## Index

ABO (accumulated benefit obligation) 62

accounting 193, 195, 310

accounting rules 217, 263

accumulated benefit obligation (ABO) 62

actuarial cost method 63, 65

actuarial deficit 110, 111

actuarial loss 246–7

actuarial surplus 110, 111

actuarial techniques 310

adverse selection bias and defined contribution (DC) pension plans 132, 133, 151, 251

and labour productivity in an aging society 94, 98

and stand-alone collective pension plans 264, 267

age

and civil servant pensions in Hesse, Germany 58–9, 60

and cognitive abilities and intelligence 86, 87

composition of labour force 83, 84

deficit hypothesis 88

and experience 85–6, 89–91, 92, 94, 97

and labour productivity 85, 97, 98

see also labour productivity in an aging society

and physical fitness 86, 97

see also aging society

agency factors, in institutional theory 219–20

agency factors in pension delivery ‘aligned interests’ 234, 235, 240, 263

and governance quality, financial implications 232–3

hypothesis testing 223–7

and ideal delivery 233–5

in integrative investment theory (IIT) 222

and (stand-alone collective pension plans 265

aging society

and defined benefit (DB) pension plans 261–2

and PAYG (pay-as-you-go) pension systems 3, 261, 309

and stand-alone collective pension plans 268

see also age; labour productivity in an aging society; longevity risk; longevity risk sharing; mortality rates; older workers; population aging in Europe; retirees

Akerlof, George 219–20

‘aligned interests’ 234, 235, 240–241, 263

ALM (asset liability management) 82, 178, 196

Almeida, H. 30, 40

Ambachtsheer, Keith P. 221, 222, 227–8

annuitization, in defined contribution (DC) pension plan design 131–40, 147–50, 161–2

annuity providers

competition 239, 255, 282, 302, 317

problems in providing defined contribution (DC) pension plans 139–40

problems in providing defined contribution (DC) pension plans 131–8

annuity rates, and risks in defined contribution (DC) pension plans 132, 147, 148, 161, 163

APRA (Australian Prudential Regulation Authority) 180, 181, 192, 196, 202–3

Asia 297

assembly lines, labour productivity 86, 88–94, 97
asset allocation
and civil servant pension reform in
Hesse, Germany 68–75, 76–7
defined contribution (DC) pension
plans 115–19, 120–121, 122–4, 129, 130, 147–50, 159, 163
Denmark 200–202, 210
market timing 130
Mexico 204, 206, 207, 208, 210
Netherlands 198–9, 210
security selection 130
strategic 130
see also bonds; cash funds; equities;
investment performance;
investment strategies; T-bills
asset liability management (ALM) 82,
178, 196
asset-liability mismatch risk
and guarantees 246, 247–50, 251–2, 253, 256
and pension gambit 44
and risk-based supervision 184, 187, 188–9, 200, 202
asset/liability modelling 65–8, 76
asset management fees 106, 129, 144–5
asset prices 173, 174, 298, 300–301
asset values
and charges in defined contribution
(DC) pension plans 100–101, 129, 143–5
and guarantees 246–7
and risk in defined benefit (DB)
pension plans 110–114
assets, international comparisons 4–5, 171–2
auditors 169, 170, 176, 193, 194, 195
Australia 170, 171, 172, 202–3, 311
see also risk-based supervision in
Australia, Denmark, Mexico
and the Netherlands
Australian Prudential Regulation
Authority (APRA) 180, 181, 192, 196, 202–3
Australian Securities and Investments
Commission 194
average age, and labour productivity in
work teams 86, 90–91
β, and corporate finance approach to
risk management 30, 40, 41, 44
baby boom generation 6–7, 83, 84, 261
back-loaded benefits 274–6, 318
back-loaded charges 100, 145, 153, 162
see also front-loaded charges
BAKIS 167
Bank of Italy 167
Banking Commission (France) 167
bankruptcy risk 30, 41, 236, 251, 267
banks 302–3
see also Bank of Italy; Banking
Commission (France); central
banks; DNB (Dutch National
Bank); ECB (European Central
Bank)
Basel I 167
Basel II 167–8, 175, 176–7, 184, 314
Battle for the Soul of Capitalism, The
(Bogle) 226
Bauer, R. 20, 223–7
Benartzi, S. 145
Berle, Adolf 219
bid-offer spread 12–14, 16–17
binary variation of outcomes, in
convex risk penalty model 29–31, 33
Black, F. 26, 27, 41, 44, 45, 49, 218
Black-Scholes framework 248–9, 256
Blake, David 60, 115, 125–31, 142, 149–50, 151–2
board committees, and risk-based
supervision in Mexico 177, 181, 182–3
boards of governors 232, 283–4
Bodie, Z. 61, 256
Bogle, John C. 226, 232
bond futures 148–9
bonds
and defined benefit (DB) pension
plans 118, 119, 120, 121
and defined contribution (DC)
pension plans 115, 116, 118, 122, 123, 128, 129, 147, 148
Denmark 200
see also bond futures; government
bonds; limited price index
bonds; long-term bonds;
longevity bonds; survivor bonds
borrowing 267
see also credit risk
Börsch-Supan, Axel 94
Index

