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Fire Research Note No. 844

FIRE LOSSES IN DIFFERENT COUNTRIES

by

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October 1970

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SUMMARY

It is generally known that estimated direct fire losses in the United Kingdom have increased rapidly during the past few years and it is of interest to know how the United Kingdom figures compare with those of other countries. This has been attempted in this paper with the aid of available information and a few tables of comparison.

KEY WORDS: Fires, loss, international

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INTRODUCTION

Estimates of direct fire loss (material damage) are available for a few countries and from 1961 onwards these have been published by the National Fire Protection Association of the United States¹. Figures for 1966 were reproduced in Fire Research 1968². Losses for the period 1955 to 1968, to the extent they are available, are given in Table 1 of the Appendix to this note.

The figures for the different countries are not strictly comparable due to differences in methods of collecting and classifying the fire loss data. For instance, some countries record only those fires attended by the public fire departments while others include all those on which insurance is paid; some exclude chimney, brush, rubbish or forest fires while others include them. Some countries report everything except losses to government property. There are also wide differences in the values of the property subjected to loss. Methods of estimation are generally not known and these too are likely to vary from country to country. However, the figures give at least some indication of the losses sustained and their acceptance enables one to make some interesting comparisons. While comparisons between nations ought to be made with caution, trends from year to year can be usefully studied.

EFFECTS OF INFLATION

The figures in Table 1 are at current prices. The post war period in many countries has been one of general economic inflation and rising prices. Hence some increase in fire losses during this period was inevitable. With the aid of the consumer price index numbers for each country^{3,4} fire losses have been corrected as far as possible for the decreasing value of money and are given in Table 2. Figure 1 shows the trends in the different countries (except W. Germany) during the period 1961-1968. It is apparent that a substantial portion of the increase in the loss estimates has been caused by rising prices. But forces other than inflation are also making large contributions to the increase in the fire losses in U.S.A., U.K., Australia, Sweden and Norway.

AVERAGE LOSS

Table 3 gives the numbers of fires in the different countries for the period 1961 to 1968. Average losses per fire at current prices and at 1955 level are given in Tables 4 and 5 respectively. Figure 2 shows the trends in the corrected averages for some of the countries for the period 1961-1968. In the case of the United Kingdom it has been assumed that the losses were concentrated mainly in fires in buildings, though in recent years an increasing proportion of outdoor fires has been observed.

For reasons mentioned earlier, a comparison of the average loss between countries is not strictly valid, though it is interesting to note that the average loss in U.S.A. is quite low in comparison with the average for U.K.

As regards yearly trends, the averages (corrected for inflation) decreased in Austria, Denmark and Japan but remained almost stationary in the United States of America. After showing an increase up to 1964, the trend in the United Kingdom is steadily downwards. In an earlier investigation Fry⁵ observed that the corrected average decreased in U.K. during the period 1947-1962. It is apparent that, in most of the countries, the increasing fire frequency and the decreasing value of money together accounted for most of the increase in fire losses. However, in Canada, the average loss in real terms is increasing at a rapid rate. The frequency of fires in that country is going down while the total loss at 1955 values is remaining more or less at a constant level.

NATIONAL PRODUCT

For the purposes of comparison the estimated fire loss of a country can be related to its Gross National Product. This is not likely to be the most satisfactory method as G.N.P. is not a measure of total amounts at risk, of increases in amounts at risk or of increases in national wealth. It is an estimate of the total output, in monetary terms, of goods produced and services rendered in a given year, to which has been added the net income from abroad; it is therefore an indicator of the economic strength of the nation.

Fire loss expressed as a percentage of the G.N.P. provides a measure of the national economic effort wasted in fire or efforts needed to be devoted to the replacement of the capital loss. The percentage is free from the effects of inflation. Hence, G.N.P. is a useful base as claimed in some recent studies of fire losses^{2,5,6,7,8}. The trends in the percentages for various countries are given in Table 6. (Diagrams showing the trends have been published in Fire Research 1968).

The upward trend in the United Kingdom is somewhat discouraging. In 1969, the percentage shot up to 0.32. A steadily increasing trend was also observed in Sweden and West Germany. The fire situation in Canada and U.S.A. appears to have been worse than that of U.K. a few years ago but nearly under control during recent years.

Increasing industrial activity would normally be expected to increase the chances of the occurrence and spread of fire. However, this does not appear to be the case in Japan where fire losses are increasing at a slower rate than the G.N.P. People in Japan are extremely 'fire conscious' because of their traditional methods of building and the frequency of natural disasters like earthquakes. The low percentage in the case of Switzerland is perhaps due to the fact that the country's G.N.P. contains a relatively high proportion of value of services rendered, e.g. banking and tourism.

