Annexe 2
Un exemple de barème

Modulations

Ancienneté du véhicule (Déterminée par différence de millésime entre l'année en cours et l'année de première mise en circulation du véhicule)

Ancienneté du véhicule	2 et moins	3	4	5	6	7	8	9	10 et plus
Note	0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 8

Reporter la note correspondant à l'ancienneté

+

Usage tous déplacements sauf tournées, limité à 8 000 kilomètres par an

Non	0
Oui	+ 4

Reporter la note correspondant à l'usage

=

(Si le résultat de l'addition est supérieur à 8, retenir 8)

Reporter la note obtenue

–

Conducteur novice

Ancienneté du permis	Nombre d'années d'assurance sans sinistre	Conducteur principal		Conducteur désigné	
		Masculin	Féminin	Masculin	Féminin
Moins de 3 ans	0	– 33	– 18	– 18	– 10
	1	– 20	– 10	– 10	– 5
	2 et plus	0	0	0	0
3 ans et plus	0	– 18	– 10	0	0
	1	– 10	– 5	0	0
	2 et plus	0	0	0	0

+

Bon conducteur

Zone	Coefficient de réduction-majoration (bonus-malus)					
	0,50	0,51 à 0,54	0,55 à 0,59	0,60 à 0,64	0,65 à 0,75	0,76 et plus
1 - 2 - 3	+ 4	+ 4	+ 2	+ 2	+ 2	0
4 - 6	+ 11	+ 8	+ 6	+ 4	+ 2	0

+

Assuré complet (Selon la définition indiquée dans les documents tarifaires)

Contrat Automobile	
Non	0
Niveau A	+ 2
Niveau B	+ 4

Plan d'assurance	
Niveau B	+ 2

+

Conduite exclusive (Un seul conducteur désigné en plus du conducteur principal)

Non	0
Oui	+ 4

+ ou –

Mode et rythme de paiement

Prélèvement automatique mensuel	– 1

–

Tableau des coefficients de modulation

La note finale calculée page 3 permet de déterminer le coefficient de modulation.

Note	Coef-ficient	Soit en %
+ 27	0,491	– 50,9
+ 26	0,504	– 49,6
+ 25	0,518	– 48,2
+ 24	0,531	– 46,9
+ 23	0,546	– 45,4
+ 22	0,560	– 44,0
+ 21	0,575	– 42,5
+ 20	0,590	– 41,0
+ 19	0,606	– 39,4
+ 18	0,622	– 37,8
+ 17	0,639	– 36,1
+ 16	0,656	– 34,4
+ 15	0,674	– 32,6
+ 14	0,692	– 30,8
+ 13	0,710	– 29,0
+ 12	0,729	– 27,1
+ 11	0,748	– 25,2
+ 10	0,768	– 23,2
+ 9	0,789	– 21,1
+ 8	0,810	– 19,0
+ 7	0,832	– 16,8
+ 6	0,854	– 14,6
+ 5	0,877	– 12,3

Note	Coef-ficient	Soit en %
+ 4	0,900	– 10,0
+ 3	0,924	– 7,6
+ 2	0,949	– 5,1
+ 1	0,974	– 2,6
+ 0	1,000	0,0
– 1	1,027	+ 2,7
– 2	1,054	+ 5,4
– 3	1,082	+ 8,2
– 4	1,111	+ 11,1
– 5	1,141	+ 14,1
– 6	1,171	+ 17,1
– 7	1,202	+ 20,2
– 8	1,235	+ 23,5
– 9	1,268	+ 26,8
– 10	1,301	+ 30,1
– 11	1,336	+ 33,6
– 12	1,372	+ 37,2
– 13	1,408	+ 40,8
– 14	1,446	+ 44,6
– 15	1,485	+ 48,5
– 16	1,524	+ 52,4
– 17	1,565	+ 56,5
– 18	1,607	+ 60,7

Note	Coef-ficient	Soit en %
– 19	1,649	+ 64,9
– 20	1,694	+ 69,4
– 21	1,739	+ 73,9
– 22	1,785	+ 78,5
– 23	1,833	+ 83,3
– 24	1,882	+ 88,2
– 25	1,932	+ 93,2
– 26	1,983	+ 98,3
– 27	2,036	+ 103,6
– 28	2,091	+ 109,1
– 29	2,147	+ 114,7
– 30	2,204	+ 120,4
– 31	2,263	+ 126,3
– 32	2,323	+ 132,3
– 33	2,385	+ 138,5
– 34	2,449	+ 144,9
– 35	2,514	+ 151,4
– 36	2,581	+ 158,1
– 37	2,650	+ 165,0
– 38	2,721	+ 172,1
– 39	2793	+ 179,3
– 40	2,868	+ 186,8
– 41	2,945	+ 194,5

Critères de différentiation

Compagnie	Nombre de tranche d'âge	Code postal Nombre de modalités	Société (oui-non)	Voiture de sport (oui-non)	Ancienneté du permis	Statut civil/fonc-tionnaire	Sexe	Divers
AAB	3 (P)	0	X	X				
AG	3 (P)	3	X					
AGF	2 (C/P)	2	X	X				
AXA	2 (C)	3	X	X			X	
Royale Belge	3 (C)	3	X	X				
Le Mans	0	0			X		X	Conducteur occasionnel ou pas
Victoire	4 (C)	6	X	X				Puissance, essence ou diesel
Winthertur	3 (C)	4	X	X		X		
Zurich	3 (P)	3	X	X		X		

(P) preneur d'assurance,
(C) conducteur habituel,
(Cp) conducteur principal,
(X) pris en compte.

Niveau des primes pour divers clients

Compagnie	Monsieur A	Monsieur B	Madame C	Monsieur D	Monsieur E	Mademoiselle F	Monsieur G
AAB	27 911	15 216	16 371	32 424	26 589	21 211	11 278
AG	30 687	15 392	16 565	26 782	29 818	23 312	13 592
AGF	24 502	15 862	17 066	?	29 177	18 621	Refusé
AXA	29 463	15 060	17 107	30 611	29 238	20 517	12 946
Royale Belge	28 194	15 875	17 090	29 127	29 782	21 416	13 184
Le Mans	43 327	15 806	17 005	35 028	27 620	29 066	12 234
Winthertur	28 235	15 561	16 205	32 009	30 114	21 450	13 205
Zurich	28 176	15 862	16 553	29 294	30 051	21 413	Refusé

Tableau VI.1

Sinistralité et coût moyen par accident
(indice 100 : ensemble des conducteurs français ; année 1987)

Catégorie	Fréquence de sinistre	Coût moyen d'un sinistre	Prime pure
Sexe masculin	99	102	101
Sexe féminin	104	94	97
Homme de moins de 21 ans	225	191	430
Homme de 21 à 25 ans	173	131	226
Homme de 25 à 30 ans	125	117	145
Homme de plus de 30 ans	89	92	82
Permis de moins d'un an	275	169	470

Tableau VI.2

Kilomètrage annuel moyen/Profession (1985)

Catégorie socio-professionnelle	Kilométrage
Agriculteur	10 500
Commerçants et chefs d'entreprise	15 600
Artisans	14 700
Professions libérales	16 700
Cadres supérieurs et ingénieurs	18 400
Employés	12 200
Ouvriers	12 600

Source : INSEE.

Sexe	Kilométrage
Masculin	13 100
Féminin	11 200

Tableau VI.4

Kilométrage annuel moyen/âge du conducteur (1985)

Age du conducteur	Kilométrage
< 25	13 200
$25 < \cdots < 30$	14 000
$30 < \cdots < 50$	13 500
$50 < \cdots < 60$	11 800
$60 < \cdots < 65$	11 000
$65 <$	8 200

Tableau VI.5

Kilométrage annuel/âge du véhicule (1985)

Age du conducteur	Kilométrage
1 an	16 800
2 ans	15 200
3 ans	14 600
4 ans	13 100
5 ans	13 200
6 ans	12 300
7 ans	11 500
8 ans	11 400
9 ans	11 100
≥ 10 ans	8 700

Tableau VI.6

Kilométrage annuel moyen/année

Année	Kilométrage
1975	13 100
1980	11 700
1985	12 600

Tableau VI.7

Consommation de supercarburant/prix de vente

Année	Prix de vente (janvier)	Consommation (en m^3)
1977	2,31	18 534 200
1978	2,42	19 469 200
1979	2,75	19 651 700
1980	3,27	19 780 700
1981	3,72	20 409 200
1982	4,32	20 519 500
1983	4,65	20 919 000
1984	5,04	21 153 900
1985	5,74	21 047 500

Table 1.8

One-year transition matrix (%)