Brinson, G. 159
Britain see UK
broking fees 106
Burrows, W. 151–2
Caerlewy-Smith, E. 221
Cairns, A. 147–8

call options
and risk-based supervision in
Australia, Denmark, Mexico
and the Netherlands 200, 216
and risk in defined benefit (DB)
pension plans 110–111, 114
and risk in defined contribution
(DC) pension plans 116, 117,
123, 124, 148–9, 151
CAMEL 167
Campbell, J.Y. 20–21
Canada 223–7
Capelle, R. 221, 227–8
capital see capital adequacy; human
capital; international capital flows;
minimum capital requirements
capital adequacy 246, 247–50, 255
see also Basel I; Basel II; insolvency;
solvency; Solvency II
Capital Adequacy Accord see Basel I;
Basel II
capital flows, international 297–8
career-average pension schemes 271
cash flows, and civil servant pension
reform in Hesse, Germany 71
cash funds 115, 147, 148
CEM Benchmarking Inc. 227–8, 229,
234–5
central banks 298, 303
see also Bank of Italy; DNB (Dutch
National Bank); ECB
(European Central Bank)
CEO scores 227–32
CEOs, and OMC (Oversight / Management Costs) 231–2
charges
and agency factors in pension
delivery 225
defined contribution (DC) pension
plans 99–107, 129, 133–8,
139–45, 153, 162–3
chief risk officers (CROs) 181, 182–3
children 278, 279–80
Chile 161–2, 163
China 298
civil servant pensions in Germany 52–6
civil service pension reform in Hesse,
Germany
background to 54–6, 76
conclusions 76–7
discussion 80–82
non-stochastic framework
economic assumptions 60
funding future pension benefits
63–4
implied pension debt for current
civil servants 60–63
mortality patterns 56–8
population dynamics 58–60
stochastic investment returns
further results 75
optimal pension fund asset
allocation with fixed
contribution rate 68–72
pension manager’s obligations and
asset/liability modelling 65–8,
76
simultaneously optimizing
contribution rates and
pension fund asset allocation
72–5
Clark, G.L. 221
cognitive abilities, and age 86, 87
collared income programme 150
collateral assets 245–7
companies
age-related labour productivity 88
financial distress and occupational
pensions 262–3
risk budgets 25, 26
as risk tolerant 25
as value maximizers 24, 25, 28
see also annuity providers; banks;
DaimlerChrysler AG;
employers; IFAs (independent financial advisers); insurance
companies
competition
annuity providers 239, 255, 282, 317
and financial distress of companies
262–3
for labour supply 269
and risk scoring 216
complex contingent defined benefit pensions 14–18
complexity, and risk-based supervision in Australia, Denmark, Mexico and the Netherlands 173, 174
compulsory contributions see mandatory contributions; quasi-mandatory contributions
concave pension gambit 44
concave zone, and corporate finance approach to risk management 41, 42–3, 44
Conditional Value at Risk (CVaR) 67, 68, 69, 70, 71, 72–5
conflicts of interest 234, 240–241, 263, 290
Conley, John 221
Consar 193, 195–6, 204
consumer protection 244
contracts 14, 15, 21, 53
see also contractual pension funds (CPFs); risk sharing contracts; swap contracts
contractual pension funds (CPFs) 239, 240, 241
contrasts of interest 241
contribution holidays 70, 71, 73, 74, 75, 76, 77
contribution rate and civil servant pensions in Hesse, Germany 64, 65, 68–75, 76, 77
flexibility and stand-alone collective pension plans 280–281
risk minimization in defined contribution (DC) pension plan design 119–24, 148
contributions see contribution holidays; contribution rate; defined contribution (DC) pension plan design; defined contribution (DC) pension plans; mandatory contributions; PAYG (pay-as-you-go) pension systems; present value (PV) of future contributions; quasi-mandatory contributions; recovery premiums; reduction in contributions; supplementary contributions (SC); voluntary contributions convex costs 27–8
convex risk penalty model 29–31, 32–9, 49
corporate finance approach 23–4, 27–31, 32–9
corporations see companies costs
and concave zone 41
and convex risk penalty model 30, 31, 34–5, 37–9
private pensions 20–21
see also actuarial cost method; asset/liability modelling; charges; dollar cost averaging; OMC (Oversight / Management Costs); operating costs; sales costs
CPFs (contractual pension funds) 239, 240, 241
credit 267
credit risk 167–8, 256, 263, 290
CROs (chief risk officers) 181, 182–3
cross-border pension provision 312–13
custody fees 106
CVaR (Conditional Value at Risk) 67, 68, 69, 70, 71, 72–5
DaimlerChrysler AG 88–92
Danish Financial Supervisory Authority (DFSA) 188, 193, 196, 315
DAV (German Association of Actuaries) 57–8
default risk 17–18
deferred annuities 148, 149–50, 151, 163, 264, 274
deferred income government securities (DIGS) 151
deficit hypothesis of aging 88
defined benefit (DB) pension plans advantages 20–21
agency factors in pension delivery 223–5
civil service pensions in Germany 52–4
see also civil service pension reform in Hesse, Germany and conflicts of interests 263, 290
demise of 261–3, 290
Netherlands 171, 172, 173
risk 110–114, 118–19, 120, 262–3
Index

