



Australian Government
Productivity Commission

Valuing the Future:
the social discount rate
in cost-benefit analysis

Visiting Researcher Paper

April 2010

Mark Harrison

The views expressed in
this paper are those of the
individual involved and do not
necessarily reflect the views of
the Productivity Commission.

© COMMONWEALTH OF AUSTRALIA 2010

ISBN 978-1-74037-313-5

This work is copyright. Apart from any use as permitted under the *Copyright Act 1968*, the work may be reproduced in whole or in part for study or training purposes, subject to the inclusion of an acknowledgment of the source. Reproduction for commercial use or sale requires prior written permission from the Commonwealth. Requests and inquiries concerning reproduction and rights should be addressed to the Commonwealth Copyright Administration, Attorney-General's Department, 3-5 National Circuit, Canberra ACT 2600 or posted at www.ag.gov.au/cca.

This publication is available in hard copy or PDF format from the Productivity Commission website at www.pc.gov.au. If you require part or all of this publication in a different format, please contact Media and Publications (see below).

Publications Inquiries:

Media and Publications
Productivity Commission
Locked Bag 2 Collins Street East
Melbourne VIC 8003

Tel: (03) 9653 2244
Fax: (03) 9653 2303
Email: maps@pc.gov.au

General Inquiries:

Tel: (03) 9653 2100 or (02) 6240 3200

An appropriate citation for this paper is:

Harrison, M. 2010, *Valuing the Future: the social discount rate in cost-benefit analysis*, Visiting Researcher Paper, Productivity Commission, Canberra.

JEL code: D9, H4

The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

Further information on the Productivity Commission can be obtained from the Commission's website (www.pc.gov.au) or by contacting Media and Publications on (03) 9653 2244 or email: maps@pc.gov.au

Contents

Preface	V
The Visiting Researcher papers	VI
Key points	VIII
Overview	IX
1 The concept of discounting in cost-benefit analysis	1
1.1 Introduction	1
1.2 The discount rate in cost-benefit analysis	2
1.3 Why discount?	3
1.4 Real and nominal discount rates	5
1.5 The discount rate's impact on project viability	6
2 Approaches to discounting	9
2.1 Different views on the social discount rate in practice	9
2.2 Cost-benefit analysis and the efficiency criterion	14
2.3 Defining the social discount rate	16
2.4 The prescriptive approach	17
2.5 Inter-generational issues	18
2.6 Why the efficiency standard is relevant for inter-generational project evaluation	20
3 The discount rate and market benchmarks	25
3.1 The discount rate in an undistorted capital market	25
3.2 The effects of capital taxes	26
3.3 The Ramsey formula	33
3.4 The marginal return to capital	37
3.5 Risk	39
3.6 Discounting the distant future	50

4	Setting the social discount rate	55
4.1	Adjusting for taxation and foreign capital flows	55
4.2	Adjusting for risk	55
A	Accounting for Inflation	63
B	How project finance affects present and future consumption	71
C	Inter-generational comparisons: the social welfare function approach	83
D	The shadow price of capital and the weighted average discount rate	97
E	Foreign Capital	109
F	Deriving the Ramsey equation	115
G	Rates of return in Australia	117
H	Asset pricing	137
I	Discounting the distant future	153
	References	161

Preface

Governments face a bewildering array of policy choices, ranging from regulatory interventions with little direct cost to government and potentially quick payoffs (such as regulating product safety), through to complex investments in social and economic infrastructure costing billions and taking years to implement and decades to deliver their full benefits. Some policies have extremely long-term effects: for example, the costs and benefits of policies to address the uncertainties of climate change span centuries.

Cost-benefit analysis is a powerful tool to inform this range of decisions. People generally expect more than a dollar in the future to compensate them for forgoing a dollar today. The selection of discount rates is important to bring the estimated dollar impacts over time to a common point so as to establish whether a particular project has a present value of benefits greater than its costs, and to rank viable alternatives.

In August 2007, the Office of Best Practice Regulation (then part of the Productivity Commission) published its *Best Practice Regulation Handbook*, containing guidelines including use of a social discount rate of 7 percent real, with sensitivity testing over the range of 3 to 11 per cent (OBPR 2007, pp 129-132).

This Visiting Researcher Paper was initiated, as foreshadowed in the *Handbook*, to examine further the evidence on the parameters influencing the choice of discount rate. It was prepared by Dr Mark Harrison when a visiting researcher at the Commission. The paper reviews conflicting views on the issues influencing discount rate selection, and examines recent evidence of possible market benchmarks for discount rate derivation.

The Visiting Researcher papers

This publication is the second in an occasional series presenting the work of the Commission's Visiting Researchers.

In support of the Commission's core function of conducting public inquiries and studies commissioned by the Government on key policy and regulatory issues, the Commission conducts supporting research into diverse issues concerning productivity and its determinants, environmental and resource management, labour markets, and economic models and frameworks to aid policy analysis.

To assist the research effort, the Visiting Researcher Program seeks to attract established researchers in areas closely related to the Commission's primary research themes. Visiting Researchers share their expertise and knowledge with Commission staff and contribute to the work of the Commission during appointments which are usually for terms up to one year.

During their stay with the Commission, Visiting Researchers take an active interest in the work of the Commission and its staff. It is common for Visiting Researchers not only to conduct their own research in conjunction with Commission staff but also to contribute to the research work of others in their areas of expertise. The views expressed in this series are those of the Visiting Researchers themselves, and do not necessarily represent those of the Commission.

More details on the Visiting Researcher Program are available on the Commission's website at www.pc.gov.au/employment/researcher