Initial rating	Rating at year-end (%)							
	AAA	AA	A	BBB	BB	B	CCC	Default
AAA	90.81	8.33	0.68	0.06	0.12	0	0	0
AA	0.70	90.65	7.79	0.64	0.06	0.14	0.02	0
A	0.09	2.27	91.05	5.52	0.74	0.26	0.01	0.06
BBB	0.02	0.33	5.95	86.93	5.30	1.17	0.12	0.18
BB	0.03	0.14	0.67	7.73	80.53	8.84	1.00	1.06
B	0	0.11	0.24	0.43	6.48	83.46	4.07	5.20
CCC	0.22	0	0.22	1.30	2.38	11.24	64.86	19.79

Source: Standard & Poor's CreditWeek (15 April 96)

11. One-year rating transition matrix

		Rating to: Aaa	Aa	A	Baa	Ba	B	Caa	Default	WR
Rating from:	Aaa	89.6%	7.2%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	2.5%
	Aa	1.1%	88.8%	6.9%	0.3%	0.2%	0.0%	0.0%	0.0%	2.8%
	A	0.1%	2.5%	89.0%	5.2%	0.6%	0.2%	0.0%	0.0%	2.5%
	Baa	0.0%	0.2%	5.2%	85.3%	5.3%	0.8%	0.1%	0.1%	3.0%
	Ba	0.0%	0.1%	0.4%	4.7%	80.1%	6.9%	0.4%	1.5%	5.8%
	B	0.0%	0.1%	0.1%	0.5%	5.5%	75.7%	2.0%	8.2%	7.8%
	Caa	0.0%	0.4%	0.4%	0.8%	2.3%	5.4%	62.1%	20.3%	8.4%

12. Five-year rating transition matrix

		Rating to: Aaa	Aa	A	Baa	Ba	B	Caa	Default	WR
Rating from:	Aaa	62.5%	21.8%	4.9%	0.5%	0.7%	0.2%	0.1%	0.2%	9.1%
	Aa	5.5%	52.9%	22.3%	3.9%	1.8%	0.5%	0.0%	0.4%	12.7%
	A	0.3%	9.9%	59.6%	15.0%	3.9%	1.1%	0.2%	0.6%	9.3%
	Baa	0.2%	1.9%	18.8%	49.7%	12.6%	3.2%	0.3%	1.7%	11.6%
	Ba	0.2%	0.5%	3.6%	13.6%	37.4%	12.6%	0.8%	10.1%	21.2%
	B	0.1%	0.1%	0.7%	3.1%	10.3%	31.8%	1.7%	24.6%	27.4%
	Caa	0.0%	0.0%	0.6%	7.6%	5.8%	14.0%	19.9%	35.1%	17.0%

13. Ten-year rating transition matrix

		Rating to: Aaa	Aa	A	Baa	Ba	B	Caa	Default	WR
Rating from:	Aaa	47.1%	31.5%	8.8%	3.6%	1.7%	0.2%	0.1%	1.0%	6.0%
	Aa	8.4%	33.6%	30.6%	9.6%	3.3%	0.8%	0.2%	1.3%	12.1%
	A	0.6%	14.8%	43.0%	17.9%	5.9%	2.5%	0.4%	1.1%	13.9%
	Baa	0.3%	4.7%	26.4%	29.9%	13.2%	4.2%	0.4%	4.0%	17.0%
	Ba	0.4%	0.0%	10.0%	18.6%	19.8%	10.4%	0.6%	13.9%	24.6%
	B	0.8%	0.0%	4.9%	6.1%	11.6%	16.5%	0.4%	30.2%	28.5%
	Caa	0.0%	0.7%	4.3%	14.5%	6.8%	8.5%	8.5%	48.7%	8.5%

Table 3. Rating history of 473 defaulting issuers

		Rating at default	Calendar years prior to default							
			1	2	3	4	5	10	15	20
Invest.	Aaa	0	0	0	0	1	2	2	2	1
grade	Aa	0	2	1	3	6	5	2	1	2
	A	1	1	8	19	15	13	19	11	8
	Baa	1	14	31	33	44	39	37	32	20
Spec.	Ba	43	118	176	163	151	138	61	36	32
grade	B	289	280	213	166	118	86	28	19	7
	Caa/Ca/C	136	58	17	12	11	11	9	7	3

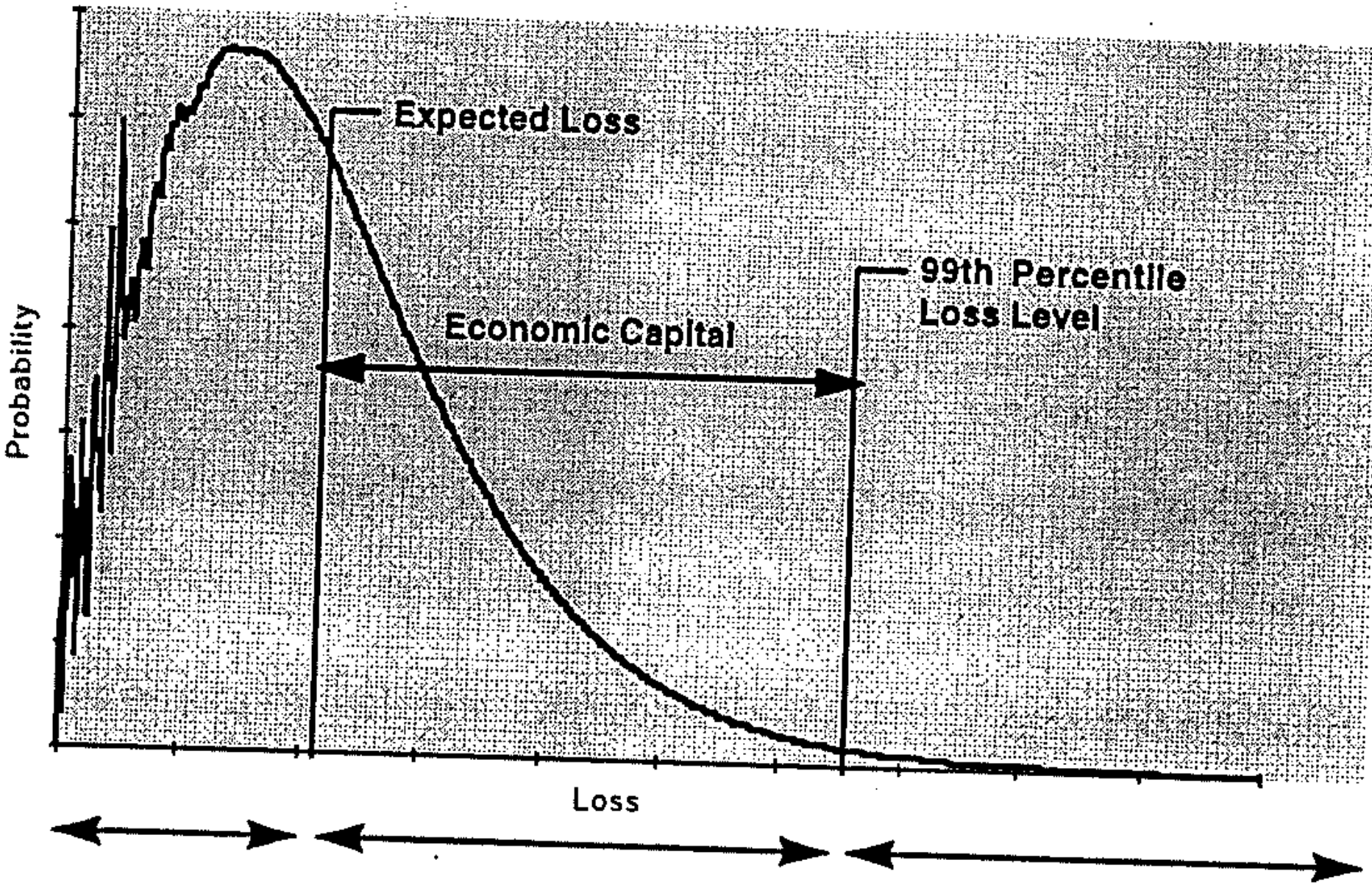
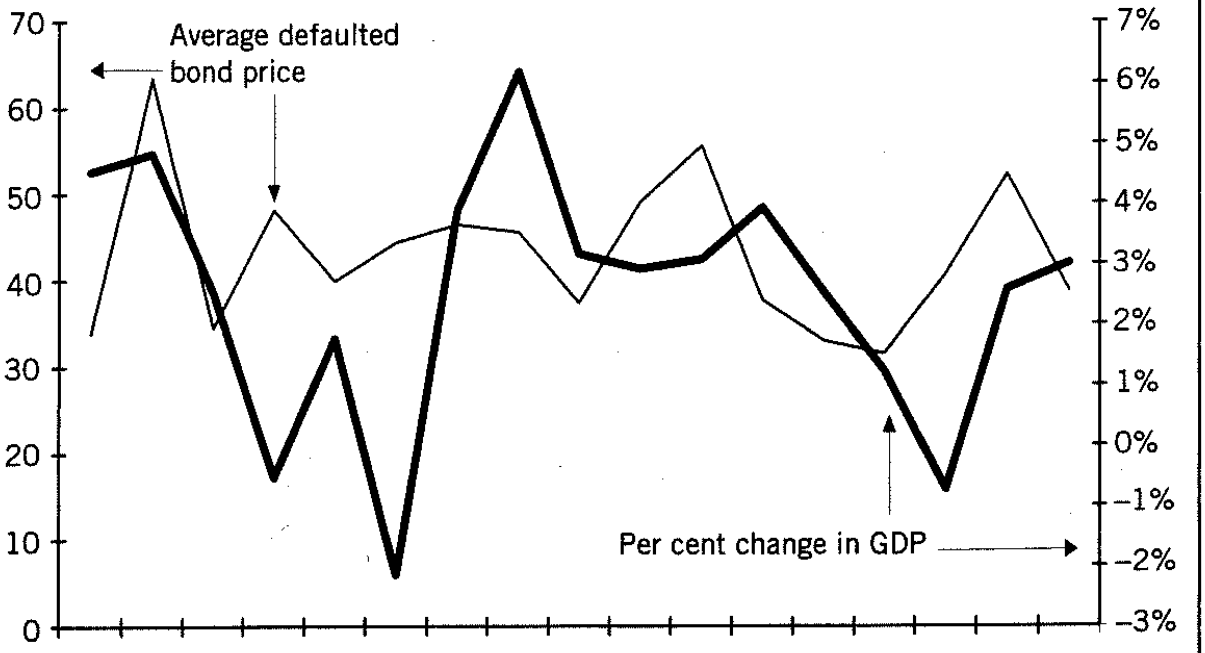

