Buchholz, Wolfgang; Schumacher, Jan

Working Paper
Discounting the long-distant future: a simple explanation for the Weitzman-Gollier-puzzle

CESifo Working Paper, No. 2357

Provided in Cooperation with:
Ifo Institute – Leibniz Institute for Economic Research at the University of Munich

Suggested Citation: Buchholz, Wolfgang; Schumacher, Jan (2008) : Discounting the long-distant future: a simple explanation for the Weitzman-Gollier-puzzle, CESifo Working Paper, No. 2357, Center for Economic Studies and Ifo Institute (CESifo), Munich

This Version is available at:
http://hdl.handle.net/10419/26402

Terms of use:
Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

www.econstor.eu
Discounting the Long-Distant Future: A Simple Explanation for the Weitzman-Gollier-Puzzle

WOLFGANG BUCHHOLZ
JAN SCHUMACHER

CESifo Working Paper No. 2357
Category 8: Resources and Environment
July 2008

An electronic version of the paper may be downloaded
• from the SSRN website: www.SSRN.com
• from the RePEc website: www.RePEc.org
• from the CESifo website: www.CESifo-group.org/wp
Discounting the Long-Distant Future: A Simple Explanation for the Weitzman-Gollier-Puzzle

Abstract

In this paper, we reconsider the debate on Weitzman's (1998) suggestion to discount the long-run future at the lowest possible rate, referring to Gollier (2004) and Hepburn & Groom (2007). We show that, while Weitzman's use of the present value approach may indeed seem questionable, its outcome, i.e. a discount rate that is declining over time, is nevertheless reasonable, since it can be justified by assuming a plausible degree of risk aversion.

JEL Code: D40, E43, Q51.

Keywords: discount rates, uncertainty, risk aversion.

Wolfgang Buchholz  
University of Regensburg  
Department of Economics and Econometrics  
93040 Regensburg  
Germany  
wolfgang.buchholz@wiwi.uni-regensburg.de

Jan Schumacher  
University of Regensburg  
Department of Economics and Econometrics  
93040 Regensburg  
Germany  
jan.schumacher@wiwi.uni-regensburg.de

July 14, 2008
1 Introduction

In a famous paper Weitzman (1998) has suggested that the lowest possible discount rate should be used for the long-distant future if discount rates are risky and the social planner is risk neutral. Gollier (2004) has challenged this view recommending instead the highest possible discount rate. At first sight, both positions are equally appealing and conform to two familiar approaches to intertemporal evaluation, i.e. to the present value (PV) approach (Weitzman) and to the future value (FV) approach (Gollier). But applying both approaches to cost–benefit–analysis yields results that are radically different. In particular, the time path of discount rates is declining when the PV method is used but increasing with the FV method. So there is a puzzle or even a paradox which has to be solved. Gollier (2004) himself has attributed the divergence between PV and FV to differences in intertemporal risk sharing whereas Hepburn & Groom (2007) have provided an explanation that refers to differences in the evaluation date. Here we first show that both attempts to explain the puzzle can be combined and traced back to the same cause: If productivity is risky the outcome of intertemporal evaluation crucially hinges on the point in time for which a safe payment is assumed and, while so, serves as the point of reference. Our argument, however, should not only give some better understanding of the Weitzman–Gollier puzzle but should also be helpful for a general assessment of Weitzman’s and Gollier’s approaches. It will be our conclusion that – from a conceptual perspective – Gollier is more right than Weitzman because the PV method is not sensible in the case of risk. But invoking the additional assumption that the social planner is sufficiently risk averse, it becomes possible to derive Weitzman’s pattern of declining certainty-equivalent interest rates by making use of the more reasonable FV method. In this way, both approaches can be reconciled, and a new justification for Weitzman’s discounting device is found.

2 Comparing the FV and PV approach in case of Gollier Projects

Let us consider a two period model and a ”Gollier project”: Any Euro that is invested in period $t = 1$ gives, with the same probability $\pi = 0.5$, either a return $R_b = 0$ (in the ”bad” case) or $R_g = M - 1$ (in the ”good” case) in period 2 where $M \geq 1$. So the marginal rates of transformation (“productivities”) between consumption in period 1 and period 2 are 1 (or, synonymously, for generation 1 and generation 2) or $M$, respectively. Each Euro invested in period 1 then gives

$$M_F = \frac{1}{2} (1 + M)$$

as the expected value of payoffs in period 2. A risk neutral planner then prefers a sure project with the safe rate of return $R_s$ to the given risky project if and only if $R_s > R_F$ with $R_F = M_F - 1$. This corresponds to Gollier’s FV approach.

Alternatively, one could ask which investment in period 1 would yield an expected return of 1 in period 2. With probability 0.5 (in the ’bad’ case), this investment has
to be 1 Euro, with the same probability (in the 'good' case) it only has to be \( \frac{1}{M} \) Euro. Hence, on average, an investment of \( \frac{1}{2} \left( 1 + \frac{1}{M} \right) \) is required. Then the corresponding marginal rate of transformation between period 1 and period 2 becomes

\[
M_P = \frac{1}{\frac{1}{2}(1 + \frac{1}{M})} = \frac{2M}{1 + M}
\]

which reflects Weitzman’s PV approach.