risk-based supervision 165, 215
see also risk-based supervision in Australia, Denmark, Mexico and the Netherlands
US 243, 251, 252
defined contribution (DC) pension plan design
charges 99–107, 129, 133–8, 139–45
changing and disguised charging structures 104–7
improvements 140–145, 153, 162–3
reduction in contributions 103–4, 105
reduction in yield 101–3, 104, 105
and risk 133–8, 139–40
types 100–101, 129
conclusion 152–3
design improvements 140–152, 153, 160–164
charges, investment performance and incentives 140–145, 153, 162–3
government amelioration of market failures 151–2
high lapse rates 145–7
investment management and annuitization 147–50
discussion 160–164
fund annuitization 131–40, 147–50
incentives 100, 106, 144, 152–3
income profile 160–161
investment performance 125–31, 140–145, 153, 159, 162
improvements 140–145, 153
managed funds 126–31, 159
unit-linked funds 125–6, 127
investment strategy 109–24, 147–50, 163
improvements 147–50, 163
maximizing risk-adjusted expected value 114–19
minimizing contribution rate risk and surplus risk 119–24
risk, compared to defined benefit (DB) pension plans 109–14, 118–19, 120, 121
lapses 107–9, 145–7
regulation 160–161
defined contribution (DC) pension plans
agency factors in pension delivery 223, 224, 225
Australia 171, 172
Denmark 171, 172
design (see defined contribution (DC) pension plan design)
Italy 238–41
mandatory contributions 134–5, 136, 137–8, 145–7, 151, 161, 311–12
Mexico 171, 172
risk-based supervision 165, 166, 215
see also risk-based supervision in Australia, Denmark, Mexico and the Netherlands
UK 243–4
US 243–4, 251
demographic risk 11
Denmark 170, 171, 172, 199–202, 315
see also DFSA (Danish Financial Supervisory Authority); risk-based supervision in Australia, Denmark, Mexico and the Netherlands
deposit administration plans 115
derivatives 148–9, 200, 202, 204
deterministic lifestyle investment strategy 118–19, 121, 124
developed economies 297, 311–12
DFSA (Danish Financial Supervisory Authority) 188, 193, 196, 315
DIGS (Danish Financial Supervisory Authority) 169
disclosure
Basel II 168
charges in defined contribution (DC) pension plans 104–7
and guarantees 246, 256
risk-based supervision in Australia, Denmark, Mexico and the Netherlands 178–9, 180, 193, 194, 195, 209
Solvency II 169
discontinuity principle 269–70
discount rate
and civil servant pensions in Hesse, Germany 60, 61, 62–4, 75, 76, 82
and risk-based supervision in the Netherlands 184, 185
discounting, and corporate finance approach 28
diversified credit risk 263, 290
DNB (De Nederlandsche Bank) 167, 192, 196
dollar cost averaging 148–9
Drucker, Peter 220, 222
Düzgün, I. 94
early retirement 54, 83
early warning indicators 190, 191, 193
ECB (European Central Bank) 295, 298, 303, 304
economics, and labour productivity in an aging society 88
economies of scale 234–5
efficiency gains 173, 174, 204, 205, 209, 271
emerging economies 297, 298, 311
employee turnover see labour mobility
employees
and civil servant pensions in Hesse, Germany 55–6, 60–63, 76
participation in stand-alone collective pension plan governance 283–4
value in bid-offer spread for complex contingent defined benefit pensions 16–17
value in bid-offer spread for simple defined benefit pensions 12–14
value in complex contingent defined benefit pensions 16, 18
value in Law of One Price 11–12
see also female workers; male workers; older workers; younger workers
employers
default risk in complex contingent defined benefit pensions 17–18
and defined benefit pensions 53 and guarantees 244
and labour market flexibility 279–80
enterprise risk management (ERM) and defined benefit pensions conclusions 44–5
corporate finance approach 27–31, 32–9
discussion 48–50
and history of risk management 24–6
and portfolio management versus modern corporate finance 23–4
present situation 26
shorting the market 31, 40–44, 49
entrepreneurship 279, 318
equities
and defined benefit (DB) pension plans 118, 119, 120, 121
and defined contribution (DC) pension plans 115, 116, 118, 122, 123, 125, 128, 129, 141–2, 147–8, 149, 150
and pension risk management 25–6
and shareholder value 26
equity index 149
ergonomics, and labour productivity in an aging society 87–8
EU 312–13
see also Euro interest rates;
European Central Bank (ECB);
European government bond index fund
Euro interest rates 66–7, 309
Europe
PAYB (pay-as-you-go) pension systems 259–61
pension fund governance 221
risk-based supervision 167–9, 175, 176–7, 184, 314–15
see also risk-based supervision in Australia, Denmark, Mexico and the Netherlands
see also EU; population aging in Europe; individual countries
European Central Bank (ECB) 295, 298, 303, 304
European government bond index fund 65, 66, 67, 68, 69, 70–71, 73, 74, 76
Excellence in Pension Fund Management (Ambachtsheer ... et al.) 221
expected present value (EPV), and charges in defined contribution (DC) pension plans 133
expected utility maximizers 24, 25
expected value maximization, risk-adjusted see risk-adjusted expected value maximization
experience, and age 85–6, 89–91, 92, 94, 97
explicit state government debt, and civil servant pensions in Hesse, Germany 61, 62, 76
factor prices 296
fair value accounting 310
fair values
bid-offer spread 12–14, 16–17
complex contingent defined benefit pensions 14-18
conclusions 18–19
discussion 20–21
Law of One Price (see Law of One Price)
practical applications 8–9
families 278, 279–80
Farr, James L. 87
fees see asset management fees; broking fees; charges; custody fees; transfer fees
female retirees 56
female workers
and civil servant pensions in Hesse, Germany 55, 56
and defined contribution (DC) pension plans 115, 116–17, 118
and labour productivity in mixed gender work teams 92
females 134–5, 137–8
see also female retirees; female workers
fertility rates 6, 259–60, 278
final salaries
and civil service pensions in Germany 54
and defined contribution (DC) pension plans 115, 121, 122, 160–161
and risk-based supervision in the Netherlands 197–8
financial distress
and convex risk penalty model 30, 31
and corporate finance approach to risk management 30, 31, 40, 49
and occupational pensions 262–3
and stand-alone collective pension plans 267–8, 271, 272, 281, 291
financial education 244, 282–3, 304, 317
see also financial illiteracy
financial engineering (FE), in integrative investment theory (IIT) 222
financial illiteracy
and agency factors in pension delivery 226–7
and defined contribution (DC) pension plans 161
and guarantees 244
and individual risk 6, 21, 304
and stand-alone collective pension plans 264
Financial Institutions Risk Analysis Method (FIRM) 167, 190, 192–3, 196, 197
financial instruments 303–4
financial intermediation 5, 20–21, 282, 302–3
financial markets 139
financial planning 280–283
Financial Services Authority (FSA) 102, 109, 167
Finkelstein, A. 133–8
FIRM (Financial Institutions Risk Analysis Method) 167, 190, 192–3, 196, 197
firms see companies
Fisher-Margrabe exchange options 113–14
Fisher Separation Theorem 24, 25
fixed contribution rate (CR), and civil servant pension reform in Hesse, Germany 68–72
flexible financial planning 280–283
flexible income programmes 149–50
flexible labour markets 278–80
flexible liabilities 270
floored income programme 150
fluctuating benefits, and stand-alone collective pension plans 292
fluctuating funds 268–9
Fortune and Folly (Conley and O’Barr) 221
France 167
front-loaded charges 100, 104, 106, 144, 145
see also back-loaded charges
Froot, K.A. 30
FSA (Financial Services Authority)
102, 109, 167
full maturity values, in defined contribution (DC) pension plans
105–6
fund value see asset values
future generations see
intergenerational benefits; intergenerational risk; intergenerational risk sharing
futures 148-149