LOSS PER HEAD

The population of a country is another useful base to which fire loss can be related. Estimates of per capita direct loss at current prices are given in Table 7. Estimates at 1955 prices are given in Table 8 with a graphical representation in Fig.3. While individual figures vary from country to country, the trend even after correcting for inflation is upwards in all the countries except Canada and Japan. One of the main factors contributing to the variation between countries is the difference between living standards. Countries like U.S.A. and Canada are known to enjoy higher living standards than the United Kingdom. Some allowance for these differences could be made on the basis of the average hourly earnings though this has not been attempted in this paper.

CAPITAL FORMATION

An estimate of the capital formation in a year is a measure of the increase in amounts at risk. It is very difficult to estimate the value of consumer durables but figures for fixed assets, i.e. buildings, plant and machinery are available. Information on gross fixed capital formation in respect of the United Kingdom is published in the National Income Blue Book⁹. Figures for a few countries for 1963 and onwards are published by the Organisation for Economic Co-operation and Development¹⁰. In Table 9 the direct fire loss for the years 1963 to 1968 is expressed as a percentage of the gross fixed capital formation. The percentage provides a measure of the National Capital wasted in direct loss in relation to the fixed capital produced during the year. Percentages in terms of the total capital would be smaller than the figures in the table. The general trend in all the countries (except Norway) was either downwards or stationary. For a better appreciation of the trends see Fig.4. The loss ratios in U.K. and U.S.A. are almost the same.

CONCLUSION

Estimates of direct fire losses are available for a few years for some countries. But these figures are not strictly comparable due to differences in methods of collecting and classifying the fire loss data. Methods of estimation are also likely to vary from country to country. However, it is possible to make some general comments on the estimates and on the relative trends in different countries.

Inflation appears to be a major factor contributing to the increase in fire losses over the period 1955 to 1968. But in countries like U.S.A., U.K., Australia, Sweden and Norway the increase had been in excess of the increase that could be attributed to rising prices. Increasing frequency of fires was another factor. The average loss per fire corrected for inflation did not register any significant increase in most of the countries. After showing an increase up to 1964, the trend in the average loss in the United Kingdom is steadily downwards. Canada is an exception. The average loss in real terms in that country is increasing at a rapid rate due to the fact that the frequency of fires is going down while the total loss is more or less stationary.

Fire loss expressed as a percentage of the Gross National Product is showing an upward trend in the United Kingdom. In 1969, the percentage shot up to 0.32. Judged from this angle the fire situation in Canada and U.S.A. is almost under control during the recent years. In Japan fire losses are increasing at a slower rate than the G.N.P.

Fire loss per head of population corrected for inflation is increasing in all the countries except Canada and Japan. The level of per capita loss in the United Kingdom is quite low compared with the levels in U.S.A. and Canada. This is perhaps due to the living standards in U.K. which are comparatively lower.

Fire loss expressed as a percentage of gross fixed capital formation is either decreasing or remaining stationary in all the countries (except Norway). The percentages in U.K. and U.S.A. are almost the same.

REFERENCES

1. International fire statistics. Nat. Fire Prot. Ass. Q., 1962, 56 (2), 191; 1963, 57 (2), 201-2; 1964, 58 (2), 210, Fire J., 1965, 59 (6), 61; 1966, 60 (6), 60; 1967, 61 (6), 96.
2. Fire Research 1968. Ministry of Technology and Fire Offices' Committee. Joint Fire Research Organisation, London, 1969. H.M. Stationery Office.
3. Annual abstract of statistics. Central Statistical Office. London (Annual). H.M. Stationery Office.
4. Statistical Yearbook, United Nations, New York (Annual).
5. FHY, J. F. The cost of fire. Fire, April, 1964, 56, 591-594.
6. CARTER, R. L. Pricing and the risk of fire. Essays in the theory and practice of pricing. Readings in Political Economy 3, Institute of Economic Affairs, 1967.
7. FULL, H. F. How much we spend on the fire service. Fire, Nov. '69, 62, 313-314.
8. International fire loss statistics. Fire Protection Association Journal, October 1969, 84, 372-373.
9. National Income and Expenditure. Central Statistical Office. H.M. Stationery Office.
10. The OECD Observer. The Organisation for Economic Co-operation and Development, Paris, (Bimonthly).