Expected Loss
99th Percentile
Loss Level
Economic Capital
Probability
Loss
Covered by
pricing and
provisioning
Covered by capital
and/or provisions
Quantified using scenario
analysis and controlled
with concentration limits

Table 3. Rating history of 473 defaulting issuers

		Rating at default	Calendar years prior to default 1	2	3	4	5	10	15	20
Invest.	Aaa	0	0	0	0	1	2	2	2	1
grade	Aa	0	2	1	3	6	5	2	1	2
	A	1	1	8	19	15	13	19	11	8
	Baa	1	14	31	33	44	39	37	32	20
Spec.	Ba	43	118	176	163	151	138	61	36	32
grade	B	289	280	213	166	118	86	28	19	7
	Caa/Ca/C	136	58	17	12	11	11	9	7	3

5. Average defaulted bond price and per cent change in GDP, 1977 to 1993



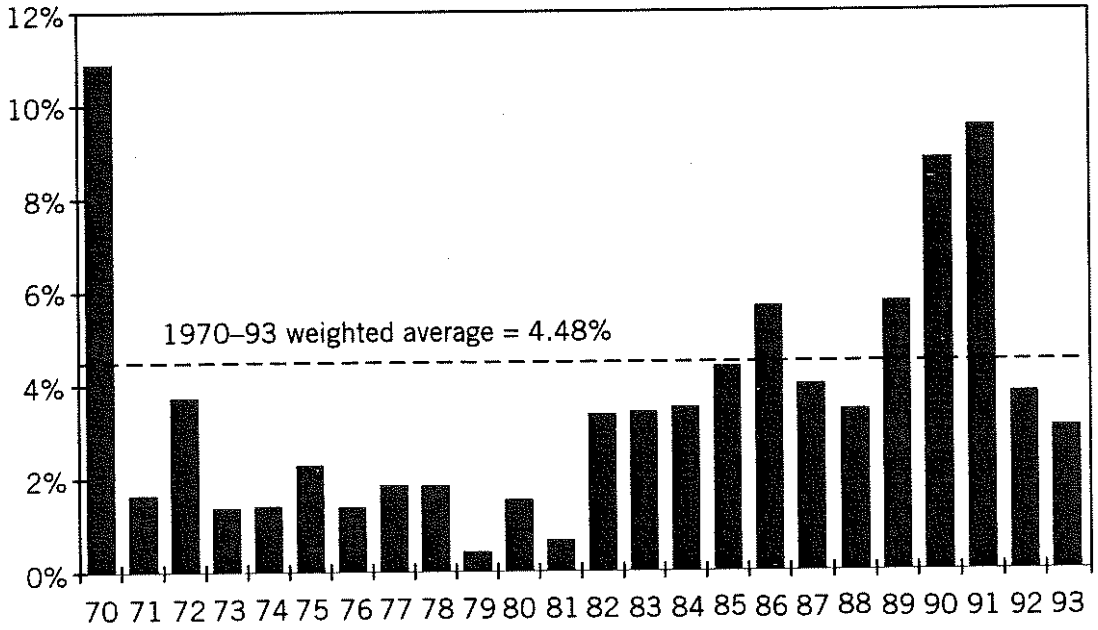
the start of year Y (where Y = 1970, 1971, ...) tha