General Theory of Employment, Interest and Money, The (Keynes)
219
German Association of Actuaries (DAV) 57–8
German Federal Supervisory Office
167
Germany 52–6, 167, 244
see also civil service pension reform
in Hesse, Germany; labour productivity in an aging society
gerontology, and labour productivity in an aging society 87
global equity index fund 65, 66, 68, 69, 70–71, 73, 74, 75, 76, 77
Global Pension Statistics (OECD) 4
Gold, J. 41, 44, 62
Gollier, C. 20
‘good governance’ 234–5
Goode Report 151
governance quality 221–2, 317
governance quality in pension delivery agency factors, financial implications 232–3
economies of scale 234–5
‘good governance’ 234–5
hypothesis testing 227–8
ideal delivery 233–5
importance 309–10
in integrative investment theory (IIT) 222
NVA-CEO coefficients 229–31
and organization performance 228–9
stand-alone collective pension plans 283–4
government bonds 52–3, 60, 139, 149, 151, 318
see also European government bond index fund
Government Investment Fund of Japan 309–10
governments
confidence in 255
and guarantees 244–5, 251–2, 253
see also PBGC (Pension Benefit Guaranty Corporation); PPF (Pension Protection Fund)
political risk in stand-alone collective pension plans 269–70, 292
and PPPs (Personal Pension Plans) 151–2
growth 295–7
see also productivity growth
growth, long-term, and population aging 295–7
guarantees
asset-liability mismatch risk and capital adequacy 247–50, 251–2, 253, 256
defined benefit (DB) pension plan demise 261–3
defined contribution (DC) pension plans 161, 172, 173, 244
disclosure 246, 253, 256
discussion 255–7
and governments 244–5, 251–2, 253
importance 244
and managed funds 244
and occupational pension schemes 244–5
PBGC (Pension Benefit Guaranty Corporation) 41, 44, 49, 243, 251–2
PPF (Pension Protection Fund) 44, 49
policy recommendations 253
pricing 246–50, 256
principles 245–7
and risk-based supervision in Australia, Denmark, Mexico and the Netherlands 172, 173, 199, 215–16
and stand-alone collective pension plans 267, 270, 273–4, 292
and swap contracts 252, 253, 256
 guarantors, and corporate finance approach to risk management 41, 44, 49

hard obligations see guarantees
health, and labour productivity 87–8
hedging
and convex risk penalty model 27–8, 35, 38–9
and corporate finance approach to risk and defined benefit (DB) pensions 27–8, 31, 35, 38–40, 44, 45
and defined contribution (DC) pension plans 147–9
and guarantees 246, 252, 253
and risk-based supervision in Denmark and the Netherlands 197, 200, 216
Henderson, R. 57
Henkens, K. 255
Hesse, Germany 54–6
see also civil service pension reform in Hesse, Germany
Holland see Netherlands
households see individuals
human capital
and defined benefit (DB) pension plans 261–2
and labour market flexibility 278, 279–80, 318
and longevity risk 147, 148, 276, 277
and PAYG (pay-as-you-go) pension systems 259–60
and retirement age increases 278
and stand-alone collective pension plans 266, 267, 268–9, 270, 274, 277, 278, 279–80, 316
and stochastic lifestyling 147, 148

IAIS (International Association of Insurance Supervisors) 168
ICPM (International Centre for Pension Management) 223, 227, 234
idiosyncratic risk 27, 28

IFAs (independent financial advisers) 20–21, 107–8
IIT (Integrative Investment Theory) of pension delivery see Integrative Investment Theory (IIT) of pension delivery
implicit taxes 268–70
implied pension debt for current civil servants, in Hesse, Germany 60–63
Improving Pension Fund Performance (Ambachtsheer, Capelle and Scheibelhut) 221
incentives, defined contribution (DC) pension plans 100, 106, 144, 152–3
income profile, and defined contribution (DC) pension plan design 160–161
independent financial advisers (IFAs) 20–21, 107–8
indexation
and civil servant pension reform in Hesse, Germany 81
and defined benefit (DB) pension plans 118
and defined contribution (DC) pension plans 149–50, 151, 163
long-term bonds 303
longevity bonds 277, 317–18
and stand-alone collective pension plans 264, 266, 271, 277–8, 291
individual risk 6, 21, 303
individuals
differences in age-related labour productivity 85, 86–7, 88
as expected utility maximizers 24, 25
inadequate pension provision 146–7
information needs 282, 317
investment decisions 21
risks in defined contribution (DC) pension plans 133–8, 139
taylor-made policies 281–2, 302–3
see also children; employees; families; females; financial illiteracy; individual risk; males; parents; retirees; spouses
inflation risk
and civil servant pensions in Hesse, Germany 60, 62, 82
and defined benefit (DB) pension plans 113
and defined contribution (DC) pension plans 122, 132, 139, 147, 148, 151
information, for individuals 282, 317
information asymmetry
and agency factors 220
and agency factors in pension delivery 226, 234, 240, 241
and defined contribution (DC) pension plans 132, 161
information processing, and age 86
insolvency 173–4
see also bankruptcy risk; capital adequacy; solvency
institutions of pension delivery 219–22
see also Integrative Investment Theory (IIT) of pension delivery
Insurance companies 6, 131–40, 315
integration of supervisory agencies 173, 175
Integrative Investment Theory (IIT) of pension delivery
agency and governance factors, financial implications 232–3
agency hypothesis testing 223–7
CEO scores and NVA 229–31
CEO scores and OMC (Oversight/Management Costs) 231–2
described 222
discussion 238–41
governance hypothesis testing 227–8
governance quality and organizational performance 228–9
and ideal pension delivery 233–5
NVA-CEO coefficient 229-231
intelligence, and age 87
interest rate crises 1, 6, 139, 166, 199–201, 211–12, 215–16, 251, 309
interest rates
and civil servant pension reform in Hesse, Germany 66–7, 82
and civil servant pensions in Hesse, Germany 60, 62
Euro zone 66–7
and risk-based supervision in the Denmark 200–201
and risk-based supervision in the Netherlands 184, 185
risks in defined contribution (DC) pension plans 132, 139, 147, 148, 149, 166, 199–201, 215
see also Euro interest rates; interest rate crises; real interest rates
intergenerational benefits 77
intergenerational risk 259–60
intergenerational risk sharing 20, 266–8, 269–70, 271
International Association of Insurance Supervisors (IAIS) 168
international capital flows 297–8
International Centre for Pension Management (ICPM) 223, 227, 234
international risk-based supervision 169–70
international risk sharing 253
investment see asset allocation;
Integrative Investment Theory (IIT) of pension delivery;
investment beliefs; investment decisions; investment performance; investment strategies; investment theory;
liability-driven investment (LDI)
investment beliefs 222
investment decisions 21
investment performance
and civil servant pensions in Hesse, Germany 60
defined contribution (DC) pension plan design 125–31, 140–145, 153, 159, 162
and governance quality in pension delivery 227–8, 229–31
mutual funds versus pension plans 20–21
stand-alone collective pension plans 292
investment strategies 109–24, 147–50, 163
investment theory 218
IOPS 312–13
Iso-CVaR (Conditional Value at Risk)
  curve 72–5
  Italy 167, 238–41