Table 1

Fire losses in different countries

(£ million)

	Australia	Austria	Canada	Denmark	France	West Germany	Japan	Norway	Sweden	Switzerland	U.K.	U.S.A.
1955	N.A.	2.8	42.8	5.0	N.A.	N.A.	N.A.	5.6	N.A.	N.A.	27.7	475.3
1956	N.A.	4.3	44.5	4.6	N.A.	N.A.	N.A.	4.8	N.A.	N.A.	27.5	513.2
1957	N.A.	3.4	55.6	4.1	N.A.	N.A.	N.A.	4.8	N.A.	N.A.	25.9	533.3
1958	N.A.	2.8	50.1	4.5	N.A.	N.A.	N.A.	5.9	N.A.	N.A.	24.2	532.8
1959	N.A.	3.1	51.9	6.1	N.A.	N.A.	N.A.	6.9	N.A.	3.2	44.2	599.8
1960	N.A.	3.8	53.9	6.0	85.0	N.A.	N.A.	5.0	N.A.	2.4	43.8	643.4
1961	11.6	3.8	52.1	6.3	N.A.	40.0	49.7	5.3	9.7	3.0	37.5	636.0
1962	14.2	5.0	47.5	7.1	N.A.	50.6	46.5	6.7	10.5	7.2	55.6	662.5
1963	27.9	4.9	58.8	7.3	N.A.	N.A.	43.3	7.7	15.3	5.4	66.5	745.0
1964	27.9	6.7	56.8	8.1	127.5	N.A.	58.1	7.5	12.5	4.1	76.7	688.6
1965	27.8	5.3	55.8	9.6	N.A.	65.2	54.6	8.5	16.3	5.2	75.1	725.5
1966	28.8	5.8	59.5	10.4	N.A.	80.0	53.5	7.9	20.3	4.3	82.0	775.2
1967	45.5	7.4	60.3	12.1	N.A.	87.5	56.3	11.7	20.8	5.3	90.0	881.8
1968	38.0	6.6	61.5	11.8	N.A.	89.0	62.0	12.8	22.6	5.1	100.0	939.6

Note: Present sterling equivalents (e.g. £1 = 2.40 U.S. dollars) are used for countries other than the U.K.

N.A. Not available

APPENDIX

Table 2

Fire losses corrected for inflation (1955 values)

(£ million)

	Australia	Austria	Canada	Denmark	West Germany	Japan	Norway	Sweden	Switzerland	U.K.	U.S.A.
1955	N.A.	2.8	42.8	5.0	N.A.	N.A.	5.6	N.A.	N.A.	27.7	475.3
1956	N.A.	4.2	43.1	4.5	N.A.	N.A.	4.7	N.A.	N.A.	26.0	496.8
1957	N.A.	3.2	52.2	3.9	N.A.	N.A.	4.6	N.A.	N.A.	23.8	500.3
1958	N.A.	2.6	45.6	4.2	N.A.	N.A.	5.4	N.A.	N.A.	21.5	484.8
1959	N.A.	2.8	46.8	5.6	N.A.	N.A.	6.2	N.A.	3.0	38.9	540.4
1960	N.A.	3.4	48.1	5.5	N.A.	N.A.	4.5	N.A.	2.2	38.2	574.0
1961	10.1	3.3	46.0	5.5	35.8	42.9	4.6	7.9	2.7	31.8	561.9
1962	12.4	4.1	41.6	5.8	44.0	37.4	5.5	8.2	6.3	45.0	574.2
1963	24.1	4.0	50.5	5.6	N.A.	32.4	6.1	11.6	4.6	52.8	639.6
1964	23.6	5.2	47.9	6.0	N.A.	41.8	5.7	9.1	3.4	59.4	585.6
1965	22.5	3.9	45.7	6.7	51.9	36.5	6.2	11.3	4.1	55.7	605.7
1966	22.6	4.1	47.5	6.8	61.6	33.9	5.5	13.6	3.3	57.9	635.5
1967	34.5	5.0	46.9	7.5	65.3	33.9	7.9	13.4	4.0	61.6	710.1
1968	27.9	4.2	46.6	7.0	64.4	35.5	8.3	14.0	3.7	65.4	756.7

