Index

Ainslie, G. 38, 152
Alston, J. 28
Antikarov, V. 39, 44
Arnold, L. 50, 52
Arrow, K. 65, 79, 109, 128, 139
Aschauer, D. 66
Åsheim, G. 152
asset markets 58, 98
Azar, C. 140
Barry, P. 5, 18, 26, 27, 29
Baumol, W. 140
BCA see benefit–cost analysis
Becker, G. 160
benefit–cost analysis (BCA) 13, 23
appropriate perspectives 17
assumption of perfect capital markets 18
boundaries of analysis 17
choice of discount rate 17, 18, 19
difficulties of 16
double counting errors 19
economic analysis 22
financial analysis 22
identification of aims 14
productivity 21, 22
real or nominal values 21
risk and uncertainty 20–21
secondary effects 19–20
taxation 22
technical systems 22
technology changes 21
unmeasurables 21
use of 14, 15
benefit–cost ratio 16, 18
Bible 2
biology

trading off present and future benefits and costs 2
Birdsall, L. 141
Blyth, M. 124, 127
Boiteux, M. 144
Boussard, J. 95, 165
Bradford, D. 108
Brealey, R. 5, 26, 27
Breeden, D. 62
capital
forms of 175
Capital Asset Pricing Model (CAPM) 62, 64
capital markets 58, 63, 161
inter-temporal efficiency 162, 163
non-substitutable and non-tradeable assets 162–3
time horizon 162
CAPM 62, 64
Castle, E. 127
CCAPM 62, 63
Champ, P. 21
Chichilnisky, G. 38, 152
Ciriacy-Wantrup, S. 114
Cline, W. 139, 141
Cocks, K. 130
Collard, D. 82
commitment problem 77, 79, 94, 114–17, 118
Commonwealth Department of Finance (Australia) 128
compounding
with risk 42–3, 44, 52–4
without risk 39–42, 44
constant discount rate 18, 19, 70, 71,
129, 150
consumption
constant 73, 74, 104, 105, 106, 107
life-cycle income and 100, 104, 105, 106, 107
marginal utility of 62
smoothly-declining path of 104, 105
sustainable growth 74
time-neutral consumers induced to
save by a positive interest rate 106, 107
Consumption-based Capital Asset
Pricing Model (CCAPM) 62, 63
Copeland, T. 39, 44
Cozet, Y. 122, 141
Cropper, M. 38, 115, 156
Dasgupta, P. 66, 70, 71, 73, 74
decreasing discount rates 172, 173
long-term discounting 152–3
time inconsistency 158–9
use of 129, 141, 142, 143, 145, 146, 156
Desaigues, B. 144
discountrate 4, 69
discounting 15, 16, 122, 138
arbitrariness 169, 175
choice of discount rate 122, 138, 139
growth rate of the economy, link to 141
inherently myopic, claimed to be 97, 99
social equity 175
uncertainty 137, 142–3, 175
under certainty 58–60, 61
distant future discounting see long-term
discounting
Dixit, A. 39, 44
double counting errors 19
Duffie, D. 39, 45
Economic Planning Advisory
Commission (EPAC) 66
effective discounting 137, 145
environment culture 133
environmental assets
valuation of 137, 144, 145, 146
environmental services projects
discount rate applied to 67
environmentalists
views on discounting 97, 99, 100
EPAC 66
equity premium 63, 64, 67
policy implications 63, 64, 65
equivalent annuity (EA) 30
exponential discounting 139
Farmer, M. 100, 102, 113, 118
Ferejohn, J. 99
financial options 47
Fisher, A. 10, 67, 144, 145, 152, 156, 157
Fisher, B. 28
Fisher, I. 138, 140
forestry management
analysis of investments 123–4
Frederick, S. 38, 71, 74, 156
future value 4
gamma discounting 38, 129
Gard, T. 52
Godard, O. 146
Gould, J. 18, 27
Goulder, L. 122
government bonds
rate of return 63
Grant, S. 63, 64, 65
Grimmell, G. 51
Hanley, N. 144
Harrod, R. 139
Hartman, R. 124
Haslam, N. 38
Hatton MacDonald, D. 9, 10, 133
Heal, G. 38, 70, 71, 73, 74, 126, 129
Hertzler, G. 8, 39, 95, 165, 170, 171