Japan 297, 309–10
Jin, L. 256
joint-and-survivor annuities 59

Keynes, John Maynard 219
Klein, Stephanie R. 87
Kocken, Theo 256, 263
Koedijk, K. 255
Kotlikoff, Laurence J. 88

labour agreements 170
labour force, age composition 83, 84
labour market flexibility 278–80, 318
labour mobility
  and back-loaded benefits 274–5, 318
  in civil service in Germany 54, 59, 62, 80
  and stand-alone collective pension
  plans 268–9, 270
labour productivity
  older workers 83, 87, 90, 93, 94, 97
  and retirement age 83, 98
  younger workers 87
labour productivity in an aging society
  conceptual framework 84–6
  economics, lessons from 88
  ergonomics, lessons from 87–8
  gerontology and sociology, lessons
  from 87
  and growth 295–6
labour force age composition 83, 84
occupational medicine, lessons from
86–7
work teams, empirical research
  conclusion and outlook 92–4
  discussion 97–8
  results 1: age and experience
  89–91, 92, 93
  results 2: team composition 91–2, 93
sample and methods 88–9
labour supply, competition 269
labour utilization, growth, in an aging
society 295–6
lapses, in defined contribution (DC)
pension plan design 107–9, 145–7

Law of One Price
  advantages 19
  bid-offer spread 12–14
  described 9–10
  value to employee 11–12
  value to shareholder 10–11
LDI (liability-driven investment) 26, 48, 252, 270
legislation
  and mandatory contributions 170,
  171, 244–5
Pension Protection Act 2006 (US)
  251–2
legitimacy 220
Lehmann, B. 126–31, 142
Leibowitz, M.L. 26
liabilities
  and risk in defined benefit (DB)
  pension plans 111, 112–14,
  120–121, 122, 123, 124
  and stand-alone collective pension
  plans 270–274
  see also asset-liability mismatch risk;
  asset/liability modelling;
  liability-driven investment
  (LDI); liability-immunizing
  portfolio (LIP); present value
  (PV) of future pension liabilities
liability-driven investment (LDI) 26, 48, 252, 270
liability-immunizing portfolio (LIP)
  122
life annuities 149, 150
life-cycle financial planning 282,
  302–3
life-cycle hypothesis of saving 296,
  299–300
life-cycle investment 267, 274
life expectancy 6–7, 277–8, 295, 296–7
  see also aging society; longevity risk;
  mortality rates; population
  aging in Europe
limited price index bonds 151
LIP (liability-immunizing portfolio)
  122
liquidity constraints, and defined
  benefit pensions 21
long recovery horizon, and stand-alone
  collective pension plans 272
long-term bonds 297, 301, 303
long-term growth, and population aging 295–7
long-term investment 82, 115, 264, 270
see also global equity index fund; life-cycle investment
longevity see life expectancy; longevity risk; longevity risk sharing
longevity bonds 151–2, 269, 277, 317
longevity risk
and defined contribution (DC) pension plans 132, 137, 138, 139, 151–2
and funded pension schemes 276 and risk-based supervision in Denmark and the Netherlands 184, 185, 193, 197 and stand-alone collective pension plans 269, 276–8, 291
longevity risk sharing 276–8
Lum, H. 223–8
Lunde, A. 125, 126, 127, 142
Lusardi, A. 6