N.A. Not available

Table 3

Number of fires

Country	1961	1962	1963	1964	1965	1966	1967	1968
Australia	38,040	58,171	74,000	62,000	65,000	76,900	78,100	84,600
Austria	7,679	8,006	8,076	8,665	11,945	13,058	13,849	8,769
Canada	83,700	83,000	83,900	76,904	68,014	68,261	64,251	63,617
Denmark	6,338	6,920	7,484	7,848	8,607	8,786	9,544	9,469
France	76,986	40,814	45,756	47,195	53,945	43,333	N.A.	N.A.
Japan	47,107	49,644	50,400	48,442	53,675	47,527	48,057	54,506
Norway	8,462	10,130	10,000	11,000	10,000	9,500	9,000	10,000
Sweden	18,000	20,000	20,000	N.A.	30,000	20,000	20,000	20,000
Switzerland	5,613	4,363	N.A.	5,691	5,160	6,148	5,864	7,418
U.K.	69,588	73,406	78,868	81,744	83,167	88,162	95,447	104,180
U.S.A.	2,190,040	2,275,790	2,468,500	2,367,325	2,347,125	2,397,000	2,393,000	2,363,700

N.A. Not available

Table 4

Loss per fire - actual values (£)

Country	1961	1962	1963	1964	1965	1966	1967	1968
Australia	305	244	377	450	428	375	583	449
Austria	495	625	607	773	444	444	534	753
Canada	622	572	701	739	820	872	939	967
Denmark	994	1026	975	1032	1115	1184	1268	1246
Japan	1055	937	859	1199	1017	1126	1172	1137
Norway	626	661	770	682	850	832	1300	1280
Sweden	539	525	765	N.A.	543	1015	1040	1130
Switzerland	534	1650	N.A.	720	1008	699	904	688
U.K.	539	757	843	938	903	930	943	960
U.S.A.	290	291	302	291	309	323	368	398

N.A. Not available

Table 5

Loss per fire - corrected (1955) values (£)

Country	1961	1962	1963	1964	1965	1966	1967	1968
Australia	266	213	326	381	346	294	442	330
Austria	430	512	495	600	326	314	361	479
Canada	550	501	602	623	672	696	730	733
Denmark	868	838	748	765	778	774	786	739
Japan	911	753	643	863	680	713	705	651
Norway	544	543	610	518	620	579	878	830
Sweden	439	410	580	N.A.	377	680	670	700
Switzerland	481	1444	N.A.	597	795	537	682	499
U.K.	457	613	669	727	670	657	645	628
U.S.A.	257	252	259	247	258	265	297	320

N.A. Not available

Table 6

International Comparisons of Fire Losses
Loss/gross national product (per cent)

Country	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
Australia	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	0.17	0.20	0.35	0.31	0.28	0.27	0.40	0.31
Austria	0.17	0.23	0.17	0.13	0.13	0.15	0.14	0.16	0.15	0.19	0.14	0.14	0.17	0.14
Canada	0.35	0.35	0.41	0.35	0.35	0.35	0.34	0.30	0.34	0.30	0.28	0.28	0.26	0.24
Denmark	0.28	0.24	0.21	0.22	0.27	N.A.	0.23	0.23	0.21	0.21	0.23	0.23	0.25	0.23
France	N.A.	N.A.	N.A.	N.A.	N.A.	0.34	N.A.	N.A.	N.A.	0.35	N.A.	N.A.	N.A.	N.A.
West Germany	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	0.12	0.14	N.A.	0.14	N.A.	0.16	0.16	0.16
Japan	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	0.25	0.21	0.16	0.19	0.16	0.14	0.12	0.10
Norway	0.41	0.33	0.31	0.36	0.39	N.A.	0.26	0.30	0.31	0.28	0.29	0.25	0.35	0.34
Sweden	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	0.17	0.17	0.23	0.17	0.20	0.23	0.23	0.21
Switzerland	N.A.	N.A.	N.A.	N.A.	0.10	0.07	0.07	0.16	0.11	0.08	0.09	0.07	0.08	0.07
U.K.	0.16	0.15	0.18	0.12	0.20	0.19	0.15	0.22	0.25	0.26	0.24	0.25	0.26	0.27
U.S.A.	0.29	0.30	0.30	0.29	0.30	0.30	0.29	0.29	0.30	0.26	0.25	0.25	0.27	0.26

N.A. Not available

Table 7

Loss per head - actual values (£)

Country	1961	1962	1963	1964	1965	1966	1967	1968
Australia	1.46	1.74	2.55	2.49	2.46	2.50	3.87	3.18
Austria	0.54	0.70	0.68	0.94	0.73	0.78	1.01	0.91
Canada	2.85	2.56	3.09	2.95	2.85	2.99	2.95	2.98
Denmark	1.37	1.53	1.55	1.73	2.00	2.16	2.50	2.41
West Germany	N.A.	N.A.	N.A.	1.04	1.11	1.36	1.52	N.A.
Japan	0.53	0.49	0.45	0.60	0.55	0.54	0.56	0.62
Norway	1.49	1.83	2.10	2.03	2.26	2.10	3.08	3.38
Sweden	1.30	1.39	2.01	1.63	2.11	2.60	2.65	2.87
Switzerland	0.54	0.85	0.96	0.70	0.87	0.70	0.87	0.85
U.K.	0.87	1.22	1.45	1.66	1.60	1.75	1.88	1.77
U.S.A.	3.48	3.57	3.95	3.60	3.74	3.96	4.43	4.68

