index at the end of $year_t$.

5) Assuming that annual returns are normally distributed.

6) Refer to the Pictet brochure "The Pictet Swiss Share Indices" (1986).

7) Refer to the Pictet brochure "Indices of Swiss Franc Bonds" (1984) (available in French and German only).

DISCLAIMERS

We value the protection of your personal data and we are keen on ensuring that you understand and feel confident in the way we process them. For more information about personal data protection and how we protect yours, please refer to the Pictet Group Privacy Notice available at https://www.group.pictet/privacynotice

Distributors: Banque Pictet & Cie SA, Route des Acacias 60, 1211 Geneva 73, Switzerland, Pictet & Cie (Europe) S.A., 15A, avenue J. F. Kennedy, L-1855 Luxembourg/B.P. 687, L-2016 Luxembourg and Pictet & Cie (Europe) S.A., London Branch, Stratton House 6th Floor, London, 5 Stratton Street, W1J 8LA.

Banque Pictet & Cie SA is established in Switzerland, exclusively licensed under Swiss Law and therefore subject to the supervision of the Swiss Financial Market Supervisory Authority (FINMA).

Pictet & Cie (Europe) S.A. is a société anonyme (public limited liability company) incorporated in Luxembourg and registered with the Luxembourg Registre de Commerce et des Sociétés (RCS no. B32060). Its head office is at 15A, avenue J.F. Kennedy, L-2016 Luxembourg. Its London branch is registered as a UK establishment with Companies House (establishment number BR016925) and its UK establishment office address is Stratton House 6th Floor, London, 5 Stratton Street, W1J 8LA.

Pictet & Cie (Europe) S.A., London Branch is authorised and regulated by the Commission de Surveillance du Secteur Financier. Deemed authorised by the Prudential Regulation Authority. Subject to regulation by the Financial Conduct Authority and limited regulation by the Prudential Regulation Authority. Details of the Temporary Permissions Regime, which allows EEA-based firms to operate in the UK for a limited period while seeking full authorisation, are available on the Financial Conduct Authority's website.

This marketing communication is not intended for persons who are citizens of, domiciled or resident in, or entities registered in a country or a jurisdiction in which its distribution, publication, provision or use would violate current laws and regulations.

The information, data and analysis furnished in this document are disclosed for information purposes only. They do not amount to any type of recommendation, either general or tailored to the personal circumstances of any person. Unless specifically stated otherwise, all price information is indicative only. No entity of the Pictet Group may be held liable for them, nor do they constitute an offer or an invitation to buy, sell or subscribe to securities or other financial instruments. The information contained herein is the result neither of financial analysis within the meaning of the Swiss Bankers Association's Directives on the Independence of Financial Research, nor of investment research for the purposes of the relevant EU MiFID provisions. All information and opinions expressed in this document were obtained from sources believed to be reliable and in good faith, but no representation or warranty, express or implied, is made as to its accuracy or completeness.

Except for any obligations that any entity of the Pictet Group might have towards the addressee, the addressee should consider the suitability of the transaction to individual objectives and independently assess, with a professional advisor, the specific financial risks as well as legal, regulatory, credit, tax and accounting consequences.

Furthermore, the information, opinions and estimates in this document reflect an evaluation as of the date of initial publication and may be changed without notice. The Pictet Group is not under any obligation to update or keep current the information contained herein. In case this document refers to the value and income of one or more securities or financial instruments, it is based on rates from the customary sources of financial information that may fluctuate. The market value of financial instruments may vary on the basis of economic, financial or political changes, currency fluctuations, the remaining term, market conditions, the volatility and solvency of the issuer or the benchmark issuer. Some investments may not be readily realizable since the market in the securities can be illiquid. Moreover, exchange rates may have a positive or negative effect on the value, the price or the income of the securities or the related investments mentioned in this document. When investing in emerging countries, please note that the political and economic situation in those countries is significantly less stable than in industrialized countries. They are much more exposed to the risks of rapid political change and economic setbacks.