Table 4. Defaulting issuers by year

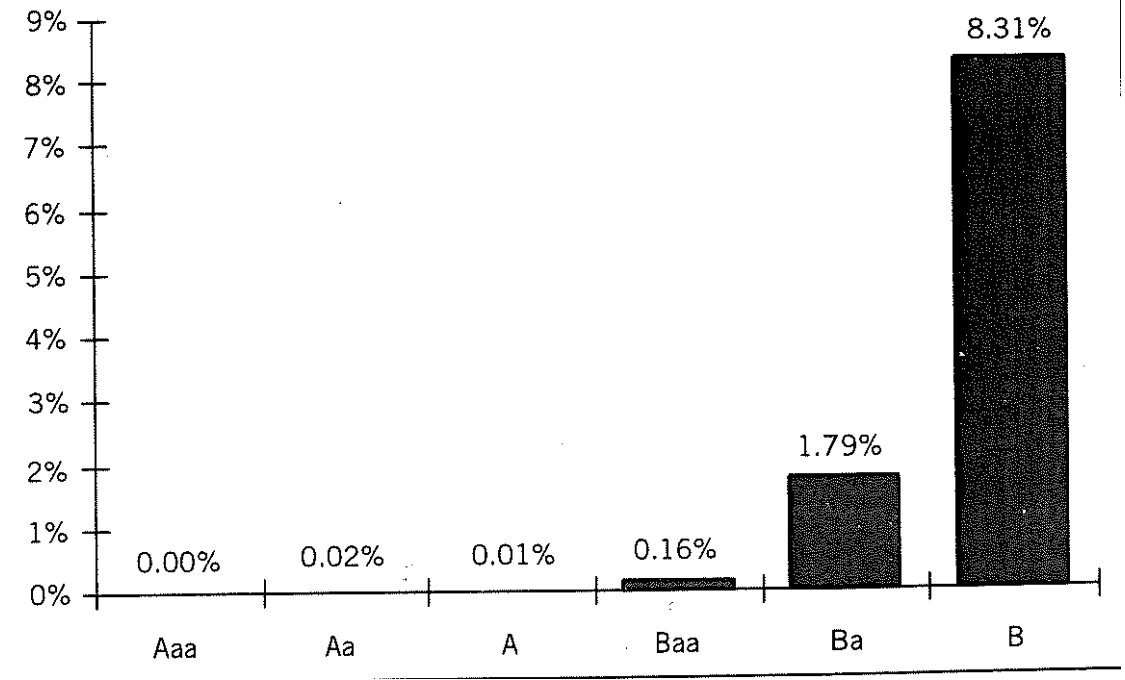
Total = 633

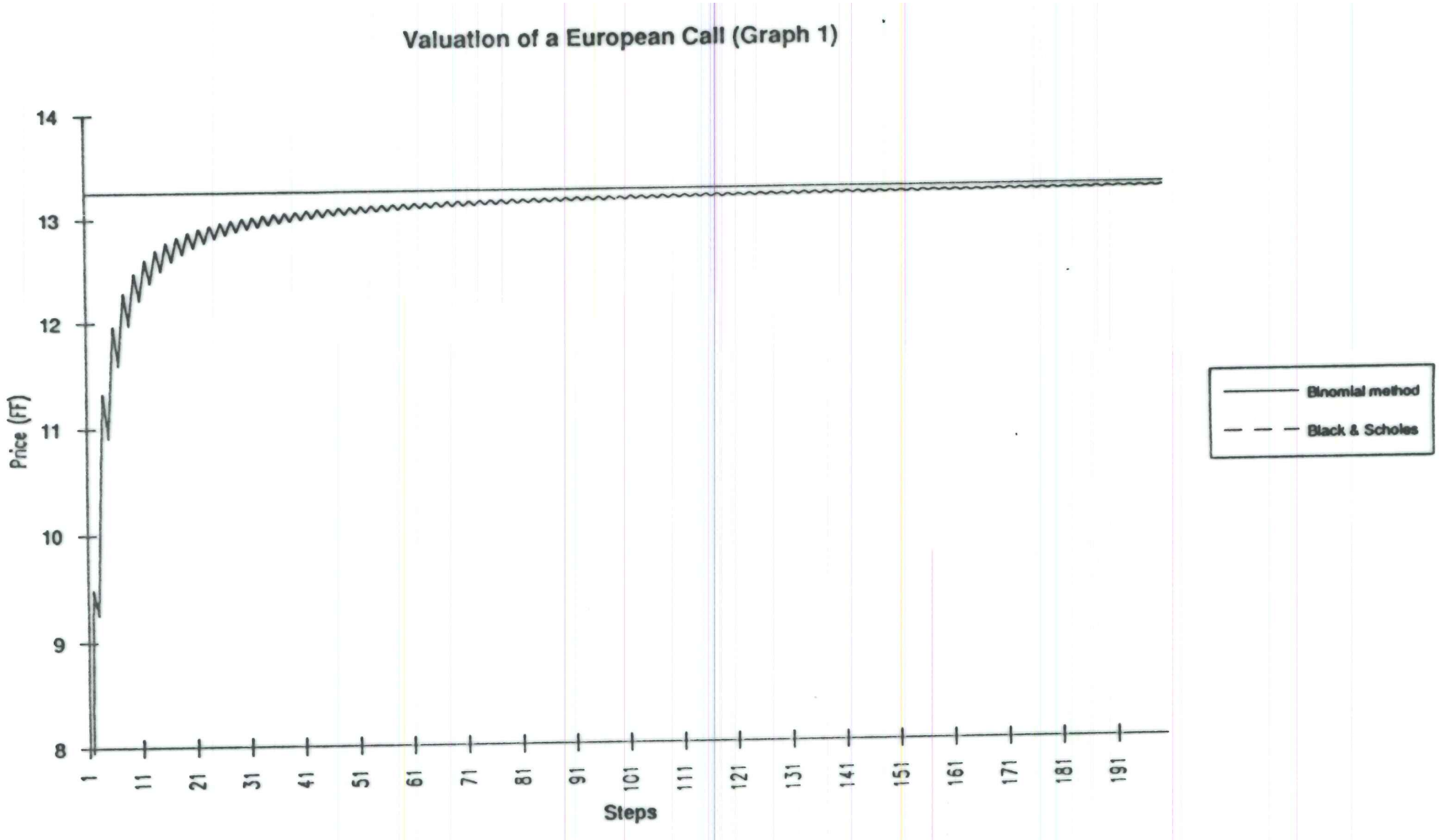
Year	Count	Year	Count
1970	31	1982	22
1971	4	1983	18
1972	9	1984	17
1973	8	1985	22
1974	8	1986	37
1975	8	1987	32
1976	5	1988	34
1977	8	1989	70
1978	5	1990	97
1979	2	1991	99
1980	6	1992	49
1981	4	1993	38

6. One-year speculative-grade default rates, 1970–93



7. Weighted average one-year default rates




Valuation of a European Call (Graph 1)
Price (FF)
14
13
12
11
10
9
8
1
11
21
31
41
51
61
71
81
91
101
111
121
131
141
151
161
171
181
191
Steps
Binomial method
Black & Scholes

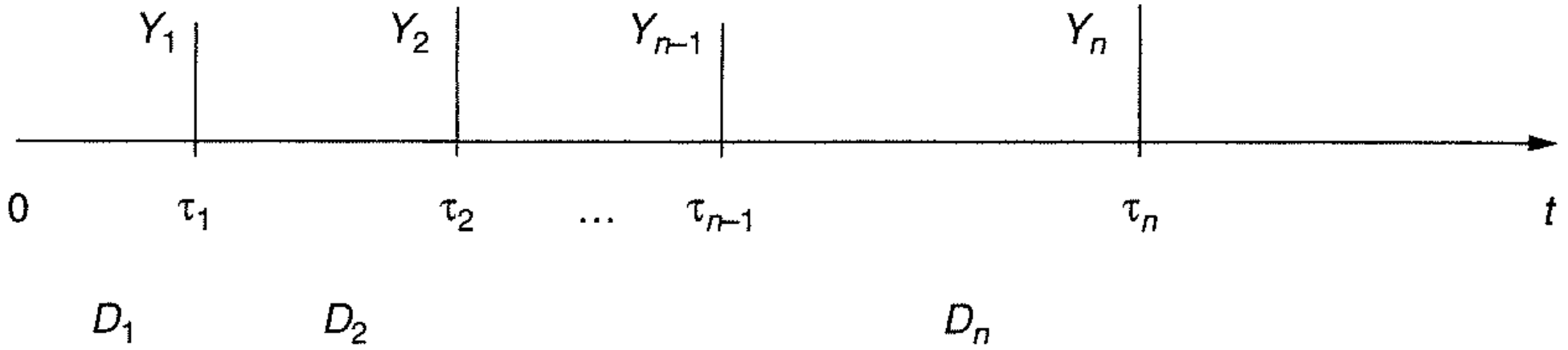


Figure 8.1
Arrivée des sinistres

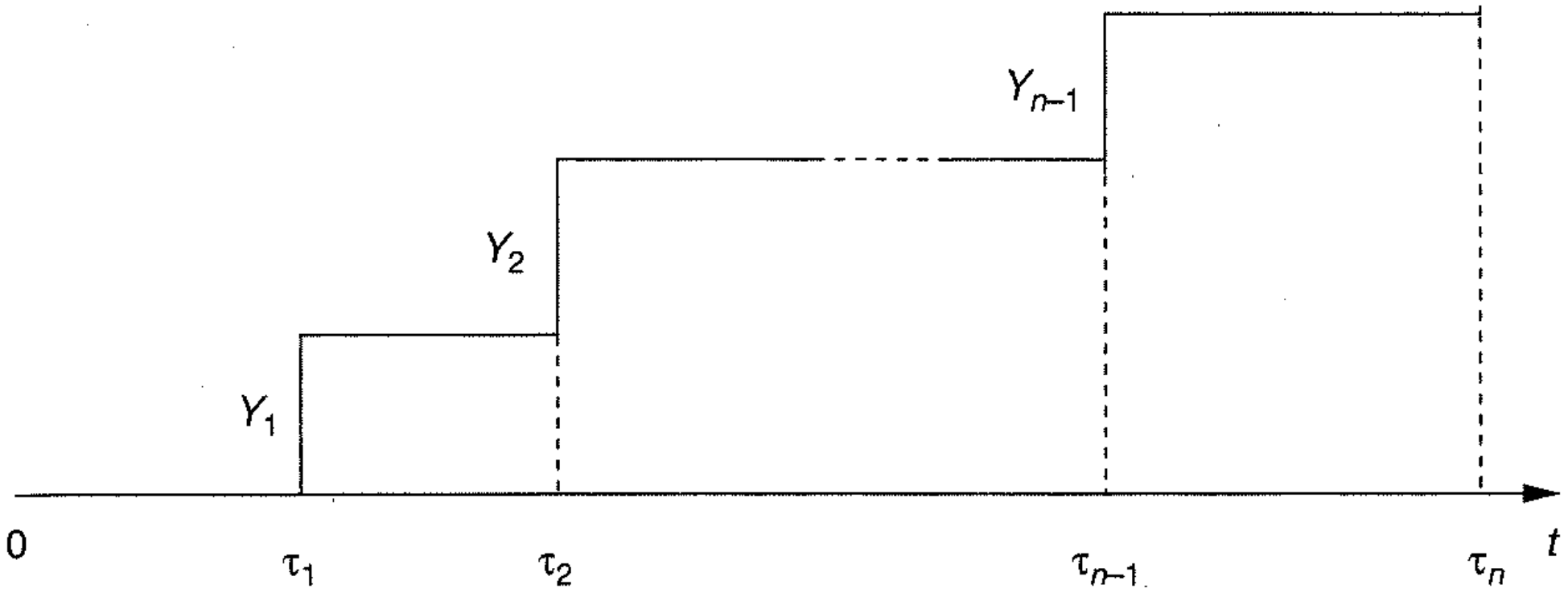


Figure 8.2
Les processus cumulés

Table 3

The 30 Most Costly Insurance Losses 1970-1995

Millions of 1992 US dollars

Loss	Date	Event	Country
16,000	8/24/92	Hurricane Andrew	USA
11,838	1/17/94	Northridge EQ	USA
5,724	9/27/91	Tornado Mireille	Japan
4,931	1/25/90	Winter storm Daria	Europe
4,749	9/15/89	Hurricane Hugo	Puerto Rico
4,528	10/17/89	Loma Prieta EQ	USA
3,427	2/26/90	Winter storm Vivian	Europe
2,373	7/6/88	Explosion on Piper Alpha oil rig	UK
2,282	1/17/95	Hanshin EQ Kobe	Japan
1,938	10/4/95	Hurricane Opal	USA
1,700	3/10/93	East coast blizzard	USA
1,600	9/11/92	Hurricane Iniki	USA
1,500	10/23/89	Explosion Philips Petroleum	USA
1,453	9/3/79	Tornado Frederic	USA
1,422	9/18/74	Tornado Fifi	Honduras
1,320	9/12/88	Hurricane Gilbert	Jamaica
1,238	12/17/83	Snowstorms, frost	USA
1,236	10/20/91	Forest fires	USA
1,224	4/2/74	Tornadoes in 14 states	USA
1,172	8/4/70	Tornado Celia	USA
1,168	4/25/73	Mississippi flooding	USA
1,048	5/5/95	Wind, hail, floods	USA
1,005	1/2/76	NW Europe Storms	Europe
950	8/17/83	Hurricane Alicia	USA
923	10/26/93	Forest fires	USA
923	1/21/95	Northern Europe, storms, floods	Europe
894	2/3/90	Tornado Herta	Europe
870	9/3/93	Typhoon Yancy	Japan
865	8/18/91	Hurricane Bob	USA
851	2/16/80	Floods in CA and AZ	USA

EQ—Earthquake; Source: Swiss Reinsurance Co.