N.A. Not available

Table 8

Loss per head - corrected (1955) values (£)

Country	1961	1962	1963	1964	1965	1966	1967	1968
Australia	0.95	1.14	2.16	2.11	1.99	1.97	2.92	2.34
Austria	0.47	0.58	0.56	0.72	0.54	0.56	0.68	0.57
Canada	2.52	2.24	2.66	2.49	2.34	2.38	2.30	2.25
Denmark	1.20	1.26	1.20	1.27	1.40	1.41	1.55	1.43
Japan	0.46	0.39	0.34	0.43	0.37	0.34	0.34	0.36
Norway	1.30	1.51	1.66	1.54	1.66	1.46	2.08	2.18
Sweden	1.05	1.08	1.52	1.19	1.47	1.75	1.70	1.77
Switzerland	0.50	1.16	0.81	0.58	0.69	0.55	0.66	0.61
U.K.	0.60	0.85	0.98	1.10	1.02	1.06	1.12	1.17
U.S.A.	3.07	3.09	3.39	3.05	3.13	3.24	3.57	3.77

Table 9

Loss/gross fixed asset formation (per cent)

Country	1963	1964	1965	1966	1967	1968
Austria	0.66	0.78	0.54	0.52	0.67	0.59
Canada	1.57	1.30	1.14	1.09	1.01	1.03
Denmark	1.11	0.97	1.04	1.08	1.17	1.12
Japan	0.48	0.57	0.50	0.45	0.36	0.29
Norway	1.02	0.98	0.99	0.87	1.13	1.27
Sweden	0.98	0.73	0.85	1.00	0.94	0.89
Switzerland	0.39	0.27	0.32	0.26	0.31	0.28
U.K.	1.55	1.48	1.36	1.42	1.44	1.48
U.S.A.	1.85	1.55	1.45	1.47	1.63	1.57