macroeconomic stability, and stand-alone collective pension plans 271, 272
Maier, G. 87
male retirees 56
male workers
and civil servant pensions in Hesse, Germany 55
defined contribution (DC) pension plans 115, 116–17, 118
and labour productivity in mixed gender work teams 92
males 134, 136–8
see also male retirees; male workers
managed funds 115, 126–31, 141–2, 159, 244
mandatory contributions
Australia 170, 171
defined contribution (DC) pension plans 134–5, 136, 137–8, 145–7, 151, 161, 311–12
international perspectives 311–12
Mexico 170, 171
and stand-alone collective pension plans 264, 267, 282, 291
see also quasi-mandatory contributions
market discipline
Basel II 168
risk-based supervision 169, 170, 176–7
risk-based supervision in Australia, Denmark, Mexico and the Netherlands 178–9, 180, 193–4, 195, 209, 211, 216–17
market failures 151–2
see also inflation risk; longevity risk
Market for Lemons, The (Akerlof) 220
market participants 169, 170, 176
markets 216
see also market discipline; market failures; market participants
Markowitz, H. 25, 218, 222
Marshall, J.C. 221
maximizing risk-adjusted expected value, in defined contribution (DC) pension plan design 114–19, 163
Means, Gardiner 219
Merton, Robert C. 27, 41, 44, 49
minimizing contribution risk and surplus risk, in defined contribution (DC) pension plan design 119–24
minimum capital requirements 169, 188
minimum solvency requirements 184, 185–6, 187
mis-valuation, and complex contingent defined benefit (DB) pensions 15
mismatch risk see asset-liability mismatch risk
Mitchell, Olivia S. 6, 146–7
Modern Corporation and Private Property, The (Berle and Means) 219
Modigliani-Miller conditions, corporate finance approach to risk and defined benefit (DB) pensions 27, 41, 44, 49
monetary policy, and population aging in Europe 293–4, 298–9, 303, 305
Money Management 102, 103, 104
moral hazard 147, 244, 250, 267
mortality improvements 151, 152, 184, 185, 277
mortality rates
and civil service pensions in Hesse, Germany 56–8
and defined contribution (DC) pension plans 132, 133, 136, 137, 138, 150, 151, 152
and risk-based supervision in Netherlands 184, 185
motivation, and labour productivity 98
mutual fund 20–21, 223, 224, 225, 226–7, 232–3, 234
National Pensions Savings Scheme 143, 145
net present value (NPV) projects 28, 29, 30
net value added (NVA) 223–5
net value added (NVA)-CEO coefficients, in governance quality in pension delivery 229–32
Netherlands
confidence in pension funds and insurers 255
pension system 170, 171, 172, 197–9, 244–5, 311–12, 316–17
risk-based supervision 167
see also risk-based supervision in Australia, Denmark, Mexico and the Netherlands
see also stand-alone collective pension plans in the Netherlands
Newton Managed Fund 144–5
North America 221, 223–7
see also US
NPV (net present value) projects 28, 29, 30
NVA-CEO coefficients, in governance quality in pension delivery 229–32
NVA (net value added) 223–5, 229–31, 234–5
O’Barr, William 221
objective function, and civil servant pension reform in Hesse, Germany 68, 81
obligations 62, 273–4
see also guarantees; PBO (projected benefit obligation)
occupational funds 171
occupational medicine, and labour productivity in an aging society 86–7
occupational pensions
and aging society 261–2
Denmark 315
and financial distress of companies 262–3
Netherlands 170, 171, 244–5
US 243
OECD countries 297
OECD Global Pension Statistics 4
offer-bid spread 12–14, 16–17
Office of Fair Trading 153
old-age pensioners see retirees
older workers
and back-loaded benefits 275
experience 85–6, 90, 92, 94
and labour market flexibility 279
and labour productivity 83, 87, 90, 93, 94, 97
and stand-alone collective pension plans 271, 276, 279
in work teams 89–90, 91–2, 93, 94
OMC (Oversight / Management Costs) 231–2, 234
open economy models 297, 298
open pension funds (OPFs) 239, 240
operating costs 246
option pricing theory, and capital adequacy and asset-liability mismatch risk 247–51
option valuation theory 218
organization performance, and governance quality in pension delivery 228–9
organization theory 218–22
Oversight / Management Costs (OMC) 231–2, 234
paid-up plans (PUPs) 104–5, 106
PAIRS (Probability and Impact Rating System) 189, 190, 196, 202, 203
parents 278, 279–80
part-time employment 279
participation, of employees in stand-
only collective pension plan
governance 283–4
PATROL 167
PAYG (pay-as-you-go) pension systems
3, 259–61, 275, 309
PBGC (Pension Benefit Guaranty
Corporation) 41, 44, 49, 243,
251–2
PBO (projected benefit obligation)
and civil servant pension reform in
Hesse, Germany 65, 68–70, 71,
72, 73, 74, 75
and civil servant pensions in Hesse,
Germany 61–2
pension accelerator 268
Pension Benefit Guaranty Corporation
(PBGC) 41, 44, 49
Pension CEO scores see CEO scores
pension debt, and civil servant in
Hesse, Germany 60, 61, 62
Pension Fund Trustee Competence
(Clark, Caerlewy-Smith and
Marshall) 221
pension gambit 41, 44
pension guarantees see guarantees
pension increases, civil servant
pensions in Hesse, Germany 61,
63, 64
Pension Protection Act 2006 (US)
251–2
Pension Protection Fund (PPF) 44, 49
pension rights 271–2, 275, 291, 292, 318
Pensions Commission 143
‘perfect storm’ of declining interest
rates 1, 6, 139, 166, 200–201,
215–16, 251, 309
performance-related charges, and
defined contribution (DC)
pension plans 143–5, 153, 162
persistency rates, and defined
contribution (DC) pension plans
107–9
Personal Accounts 312
personal insurance policies (PIPs) 239,
240
Personal Investment Authority (PIA)
107–8
Personal Pension Plans (PPPs) see
PPPs (Personal Pension Plans)
Philippon, T. 30, 40
physical fitness, and age 86, 97
PIA (Personal Investment Authority)
107–8
PIPs (personal insurance policies) 239,
240
policy ladders 266
political risk 269–70, 275, 291
population aging in Europe
and financial markets 299–302
and international capital flows 297–8
and long-term growth 295–7
and monetary policy 293–4, 298–9,
303, 305
and real interest rates 297
see also aging society
population dynamics, and civil service
pensions in Hesse, Germany 58–60
portfolio management, versus modern
corporate finance 23–4
portfolio theory 218, 222
portfolio value, and civil servant
pension reform in Hesse,
Germany 65–6
Poterba, J. 133–8
poverty alleviation, and PAYG (pay-as-
you-go) pension systems 260–261
PPF (Pension Protection Fund) 44, 49
PPPs (Personal Pension Plans)
charges 100, 102, 103, 104, 153, 264
fund annuitization 131–40, 147–50,
161
government amelioration of market
failures 151–2
history 99
incentives 100, 106, 144, 152–3
investment performance 125–31,
141–3, 153
investment strategies 115–18, 147–50
lapses 107–8, 109, 145–7
withdrawal 100
present value (PV) of future
contributions 112, 148
present value (PV) of future pension
liabilities 63–4, 67, 110
present value (PV) of future salaries
63, 64
price caps 162
price indexation 151
price stability 298, 299, 305
pricing, and guarantees 246–50, 256
pricing kernel 28, 30
principle-agent problem see agency factors, in institutional theory; agency factors in pension delivery
principle-based regulation 312–13
private pensions 20–21, 238–41, 312
Probability and Impact Rating System (PAIRS) 189, 190, 196, 202, 203
productivity see labour productivity; productivity growth