Hirshleifer, J. 65, 107
Horowitz, J. 61, 62
Hotelling, H. 98, 123, 126, 144, 157
Howarth, R. 99, 162
Huxley, A. 95, 149, 153
hyperbolic discounting 38, 72, 74, 110–11, 114–17, 159–60
Imola 2
impatience 138, 170
public decisions 171
rate of 69, 70
constant 70, 71
declining 71
time inconsistency 71, 72, 73

Economics and the Future
income distribution 61, 62
interest rates 58
intergenerational effects of discounting 139, 140, 141
equity 61, 129, 131, 149, 153, 154, 172, 173
internal rate of return (IRR) 16, 18, 27
irreversible benefits see research and development, investments in irreversible investments 79
Jenkins, A. 134
Kirby, M. 124, 127
Knight, F. 128
Krautkraemer, J. 126
Krutilla, J. 10, 67, 130, 133, 144, 145, 152, 156, 157
Kula, E. 129, 134
Laibson, D. 115, 156
Lind, R. 65, 108, 109, 128, 139
Loewenstein, G. 152
logarithmic approach 129
long-term discounting (LTD) 50, 174, 175
approaches to 151–2, 163–5
capital markets 161, 162, 163
declining discount rate 152–3
intergenerational equity 149, 153, 154, 172, 173
lowering of discount rate 154–8
multiple discount rate 152
no discounting 152, 153
problems of 78
relevance of great distances in time 173–4
risk and uncertainty 164–5, 173
single positive discount rate 152
time frames 150–51
time inconsistency 149–50, 153, 158–61
zero-discounting 152, 153
Lowenstein, G. 38, 156, 170
lowering discount rates
declining discount rate 156
future negative growth 155, 156
offset discounting by increasing future costs 156–7
setting pure time preference equal to zero 154–5
uncertain future discount rates 157, 158
Malcolm, B. 7, 26
Mäler, K.-G. 66
Mankiw, N. 64
marginal utility of consumption 62
Marglin, S. 171
Mehra, R. 64
Miller, M. 64
Mishan, E. 23
Modigliani, F. 64
moral objections 131–2
Morrison, M. 133
Mulligan, C. 160
multiple discount rate 152
Myers, S. 5, 26, 27
natural resource economics 122
choice of discount rate 123, 127
discount rate applied to environmental services projects 67
dynamic optimal control theory 126–7
equity issues and non-market considerations 122–3, 125
financial analysis of private investments 123–4
relative prices over time 130, 133
valuation of environmental assets 137, 144, 145, 146
see also sustainability
net final value (NFV) 29
net present value (NPV) 16, 18, 27, 37, 69, 101
additional considerations 134
appropriateness for long-term investments 50
boundary conditions 45, 46
environmental issues inadequacy of method 37, 44
type of real option, as 45, 46
Neumayer, E. 144, 157
Newell, R. 39, 143, 157, 158
NFV 29
Norgaard, R. 99, 162
NPV see net present value
obsolescence effect 157
opportunity cost 16, 18, 19, 27, 67, 140–41
option values see real options theory
Otto, G. 66
Page, T. 99, 156, 159, 160
Pannell, D. 7, 10, 20, 22, 31, 74, 95, 123, 165
Pardey, P. 28
Pearce, D. 95, 122, 157, 165
Pezzey, J. 8, 74, 77, 95, 151, 157, 160, 165
Philibert, C. 10, 95, 143, 155, 157, 161, 165, 171
Pigou, A. 139
Pindyck, R. 39, 44
Pinker, S. 2
Pizer, W. 39, 143, 157, 158
Point, P. 144
population levels
changes in 130–31
Portney, P. 5, 151, 172
Prelec, D. 38, 152, 156, 170
Prescott, E. 63
present value (PV) 4, 15
price trends
inclusion in investment analysis 30, 31, 34
private decision making 1, 3, 4, 5, 61
complexities and difficulties in 26
discount rates 128
hedging against risk 128
time horizon 170
time inconsistency 161