Table 1

Estimated Return Periods and Non-encounter Probabilities for Various Wind Speeds

Wind speed (mph)	Return period (years)	Std. err.	Non-encounter probability	Std. err.
75	0.86	.0055	.1845	.0039
100	1.54	.0127	.4767	.0050
125	3.60	.0339	.7434	.0044
150	10.70	.1044	.9114	.0028
175	43.90	.4397	.9780	.0015
200	320.04	3.1924	.9981	.0004

Source: Parisi and Lund (1999).

Table 2

Estimated Return Periods and Non-encounter Probabilities for Various Central Pressures

Central pressure (mb)	Return period (years)	Std. err.	Non-encounter probability	Std. err.
1002	0.86	.0054	.1856	.0039
980	1.44	.0116	.4402	.0050
965	2.45	.0223	.6410	.0048
940	8.86	.0879	.8869	.0032
920	42.11	.4252	.9757	.0015
910	139.07	1.3692	.9933	.0008

Source: Parisi and Lund (1999).

After the storm, the reckoning

Global natural-disaster costs, $bn (2011 dollars)

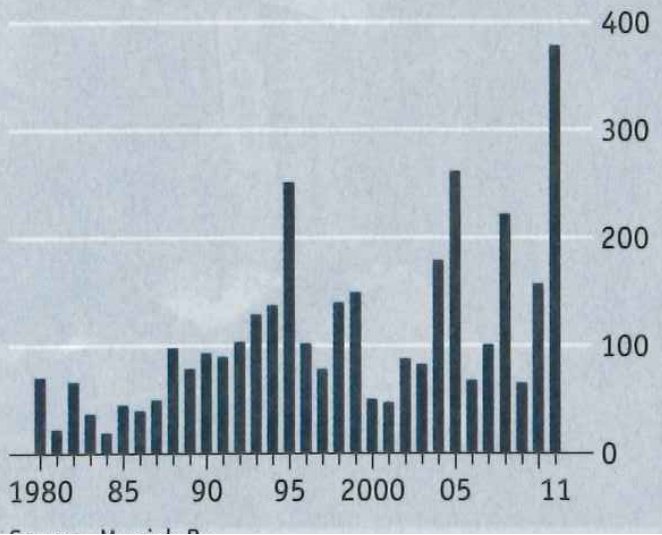
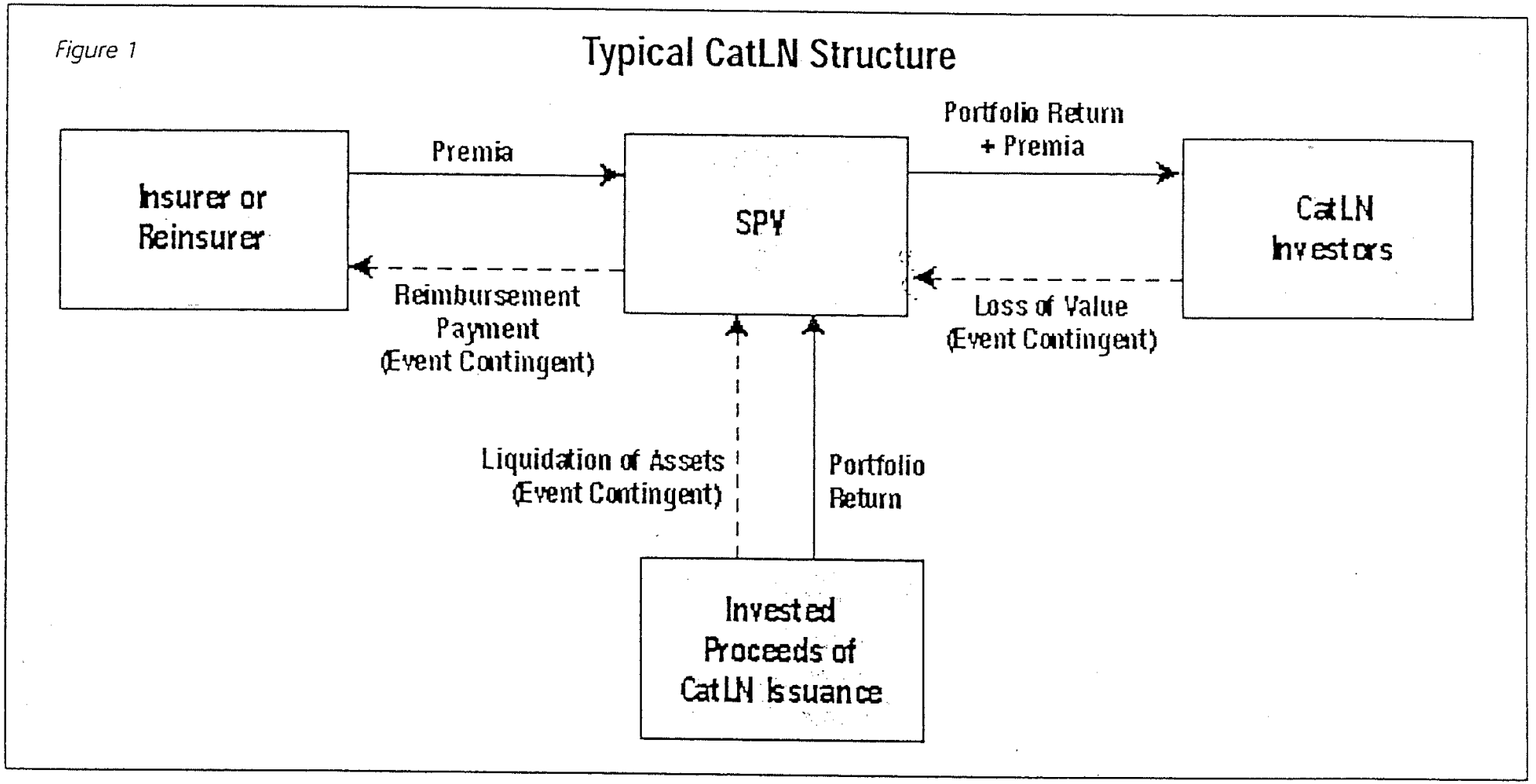


Figure 1



2 Since investment-grade instruments virtually never directly default without first being downgraded to noninvesment-grade levels, the default risk of CatLNs more closely resembles that of noninvestment-grade offerings.