productivity growth 113, 122, 147–8
professional governance 317
projected benefit obligation (PBO) see PBO (projected benefit obligation)
‘prudent person’ principle 312
PUPs (paid-up plans) 104–5, 106
put option
and risk in defined benefit (DB) pension plans 110–111, 114
and risk in defined contribution (DC) pension plans 116, 117, 123, 124, 150
PV (present value) of future contributions 112, 148
PV (present value) of future pension liabilities 63–4, 67, 110
PV (present value) of future salaries 63, 64
quasi-mandatory contributions 170, 171, 244, 311–12
RAST 167
RATE 167
real GDP growth 295
real interest rates 60, 67, 296–7, 298, 302
recovery horizon 272
recovery premiums 266–70
reduction in contributions 103–4, 105, 108–9, 143
reduction in yield
and aging society 297, 302, 303
in defined contribution (DC) pension plan design 101–3, 104, 105, 108–9, 140, 143
regulation 102, 160–161
see also principle-based regulation; risk-based supervision
reinvestment risk 132–3
rent-seeking 219
retail costs 13, 17
retail price index 151
retirees
and civil servant pensions in Hesse, Germany 55, 56, 59–60, 61, 62, 76
and stand-alone collective pension plans 272, 273, 277, 291, 292
retirement age
and civil servant pensions in Hesse, Germany 59–60, 61
increasing, and human capital investment 278, 318
and labour productivity 83, 98
see also early retirement risk
defined benefit (DB) pensions 110–114, 118–19, 120, 262–3
defined contribution (DC) pension plans 109–14, 115, 116–17, 125
diversification 263
and investment strategy in defined contribution (DC) pension plan design 109–14
to shareholder in complex contingent defined benefit (DB) pensions 14–15
see also asset-liability mismatch risk; bankruptcy risk; convex risk penalty model; credit risk; CROs (chief risk officers); CVaR (Conditional Value at Risk); default risk; demographic risk; enterprise risk management (ERM) and defined benefit pensions; FIRM (Financial Institutions Risk Analysis Method); idiosyncratic risk; individual risk; inflation risk; intergenerational risk; Iso-CVaR (Conditional Value at Risk) curve; longevity risk; political risk; reinvestment risk; surplus risk; systematic risk; terminal fund risk; VaR (Value at Risk)
risk-adjusted expected value maximization 114–19
risk aversion and convex risk penalty model 30–31
and defined benefit (DB) pension plan design 118, 119
and defined contribution (DC) pension plan design 114–15, 116, 118
risk awareness 244
risk-based solvency rules and defined benefit (DB) pension plans 290
and obligations 273–4
and risk-based supervision 170, 174, 176, 210–211
Australia 177, 178–9, 180, 186, 188
Denmark 177, 178, 180, 185–6, 187–8, 199, 201, 208
Mexico 177, 179, 180, 186, 188–9
Netherlands 177, 178, 184, 185, 187, 197–8, 273–4, 310
risk-based supervision conceptual origins 167–70
EU 312–13
Europe 167–9, 175, 176–7, 184, 314–15
see also risk-based supervision in Australia, Denmark, Mexico and the Netherlands
risk-based supervision in Australia, Denmark, Mexico and the Netherlands concluding observations 206, 208–12
discussion 215–17
elements 175–96
common objectives and design elements 175–7
internal structure of supervisory agency 178–9, 180, 194–6
market-based discipline and third parties 178–9, 180, 193–4, 195, 216–17
overview of main components 177–80
regulatory requirements for risk management architecture 177, 178–9, 180–184
risk-based solvency rules 177, 178–9, 180, 184–9, 197–8, 199, 210–211, 273–4, 310
supervisory risk scoring systems 178–9, 180, 189–93, 196, 216
impacts 196–206
Australia 202–3
Denmark 199–202
Mexico 204–6, 207, 208
Netherlands 197–9
introduction 170–175
motivating factors for adoption of risk-based supervision 172–5
overview of pension systems 170–2
and ‘perfect storm’ of declining interest rates 166, 200–201, 215–16
risk budgets 25, 26
risk disposal 29
risk retention 29
risk scoring
and risk-based supervision 170, 176
and risk-based supervision in Australia, Denmark, Mexico and the Netherlands
risk sharing 81, 253, 265–70, 280, 291, 316–17
see also intergenerational risk sharing; longevity risk sharing
risk sharing contracts 264–6, 283
risk specification 222
risk tolerance 25, 280–281
rules see accounting rules; policy ladders; risk-based solvency rules; standards
salaries 55–6, 58, 59, 88
see also career-average pension schemes; final salaries; PV (present value) of future salaries; salary increases
salary increases 60, 61, 62, 63, 64
sales costs 13, 17
‘save more tomorrow’ pension plans 145
saving, life-cycle hypothesis 296, 299–300
‘savings gluts’ 298
scarce supervisory resources 173, 174–5
Scharfstein, D.S. 30
Scheibelhut, T. 221
Scholes, Myron 218
see also Black-Scholes framework
securities; deferred income 151
Securities and Investments Commission (Australia) 194
security selection 130
selection bias see adverse selection bias
service industries 94
shareholder value 10–11, 14–16, 17–18, 26, 40, 44
Sharpe, W.F. 25–6, 41
shortfall risk see surplus risk
shorting the market, and corporate
finance approach to risk management 31, 40–44, 49
skills, and labour productivity 87
Slade, P. 104–5, 106
Slager, A. 255
Smith, C.W. 27, 30–31
Smith, E. Caerlewy—see Caerlewy—Smith, E.
SOARS 189, 191, 196, 202, 203
sociology, and labour productivity in an aging society 87
soft obligations 273–4
 solvency 168–9, 176–7
see also bankruptcy risk; Basel I; Basel II; capital adequacy; insolvency; minimum solvency requirements; risk-based solvency rules; solvency buffers; Solvency II
solvency buffers 184, 185–6, 187–8, 197, 210
Solvency II 168–9, 175, 176–7, 314–15
specialist risk units 169, 170
sponsors, role of 216–17
spouses 59
SPPs (Stakeholder Pension Plans) 102–3, 104, 143
stand-alone collective pension plans back-loaded benefits, reducing 274–6, 318
described 264–5, 291
and financial planning flexibility 280–283
and human capital 266, 267, 268–9, 270, 274, 277, 278, 279–80, 316
and labour market flexibility 278–80
stand-alone collective pension plans in the Netherlands back-loaded benefits, reducing 274–6
conclusions 284–5
discussion 290–292
governance improvements 283–4
liability restructuring 270–274
longevity risk sharing 276–8, 291
risk sharing and recovery of premiums 266–70, 291
risk sharing contracts 265–6, 283
standards 246, 255
see also accounting rules; risk-based solvency rules
state debt, and civil servant pensions in Hesse, Germany 61, 62–3, 76
Stein, J.C. 30
stochastic lifestyling 147–8
stock prices 247, 248–50, 251
strategic asset allocation 130, 159
stress tests 177, 178, 184, 185–6, 187–8, 190–191, 193, 200, 210
Stulz, R.M. 27, 30–31
Supan, Axel Börsch- see Börsch-Supan, Axel
supranational licensing 203, 210
supervision see risk-based supervision
supervisory agencies
internal structure and risk-based supervision in Australia, Denmark, Mexico and the Netherlands 178–9, 180, 194–6
risk management architecture 169, 170, 176
supervisory review 168, 169
supplementary contributions (SC) and civil servant pension reform in Hesse, Germany 64, 67–8, 70, 71, 73, 74, 75, 77
and stand-alone collective pension plans 281, 317
surplus 110, 111, 114, 121–2
surplus risk 112–13, 114, 119–24
see also guarantees
survivor bonds 151–2
swap contracts 252, 253, 256
systematic risk 27, 28, 44, 45