productivity of capital
driver of positive interest rates 102, 103, 107
productivity trends
inclusion in investment analysis 30, 31, 34
public investments 1, 57, 61, 67, 128
discounting 5–7, 175
effects of substitutability/complementarity with private investments 65–6
environmental dimensions 128
policy of competitive neutrality 65–6
problems of 58
Quiggin, J. 8, 61, 62, 63, 64, 65, 95, 123, 127, 157, 165, 171
Rabl, A. 10, 95, 141, 144, 163, 165
radioactive waste containment
model of investment analysis 80–88, 95
outcomes 89–94
Ramsey, F. 123, 139, 141, 154, 155, 157, 159, 161, 171
Randall, A. 9, 10, 100, 102, 112, 113, 118, 123, 155, 170, 172
rate of time preference 18, 19
Rawls, J. 131, 139
Read, D. 156, 160
real interest rate 127
real options theory 37, 39, 44, 45, 50, 170
applications of 50
payoff or damage function 50
sensitivity of values to changes in assumptions 49
time consistency 50
valuations 45, 47–50
religions
interest on loans 2
research and development (R&D), investments in 78–9
irreversible benefits 79, 94, 95, 163, 173
circumventing commitment problem 94
see also radioactive waste containment
Ricœur, P. 145
Riddel, M. 133
risk
compounding and discounting with risk 20–21, 42–3, 44, 52–4, 62
compounding and discounting without risk 39–42, 44
long-term discounting 164, 165, 173
public investments 57, 64–5
Robinson, J. 175
Robison, L. 5, 18, 26, 27, 29
Rogers, A. 160
safe minimum standard (SMS) of conservation 114, 118, 173
benefits of the policy 117
<table>
<thead>
<tr>
<th>Term</th>
<th>Page Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>hyperbolic discounting and time-inconsistency</td>
<td>114–17</td>
</tr>
<tr>
<td>multigenerational commitment</td>
<td>117, 118</td>
</tr>
<tr>
<td>salinity problem (Australia)</td>
<td>124</td>
</tr>
<tr>
<td>use of discounting</td>
<td>125</td>
</tr>
<tr>
<td>scarcity effect</td>
<td>157</td>
</tr>
<tr>
<td>Schelling, T.</td>
<td>6, 78, 152, 158, 172, 173</td>
</tr>
<tr>
<td>Scheraga, J.</td>
<td>108</td>
</tr>
<tr>
<td>Schilizzi, S.</td>
<td>9, 10, 11, 74, 123, 129, 173</td>
</tr>
<tr>
<td>secondary effects</td>
<td>19–20</td>
</tr>
<tr>
<td>Sen, A.</td>
<td>61, 174</td>
</tr>
<tr>
<td>sensitivity analysis</td>
<td>20, 21</td>
</tr>
<tr>
<td>Shaw, W.</td>
<td>133</td>
</tr>
<tr>
<td>simplistic assumptions</td>
<td>25, 27, 28</td>
</tr>
<tr>
<td>introduction of more realistic assumptions</td>
<td>31, 32, 33, 34</td>
</tr>
<tr>
<td>social benefit–cost analysis</td>
<td>34</td>
</tr>
<tr>
<td>problems of 28, 33</td>
<td></td>
</tr>
<tr>
<td>realism 25–6</td>
<td></td>
</tr>
<tr>
<td>Smith, V.</td>
<td>21</td>
</tr>
<tr>
<td>social context</td>
<td></td>
</tr>
<tr>
<td>trade-off between present and future</td>
<td>2–3</td>
</tr>
<tr>
<td>social discount rate</td>
<td>171</td>
</tr>
<tr>
<td>appropriateness of low discount rates</td>
<td>110–12</td>
</tr>
<tr>
<td>consumption–welfare model</td>
<td>108, 109, 110, 118</td>
</tr>
<tr>
<td>discounting nonmonetized goods</td>
<td>112</td>
</tr>
<tr>
<td>inclusion of nonmarket and/or public goods</td>
<td>112</td>
</tr>
<tr>
<td>marginal efficiency of capital (MEC) model</td>
<td>107, 108, 109, 110, 118</td>
</tr>
<tr>
<td>principles for determining 101, 102, 109, 170, 171</td>
<td></td>
</tr>
<tr>
<td>large long-term investments</td>
<td>109, 110, 118</td>
</tr>
<tr>
<td>small short-term investments</td>