Past performance must not be considered an indicator or guarantee of future performance, and the addressees of this document are fully responsible for any investments they make. No express or implied warranty is given as to future performance. Moreover, forecasts are not a reliable indicator of future performance. The content of this document can only be read and/ or used by its addressee. The Pictet Group is not liable for the use, transmission or exploitation of the content of this document. Therefore, any form of reproduction, copying, disclosure, modification and/or publication of the content is under the sole liability of the addressee of this document, and no liability whatsoever will be incurred by the Pictet Group. The addressee of this document agrees to comply with the applicable laws and regulations in the jurisdictions where they use the information reproduced in this document.

This document is issued by Banque Pictet & Cie SA. This publication and its content may be cited provided that the source is indicated. All rights reserved. Copyright 2022.

Distributors: Bank Pictet & Cie (Asia) Ltd ("BPCAL") in Singapore, 10 Marina Blvd #22-01 Tower 2, Marina Bay, Financial Centre, Singapore 018983 and Pictet & Cie (Europe) S.A., Hong Kong branch ("Pictet HK branch") in Hong Kong. The registered address of Pictet HK branch is 9/F, Chater House, 8 Connaught Road Central, Hong Kong.

The information, tools and material presented in this document are provided for information purposes only and are not to be used or considered as an offer, an invitation to offer or solicitation to buy, sell or subscribe for any securities, commodities, derivatives, (in respect of Singapore only) futures, or other financial instruments (collectively referred to as "Investments") or to enter into any legal relations, nor as advice or recommendation with respect to any Investments. This document is intended for general circulation and it is not directed at any particular person. This document does not have regard to the specific investment objectives, financial situation and/or the particular needs of any recipient of this document. Investors should seek independent financial advice regarding the appropriateness of investing in any Investments or adopting any strategies discussed in this document, taking into account the specific investment objectives, financial situation or particular needs of the investor, before making a commitment to invest.

BPCAL/Pictet HK branch has not taken any steps to ensure that the Investments referred to in this document are suitable for any particular investor, and accepts no fiduciary duties to any investor in this regard. Furthermore, BPCAL/Pictet HK branch makes no representations and gives no advice concerning the appropriate accounting treatment or possible tax consequences of any Investment. Any investor interested in buying or making any Investment should conduct its own investigation and analysis of the Investment and consult with its own professional adviser(s) as to any Investment including the risks involved with transactions on such Investment.

This document is not to be relied upon in substitution for the exercise of independent judgment. The value and income of any Investment mentioned in this document may fall as well rise. The market value may be affected by, amongst other things, changes in economic, financial, political factors, time to maturity, market conditions and volatility, and the credit quality of any issuer or reference issuer. Furthermore, foreign currency rates of exchange may have a positive or adverse effect on the value, price or income of any Investment mentioned in this document. Accordingly, investors must be willing and able to, and effectively assume all risks and may receive back less than originally invested.

Past performance should not be taken as an indication or guarantee of future performance and no representation or warranty, expressed or implied, is made by BPCAL/Pictet HK branch regarding future performance.

This document does not constitute the investment policy of BPCAL/Pictet HK branch, or an investment recommendation, and merely contains the different assumptions, views and analytical methods of the analysts who prepared them. Furthermore, the information, opinions and estimates expressed herein reflect a judgment at its original date of publication and are subject to change without notice and without any obligation on BPCAL/Pictet HK branch to update any of them. BPCAL/Pictet HK branch may have issued or distributed other reports or documents that are inconsistent with, and reach different conclusions from, the information presented in this document.

While the information and opinions presented herein are believed to be from sources believed to be reliable, BPCAL/Pictet HK branch is not able to, and do not make any representation or warranty as to its accuracy or completeness. Accordingly, BPCAL/Pictet HK branch accepts no liability for loss arising from the use of or reliance on this document presented for information purposes only. BPCAL/Pictet HK branch reserves the right to act upon or use any of the information in this document at any time, including before its publication herein.