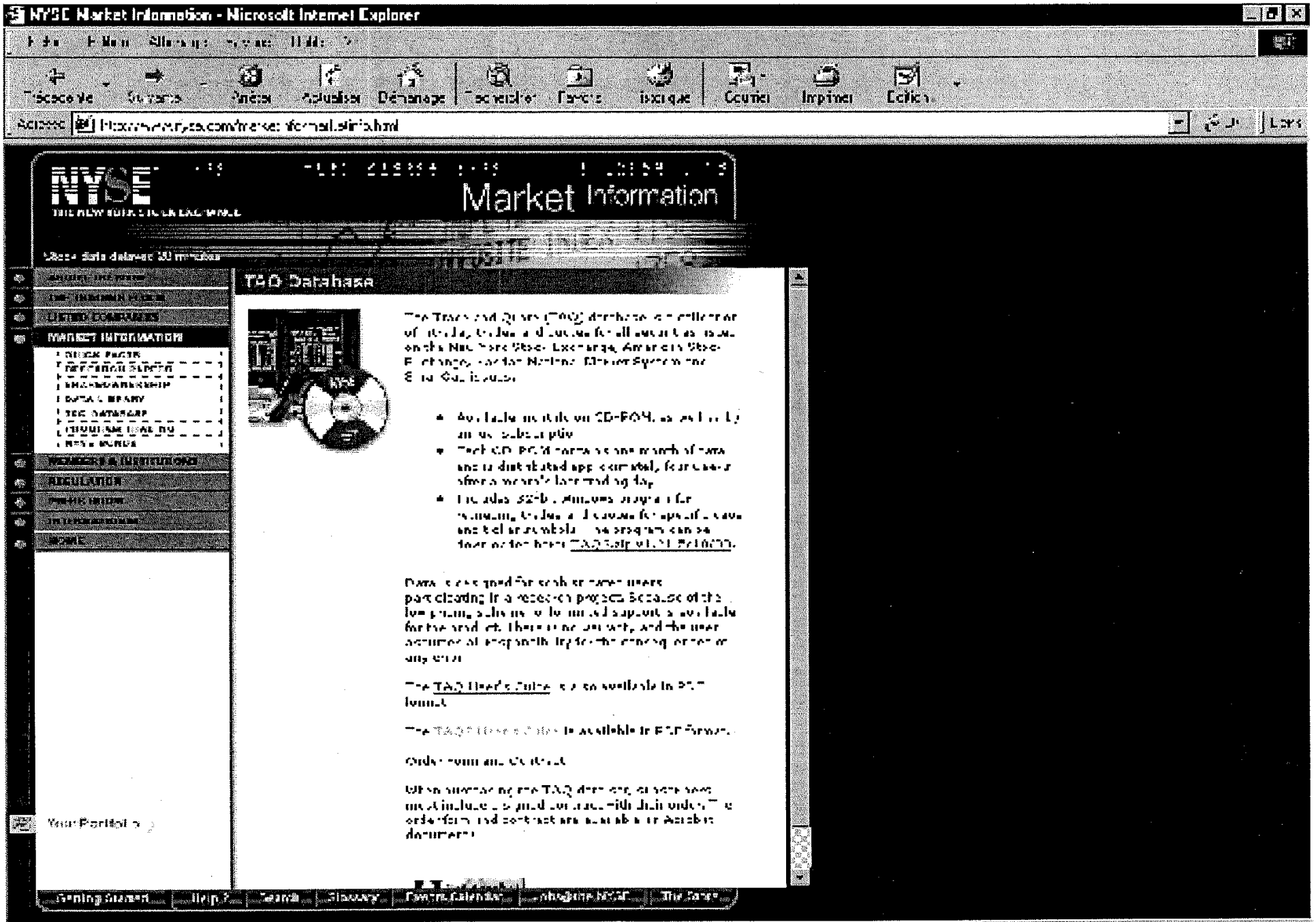
Table 4

Estimated Return Periods and Non-encounter Probabilities for Various Catastrophic Losses (Single Events)

Loss Amounts are billions of 1992 US dollars

Loss	Return period (years)	Std. err.	Non-encounter probability	Std. err.
1.0	0.88	.0028	.3174	.0015
2.0	1.10	.0035	.4000	.0015
3.0	2.68	.0084	.6881	.0015
5.0	6.05	.0192	.8466	.0011
10.0	15.42	.0485	.9382	.0008
15.0	25.15	.0792	.9611	.0006
20.0	35.46	.1125	.9718	.0005

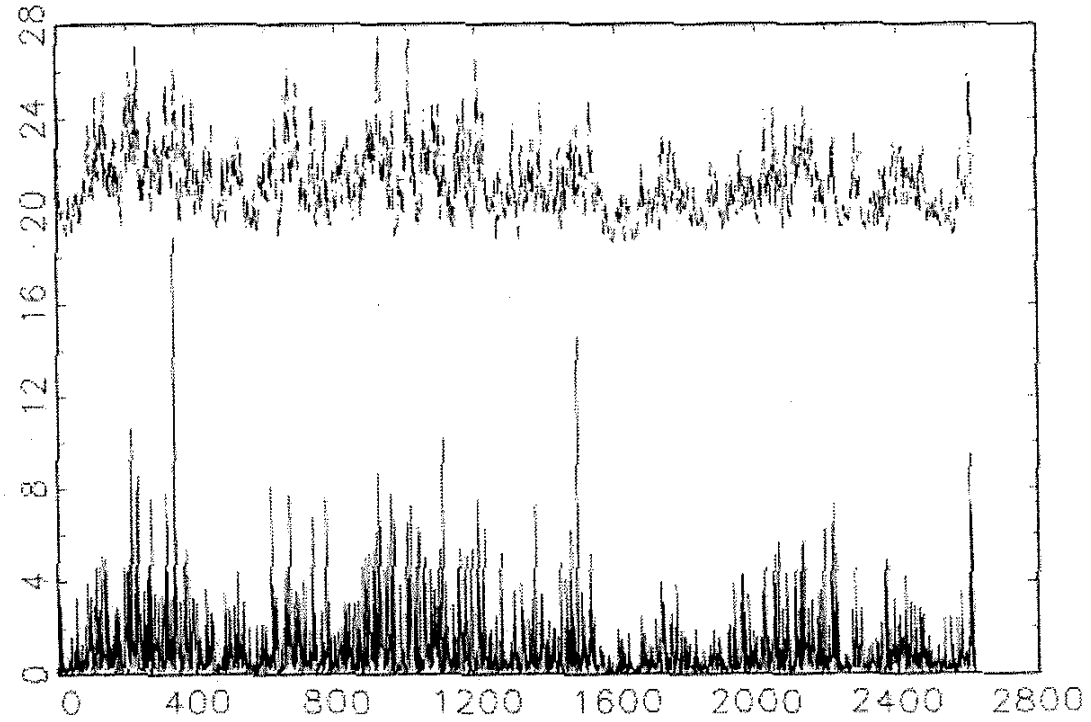
I.3 TAQ Data Base



Trades

SYMBOL	DATE	EX	TIME	PRICE	SIZE	CR	TSEQ	G127
IBM	960903	N	93644	11287500	2600	0	2311350	0
IBM	960903	N	93650	11287500	1800	0	2311360	0
IBM	960903	N	93658	11287500	1000	0	2311380	0
IBM	960903	N	93701	11287500	100	0	2311390	0
IBM	960903	N	93706	11287500	1600	0	2311410	0
IBM	960903	N	93758	11275000	700	0	2311420	0
IBM	960903	N	93828	11275000	300	0	2311440	0
IBM	960903	N	93840	11275000	500	0	2311460	0
IBM	960903	N	93848	11275000	800	0	2311470	0
IBM	960903	N	93857	11275000	200	0	2311490	0
IBM	960903	N	93924	11275000	800	0	2311500	0
IBM	960903	N	93934	11275000	200	0	2311510	0
IBM	960903	N	93956	11275000	100	0	2311520	0
IBM	960903	N	94008	11275000	500	0	2311530	0
IBM	960903	N	94021	11275000	1000	0	2311540	0
IBM	960903	N	94027	11275000	200	0	2311550	0
IBM	960903	N	94040	11275000	2000	0	2311560	0
IBM	960903	N	94045	11262500	1000	0	2311570	0
IBM	960903	N	94101	11262500	1000	0	2311590	0
IBM	960903	N	94115	11262500	200	0	2311610	0
IBM	960903	N	94124	11262500	600	0	2311620	0
IBM	960903	N	94144	11275000	1000	0	2311630	0
IBM	960903	N	94151	11275000	1000	0	2311640	0