<td>109, 110, 118</td>
</tr>
<tr>
<td>productivity of capital, reflecting</td>
<td>118</td>
</tr>
<tr>
<td>public policy issue</td>
<td>98</td>
</tr>
<tr>
<td>sustainability and 113, 114</td>
<td></td>
</tr>
<tr>
<td>uncertainty of the future 111–12</td>
<td></td>
</tr>
<tr>
<td>social opportunity costs of environmental services</td>
<td>67</td>
</tr>
<tr>
<td>Solow, R.</td>
<td>73, 139, 141, 159</td>
</tr>
<tr>
<td>Spash, C.</td>
<td>144</td>
</tr>
<tr>
<td>Stavins, R.</td>
<td>122</td>
</tr>
<tr>
<td>Steer, A.</td>
<td>141</td>
</tr>
<tr>
<td>Sterner, T.</td>
<td>140, 142</td>
</tr>
<tr>
<td>Stirzaker, D.</td>
<td>51</td>
</tr>
<tr>
<td>Strotz, R.</td>
<td>38, 71, 153</td>
</tr>
<tr>
<td>sub-additive discounting</td>
<td>156, 170</td>
</tr>
<tr>
<td>substitutability</td>
<td>144</td>
</tr>
<tr>
<td>Sumaila, U.</td>
<td>130</td>
</tr>
<tr>
<td>Sussman, F.</td>
<td>108</td>
</tr>
<tr>
<td>sustainability 66, 67, 145</td>
<td></td>
</tr>
<tr>
<td>age preferences 132, 133, 134</td>
<td></td>
</tr>
<tr>
<td>childless households 132</td>
<td></td>
</tr>
<tr>
<td>developing countries 132</td>
<td></td>
</tr>
<tr>
<td>discounting 69</td>
<td></td>
</tr>
<tr>
<td>absolute time approach 69–70, 74</td>
<td></td>
</tr>
<tr>
<td>need for increased investment in conservation projects 133, 134</td>
<td></td>
</tr>
<tr>
<td>repressing the discount rate as counterproductive to 98, 101, 103, 113, 114, 118</td>
<td></td>
</tr>
<tr>
<td>see also natural resource economics;</td>
<td></td>
</tr>
<tr>
<td>safe minimum standard of conservation</td>
<td></td>
</tr>
<tr>
<td>sustainable welfare 38</td>
<td></td>
</tr>
<tr>
<td>taxation</td>
<td></td>
</tr>
<tr>
<td>inclusion in investment analysis 22, 29–30, 34</td>
<td></td>
</tr>
<tr>
<td>technical systems 22</td>
<td></td>
</tr>
<tr>
<td>technology changes 21</td>
<td></td>
</tr>
<tr>
<td>Thucydides 2</td>
<td></td>
</tr>
<tr>
<td>time consistency 38, 39, 114–17, 141, 161</td>
<td></td>
</tr>
<tr>
<td>long-term discounting 149–50, 153, 158–61</td>
<td></td>
</tr>
<tr>
<td>rate of impatience 71, 72, 73</td>
<td></td>
</tr>
<tr>
<td>real option values 50</td>
<td></td>
</tr>
<tr>
<td>time dimension 15</td>
<td></td>
</tr>
<tr>
<td>Treasury of the United Kingdom 129</td>
<td></td>
</tr>
<tr>
<td>Turner, R.</td>
<td>122, 157</td>
</tr>
<tr>
<td>two-stage inter-generational discounting</td>
<td>163</td>
</tr>
<tr>
<td>Van Horne, J.</td>
<td>5, 26</td>
</tr>
<tr>
<td>Volkman, D.</td>
<td>27</td>
</tr>
<tr>
<td>Voss, G.</td>
<td>66</td>
</tr>
<tr>
<td>Wachowicz, J.</td>
<td>5, 26</td>
</tr>
<tr>
<td>Wallace, N.</td>
<td>67</td>
</tr>
<tr>
<td>Authors</td>
<td>Pages/Sections</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Walters, C.</td>
<td>130</td>
</tr>
<tr>
<td>weed</td>
<td></td>
</tr>
<tr>
<td>management</td>
<td></td>
</tr>
<tr>
<td>systems</td>
<td></td>
</tr>
<tr>
<td>example</td>
<td></td>
</tr>
<tr>
<td>investment</td>
<td></td>
</tr>
<tr>
<td>analysis</td>
<td>31–3</td>
</tr>
<tr>
<td>Weil, P.</td>
<td>63</td>
</tr>
<tr>
<td>Weyant, J.</td>
<td>5, 151, 172</td>
</tr>
<tr>
<td>Withagen, C.</td>
<td>74</td>
</tr>
<tr>
<td>Wonder, B.</td>
<td>28</td>
</tr>
<tr>
<td>World Bank</td>
<td>141</td>
</tr>
<tr>
<td>Young, M.</td>
<td>9, 10, 95, 127, 129, 165</td>
</tr>
<tr>
<td>zero discounting</td>
<td></td>
</tr>
<tr>
<td>Zilberman, D.</td>
<td>31</td>
</tr>
</tbody>
</table>