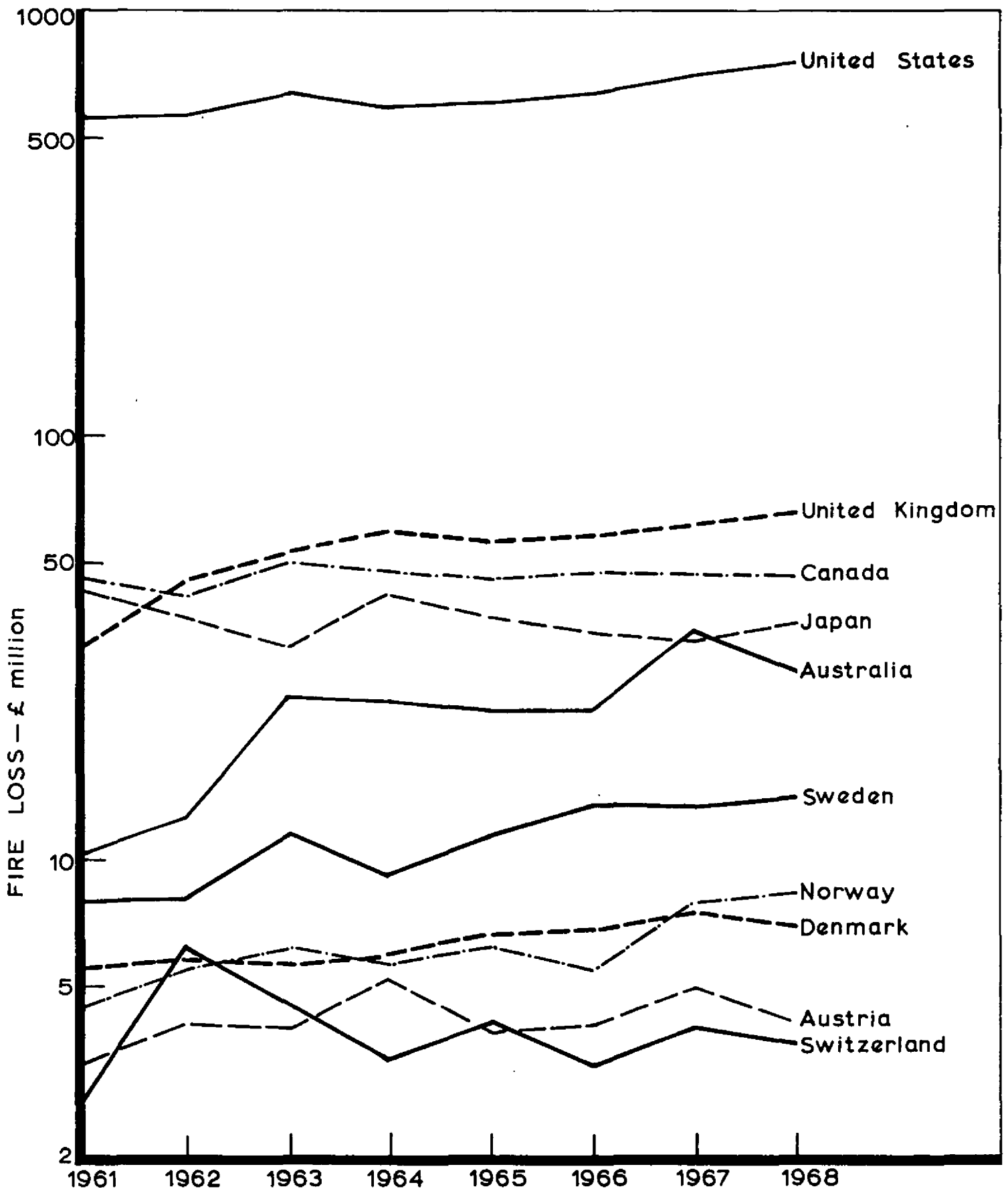


FIG. 1. FIRE LOSS AT 1955 VALUES

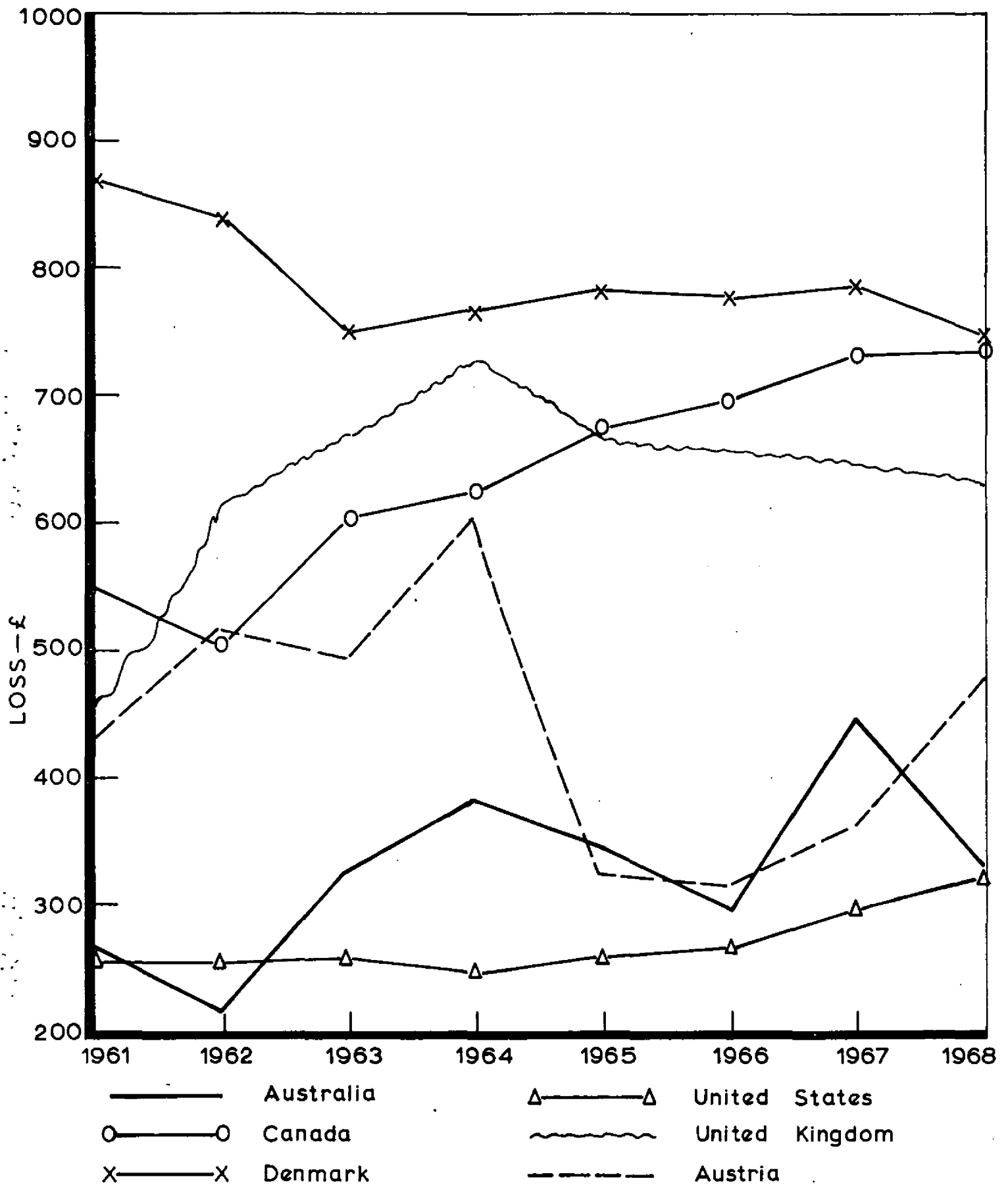