V. PP and HFD



Duration Information

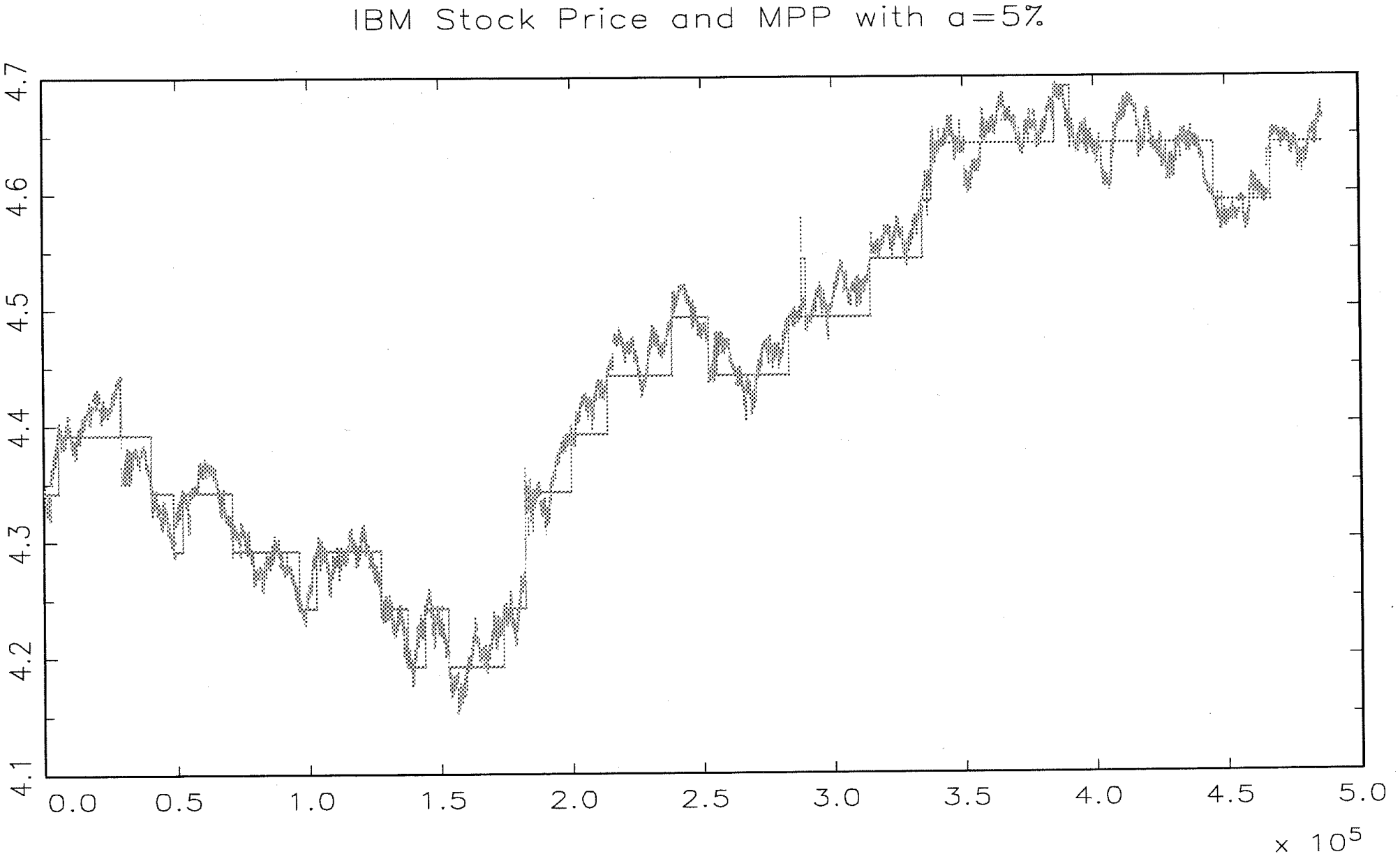
	Boeing	Coca Cola	Disney	Exxon
Observations	**2 620**	**1 609**	**2 160**	**2 717**
Standard Dev	**1,34**	**1 ,17**	**1 ,21**	**1,20**
Mode	**0,11**	**0,09**	**0,11**	**0,14**
Proportion<mode	**0,14**	**0,07**	**0,09**	**0,12**
Min	**0,0048**	**0,0040**	**0,0054**	**0,0046**
Max	**18,9**	**9,2**	**14,5**	**15,0**
Q(1)	**72,1**	**7,7**	**19,1**	**17,5**
Q(10)	**322**	**69,4**	**137**	**68,2**
Q(100)	**949**	**175**	**376**	**165**

Trade Durations and its Seasonality

Trade durations
Dummies approach
Piecewise cubic spline

0 200 400 600 800 1000 1200 1400 1600

0 200 400 600 800 1000 1200 1400 1600 1800 2000


IBM Stock Price and MPP with a=5%
4.7
4.6
4.5
4.4
4.3
4.2
4.1
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
x 10^5