BPCAL/Pictet HK branch and its affiliates (or employees thereof) may or may not have long or short positions in, and buy or sell, or otherwise have interest in, any of the Investments mentioned herein, and may or may not have relationships with the issuers of or entities connected with Investments mentioned in this document. BPCAL/Pictet HK branch and their affiliates (or employees thereof) may act inconsistently with the information and/or opinions presented in this document.

The information used to prepare this document and/or any part of such information, may have been provided or circulated to employees and/or one or more clients of BPCAL/Pictet HK branch before this document was received by you and such information may have been acted upon by such recipients or by BPCAL/Pictet HK branch.

This document is provided solely for the information of the intended recipient only and should not be reproduced, published, circulated or disclosed in whole or in part to any other person without the prior written consent of BPCAL/Pictet HK branch.

Singapore

This document is not directed to, or intended for distribution, publication to or use by, persons who are not accredited investors, expert investors or institutional investors as defined in section 4A of the Securities and Futures Act (Cap. 289 of Singapore) ("SFA") or any person or entity who is a citizen or resident of or located in any locality, state, country or other jurisdiction where such distribution, publication, availability or use would be contrary to law or regulation or would subject BPCAL and any of its affiliates or related corporations to any prospectus or registration requirements.

BPCAL has obtained an exemption from the Monetary Authority of Singapore ("MAS") under section 100(2) of the Financial Advisers Act ("FAA") for the provision of financial advisory services to High Net Worth Individuals (as defined in the MAS Guidelines on Exemption for Specialised Units Serving High Net Worth Individuals FAA-G07) (the "Exemption") and is exempted from the requirements of sections 25, 27, 28 and 36 of the FAA, the MAS Notice on Recommendations on Investment Products (FAA-N16), MAS Notice on Appointment and Use of Introducers by Financial Advisers (FAA-N02), MAS Notice on Information to Clients and Product Information Disclosure (FAA-N03) and MAS Notice on Minimum Entry and Examination Requirements for Representatives of Licensed Financial Advisers and Exempt Financial Advisers (FAA-N13).

Please contact BPCAL in Singapore in respect of any matters arising from, or in connection with this document.

Hong Kong

This document is not directed to, or intended for distribution, publication to or use by, persons who are not "professional investors" within the meaning of the Securities and Futures Ordinance (Chapter 571 of the Laws of Hong Kong) and any rules made thereunder (the "SFO") or any person or entity who is a citizen or resident of or located in any locality, state, country or other jurisdiction where such distribution, publication, availability or use would be contrary to law or regulation or would subject Pictet HK branch and any of its affiliates or related corporations to any prospectus or registration requirements.

Pictet & Cie (Europe) S.A. is incorporated in Luxembourg with limited liability. It is an authorized institution within the meaning of the Banking Ordinance and a registered institution (CE No.: AQ515) under the SFO carrying on Type 1 (dealing in securities), Type 4 (advising on securities) and Type 9 (asset management) regulated activities.

Warning: The contents of this document have not been reviewed by any regulatory authority in Hong Kong. You are advised to exercise caution in relation to the offer. If you are in any doubt about any of the contents of this document, you should obtain independent professional advice. Please contact Pictet HK branch in Hong Kong in respect of any matters arising from, or in connection with this document.

Distributor: Pictet Bank & Trust Limited, where registered office is located at Building 1, Bayside Executive Park, West Bay Street & Blake Road, Nassau, New Providence,The Bahamas.

The document is not directed to, or intended for distribution or publication to or use by persons who are not Accredited Investors (as defined inthe Securities Industry Regulations, 2012) and subject to the conditions set forth in the Securities Industry Regulations, 2012 or to any person or entity who isa citizen or resident of or located in any locality, state, country or other jurisdiction where such distribution, publication, availability or use would be contraryto law or regulation or would subject Pictet Bank & Trust Limited to any prospectus or registration requirements. Pictet Bank & Trust Limited is incorporated in The Bahamas with limited liability. It is a bank and trust company that is licensed in accordance with the Banks and Trust Companies' Regulation Act and is regulated by the Central Bank of The Bahamas. Additionally, Pictet Bank & Trust Limited is registered with the Securities Commission of The Bahamas as a Broker Dealer II and is approved to (i) Deal in Securities 1.(a) & (c); (ii) Arrange Deals in securities; (iii) Manage Securities ; (iv) Advise on Securities.