FIG. 2. LOSS PER FIRE AT 1955 VALUES

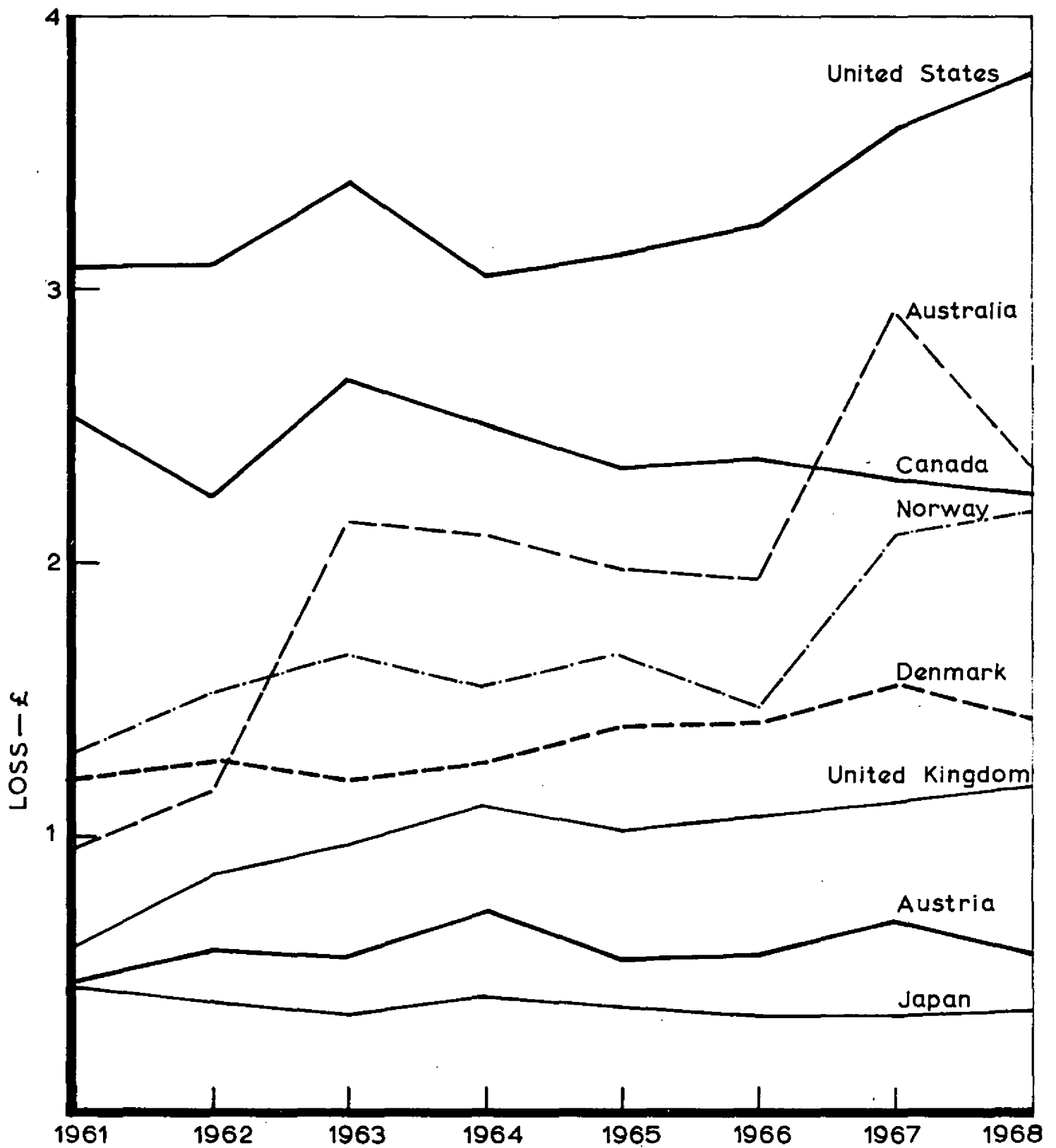