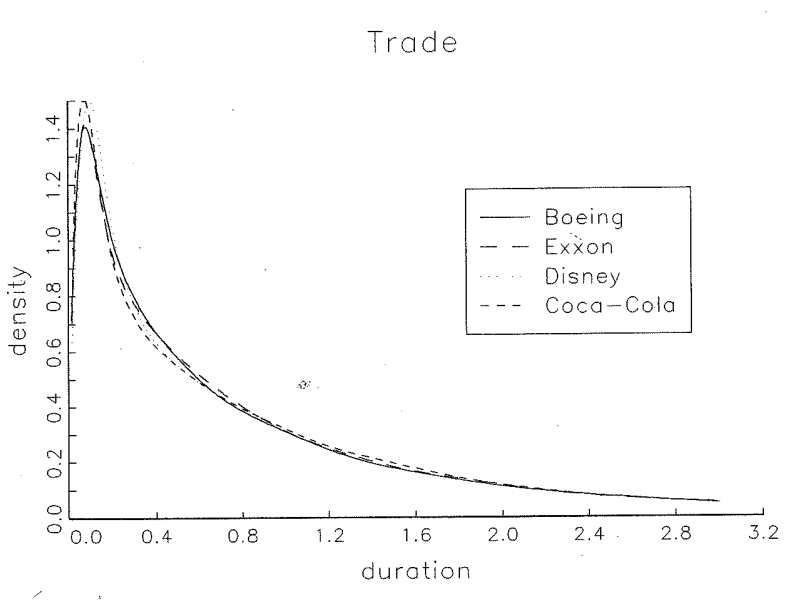


Figure 4.1: Kernel Densities of Trade Durations

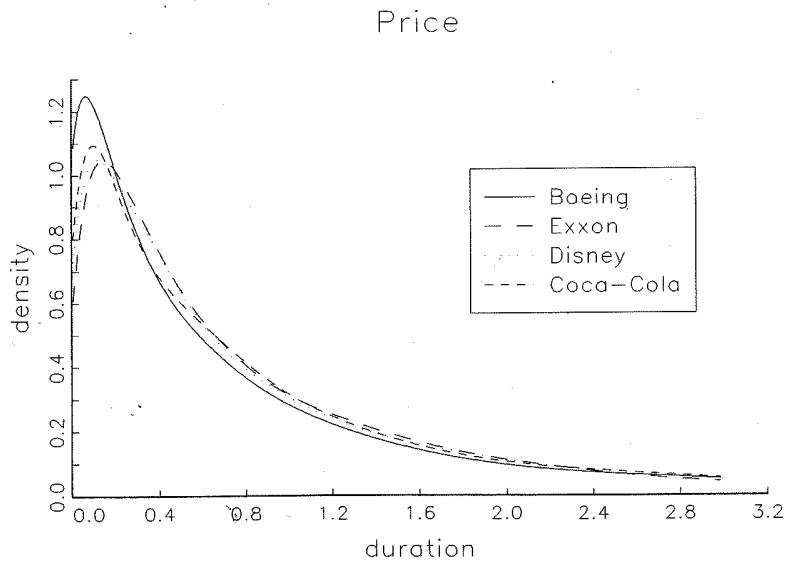


Figure 4.2: Kernel Densities of Price Durations

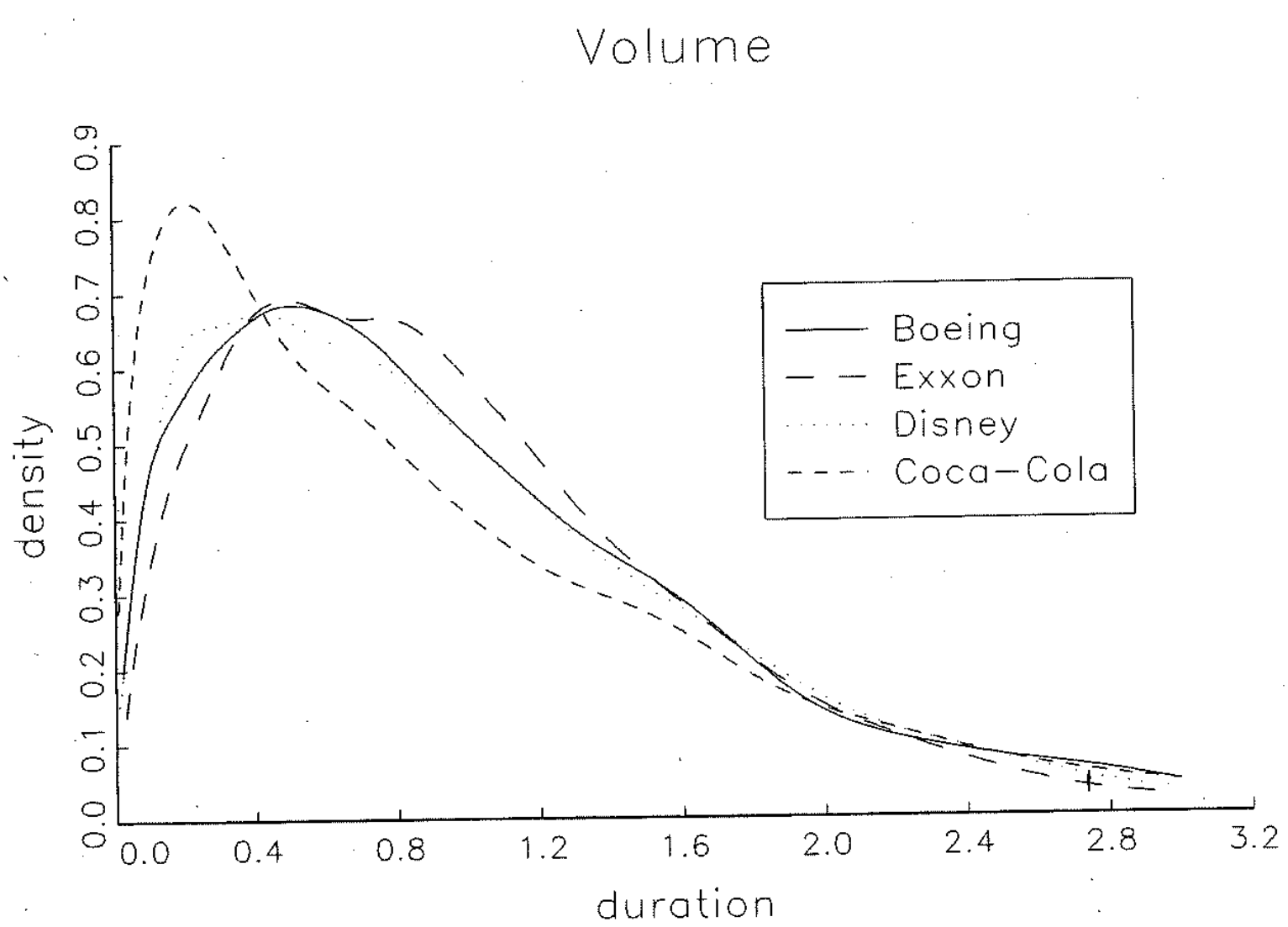
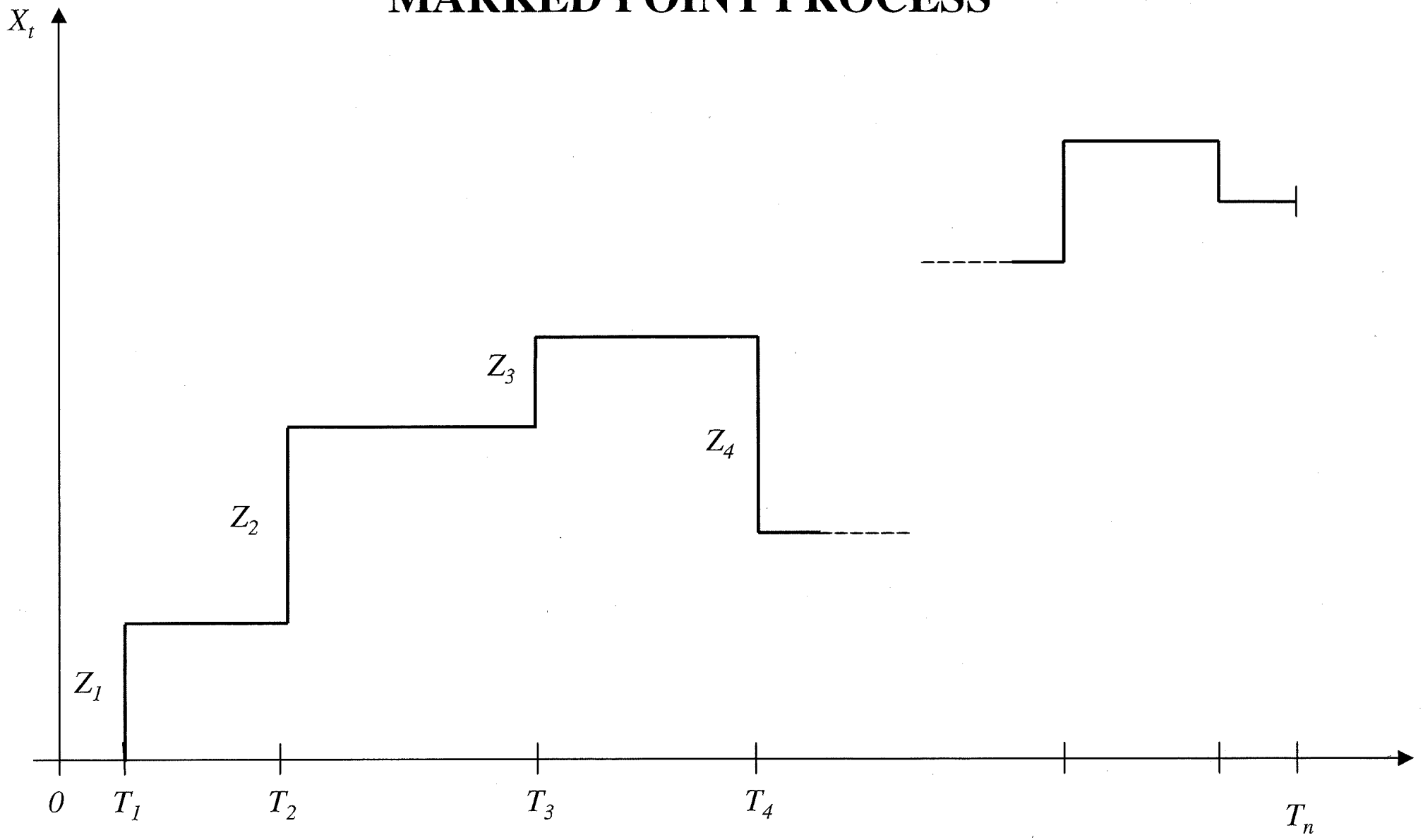
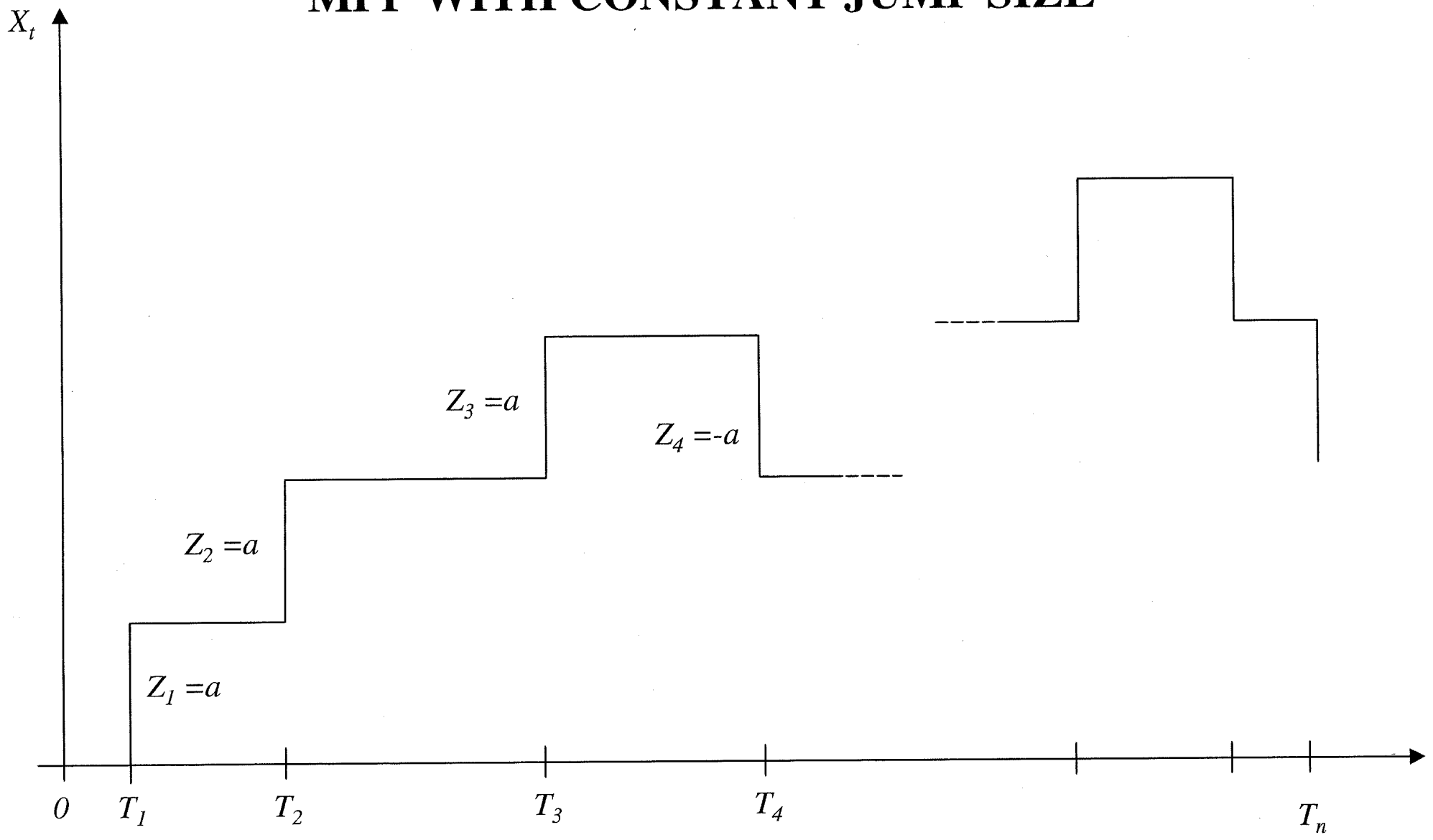


Figure 4.3: Kernel Densities of Volume Durations

MARKED POINT PROCESS



MPP WITH CONSTANT JUMP SIZE



Log of Stock Price and Corresponding MPP