Warning: The content of this document has not been reviewed by any regulatory authority in The Bahamas. You are, therefore, advised to exercise caution when processing the information contained herein. If you are in any doubt about any of the content of this document, you should obtain independent professional advice.

STOXX Limited ("STOXX") is the source of Stoxx 600 and of Euro Stoxx and the data comprised therein. STOXX has not been involved in any way in the creation of any reported information and does not give any warranty and excludes any liability whatsoever (whether in negligence or otherwise) – including without limitation for the accuracy, adequateness, correctness, completeness, time¬liness, and fitness for any purpose – with respect to any reported information or in relation to any errors, omissions or interruptions in the Stoxx in¬dices mentioned on this document or its data. Any dissemination or further distribution of any such information pertaining to STOXX is prohibited."

ICE-BofA Merril Lynch. The index data referenced herein is the property of ICE Data Indices, LLC, its affiliates ("ICE Data") and/or its Third Party Suppliers and has been licensed for use by Pictet. ICE Data and its Third Party Suppliers accept no liability in connection with its use.

NYSE Euronext. All rights in the NYSE Euronext indices and/or the NYSE Euronext index trade¬marks vest in NYSE Euronext and/or its licensors. Neither NYSE Euronext nor its licensors accept any liability for any errors or omissions in the NYSE Euronext indices or underlying data. No further distribution of NYSE Euronext data and/ or usage of NYSE Euronext index trademarks for the purpose of creating and/or operating a financial product is permitted without NYSE Euronext's express writ¬ten consent."

Bloomberg Index Services Limited.

"SIX Swiss Exchange AG ("SIX Swiss Exchange") is the source of SMI_SPI and the data comprised" SIX Swiss Exchange AG ("SIX Swiss Exchange") is the source of SMI_SPI and the data comprised therein. SIX Swiss Exchange has not been involved in any way in the creation of any reported informa¬tion and does not give any warranty and excludes any liability whatsoever (whether in negligence or otherwise) – including without limitation for the accuracy, adequateness, correctness, complete¬ness, timeliness, and fitness for any purpose – with respect to any reported information or in rela¬tion to any errors, omissions or interruptions in the SMI_SPI or its data. Any dissemination or further distribution of any such information pertaining to SIX Swiss Exchange is prohibited.

The MSCI information may only be used for your internal use, may not be reproduced or redissemi¬nated in any form and may not be used as a basis for or a component of any financial instruments or products or indices. None of the MSCI information is intended to constitute investment advice or a recommendation (o make (or refrain from making) any kind of investment decision and may not be relied on as such. Historical data and analysis should not be taken as an indication or guaran¬tee of any future performance analysis, forecast or prediction. The MSCI information is provided on an "as is" basis and the user of this information assumes the entire risk of any use made of this information. MSCI, each of its affiliates and each other person involved in or related to compiling, computing or creating any MSCI information (col-lectively, the "MSCI Parties ") expressly disclaims all warranties (including, without limitation, any warranties of originality, accuracy, completeness, timeliness, non-infringement. merchantability and fitness for a particular purpose) with respect to this information. Without limiting any of the foregoing, in no event shall any MSCI Party have any liability for any direct, indirect, special, inci¬dental, punitive, consequential (including, without limitation, fast profits) or any other damages. (www.msci.com).

@ 2022, Markit Economics Limited. All rights re¬served and all Intellectual property rights retained by "Markit Economics Limited." or as may be noti¬fied by Markit to Pictet from time to time.

The TOPIX Index Value and the TOPIX Marks are subject to the proprietary rights owned by Tokyo Stock Exchange, Inc. and Tokyo Stock Exchange, Inc. owns all rights and know-how relating to the TOPIX such as calculation, publication and use of the TOPIX Index Value and relating to the TOPIX Marks. No Product is in any way sponsored, en¬dorsed or promoted by Tokyo Stock Exchange, Inc.