FIG 3 LOSS PER HEAD AT 1955 VALUES

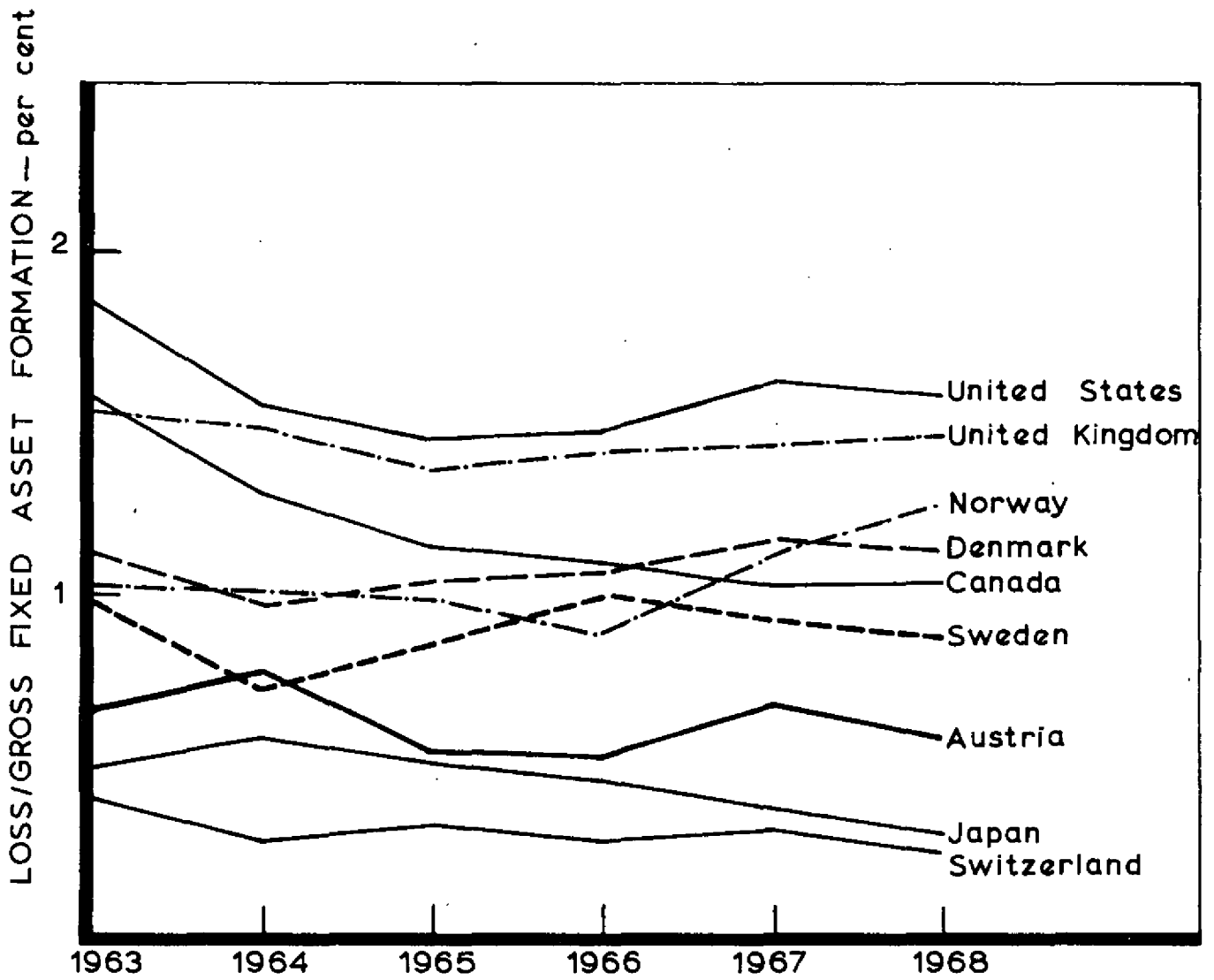


FIG. 4. LOSS/GROSS FIXED ASSET FORMATION