T-bills
and defined benefit (DB) pension plans 118–19, 120, 121
and defined contribution (DC) pension plans 115, 116, 118, 122, 123, 147, 148
tax benefits 277–8
taxes
and convex risk penalty model 30
and corporate finance approach to risk and defined benefit pensions 27–8, 41, 44, 45, 49
and poverty alleviation 260–261
see also implicit taxes; tax benefits
taylor-made policies 281–2, 302–3
Tepper, I. 26, 27, 41, 44, 45, 49
terminal fund risk 116, 117, 118
Tesluk, Paul E. 87
TFR 239
Thaler, R. 145
time, and capital adequacy and matching restrictions’ trade-off 247–51
Timmermann, A. 125–31, 142
Towers Perrin 106
traffic light stress test 177, 178, 185–6, 187–8, 190–191, 193, 200
training, and labour productivity 87
transfer fees 162–3
transfers 104–5, 106, 162–3, 226–7
transparency of charges in defined contribution (DC) pension plans 104–7, 144, 145, 153, 162
and guarantees 244, 246, 253
importance 309
and risk-based supervision 169, 216
and Solvency II 169
Turner Commission on pension reform (UK) 233

UK
defined contribution (DC) pension plans 243–4
guarantees 44, 49, 252

National Pensions Savings Scheme 143, 145
pension fund governance 221
Personal Accounts 312
PPPs (Personal Pension Plans) (see PPPs (Personal Pension Plans)) reduction in yield 301
risk aversion 115
risk-based supervision 167
SPPs (Stakeholder Pension Plans) 102–3, 104, 143
Turner Commission on pension reform 233
UK equities 128, 129, 141, 142
uncertainty 112–13, 122, 147–8, 304
see also risk
underfunding 173, 269, 272
unit-linked funds 125–6, 127
unit-linked plans 115
unit-linked programme 150
Unseen Revolution, The (Drucker) 220
US
agency factor in pension delivery 223–7
aging society 297
labour productivity and utilization growth 296
PBGC (Pension Benefit Guaranty Corporation) 41, 44, 49, 243, 251–2
pension fund governance 221
pension system 243–4, 251, 252
risk-based supervision 167
‘s save more tomorrow’ pension plans 145
Utkus, Stephen 147
value maximizers 24, 25, 28
Van Dalen, H. 255
VaR (Value at Risk) 171, 172, 174, 186, 188–9, 191, 192, 196, 204–6, 207, 208
voluntary contributions 134–5, 136, 137, 138
wealth 219, 271, 280
wealth-to-income ratio 298, 299–300
Weiss, M. 94
welfare 268, 280, 298
Whittaker, E.T. 57
Wise, David A. 88
withdrawal penalties 68, 70, 75, 100
withdrawals
and civil servant pension reform in
Hesse, Germany 69, 70, 71, 73, 74, 75, 76, 77
PPPs (Personal Pension Plans) 100
work teams, labour productivity 86,
88–94
working conditions, and labour
productivity 87
working population, growth rate
decline 294, 297

yield, reduction in see reduction in
yield younger workers
and back-loaded benefits 274, 275
experience 91, 92
and labour market flexibility 279
labour productivity 87
and liability-driven investment (LLD) 270
and stand-alone collective pension
plans 266–7, 271, 272, 273–4, 275–6, 291
in work teams 90, 91, 92, 93