For all \( M > 1 \) we have \( M_F > M_P \)

\[ \text{Thus } M_F \text{ and } M_P \text{ do not coincide and have different implications for intertemporal evaluation. With the PV method it is more likely that a sure project is deemed as superior to the given risky Gollier project than with the FV method. Both } M_F \text{ and } M_P \text{ are increasing in } M \text{ but } \lim_{M \to \infty} M_F = \infty \text{ and } \lim_{M \to \infty} M_P = 2. \text{ So } M_F \text{ is growing much stronger in } M \text{ than } M_P \text{ and, with } M \text{ going to infinity, the difference between } M_F \text{ and } M_P \text{ becomes infinitely large.} \]

The divergence between the FV and the PV method can be explained in the following way: Assume again that 1 Euro is invested in a Gollier project. Now according to Weitzman’s PV approach we determine the investment which makes sure that the payoff \( M_F = \frac{1}{2}(1 + M) \) is realized in any case for generation 2. To this end, a sum of \( \frac{1}{2}(1 + M) \) must be invested in the bad case with zero return by generation 1. This 'bad case investment' on its own already contributes \( \frac{1}{2} \cdot \frac{1}{3}(1 + M) = \frac{1}{6}(1 + M) \) to the average value of the overall investment. We have \( \frac{1}{3}(1 + M) > 1 \) if \( M > 3 \). Then the expected value of the whole investment in period 1, which is \( \frac{1}{2} \left( \frac{1}{2}(1 + M) + \frac{1}{2} \frac{1}{M} \right) \), clearly exceeds 1 Euro, too. The intuition of this explanation is that a large \( M \) drives the expected future value of the Gollier project so high that more than the original 1 Euro is on average needed in period 1 to provide sufficient hedging for generation 2.

Let us now consider the standard situation in which productivity grows exponentially with some constant rate \( r > 0 \) as a special case. Then we have \( M(t) = e^{rt} \) where \( t \) is a continuous time parameter and \( M(t) \) is the discount factor at time \( t \). The divergence between the implied expected values \( M_F(t) \) and \( M_P(t) \) has much effect on the development of the two certainty-equivalent discount rates \( r_F(t) \) and \( r_P(t) \), that are defined by

\[
e^{r_F(t)t} = M_F(t) = \frac{1}{2}(1 + e^{rt})
\]

and

\[
e^{-r_P(t)t} = \frac{1}{M_P(t)} = \frac{1}{2}(1 + e^{-r_P(t)}).
\]

A short calculation shows that \( r_F(t) \) is increasing and \( r_P(t) \) is decreasing in \( t \). This result also holds in a far more general setting and clearly reflects the divergent patterns of \( M_F(t) \) and \( M_P(t) \).

\[1\text{This follows from}

\[ (1 - M)^2 > 0 \Rightarrow (1 + M)^2 = 1 + 2M + M^2 > 4M \Rightarrow M_F = \frac{1 + M}{2} > \frac{2M}{1 + M} = M_P \]

For a more general treatment see Appendix A1.
3 Interpreting Gollier’s and Hepburn & Groom’s explanations

Gollier’s own attempt at solving the puzzle refers to the different allocation of risk that is implied by each the FV and the PV method. With FV it is the future period that bears all the risk whereas with PV the risk completely falls upon the present period. From this perspective, both cases look completely symmetric, which, however, is not in accordance with the conditions that apply in reality. As in our explanation, Gollier (2004, p. 88) supposes in the FV case, that the "current generation has a fixed budget for investing for the future.” The difficulty, however, is that in the PV case there is no complete analogy for that. If productivity is uncertain when the investment decision is made, actually there is no chance to move the risk to period 1. Asymmetry of time inevitably entails asymmetry of risk-bearing. In our model, in which a strictly positive return only occurs with probability 0.5, 1 Euro has to be invested definitely to guarantee 1 Euro as a sure payoff in period 2.

The asymmetry of time also shows up in Hepburn & Groom’s (2007) alternative explanation in which different dates for intertemporal evaluation are the crucial element. In order to reformulate their argument in our framework, let, as above, \( M(t) \) be an increasing function that describes how the marginal rate of transformation MRT between a payoff at time 0 and a payoff at some time \( t \) depends on the continuous time parameter \( t \). \( M(t) \) is defined on the finite interval \([0, T]\) with \( M(0) = 1 \) and \( M(T) = M \). Assuming complete interchangeability of payoffs along this MRT-curve the marginal rate of transformation between some arbitrary points in time \( \tau \) and \( t \) out of \([0, T]\) is \( \frac{M(\tau)}{M(t)} \), where – this is the essential point – not only \( t > \tau \) but also \( \tau > t \) is possible. This means that foregoing a payoff of 1 Euro at time \( \tau \) changes the payoff by \( \frac{M(\tau)}{M(t)} \) at point \( t \). Adopting quite formally the FV approach with \( \tau \) as the evaluation date gives

\[
M_F(\tau, t) = \frac{1}{2} \left( 1 + \frac{M(t)}{M(\tau)} \right)
\]  

(5)

If \( M(t) \) is increasing, \( M_F(\tau, t) \) is increasing in \( t \) but decreasing in \( \tau \) as, letting \( \tau = 0 \) and \( t = T \) then (5) is the expected future value of payoffs as described by (1) (see Hepburn & Groom (2007)). Conversely, if \( \tau = T \) and \( t = 0 \) equation (5) gives the expected present value as in (2). To motivate the evaluation approach, a safe payoff is implicitly assumed as a target at evaluation date \( \tau \), which indicates the similarity of Gollier’s and Hepburn & Groom’s approaches (see Hepburn & Groom (2007), especially p. 102).

Even though investment in its literal sense goes from the present to the future, the two cases, \( \tau = 0 \) and \( \tau = T \), nevertheless are equally plausible when productivity is certain. If the payoff accruing in the future is reduced and the payoff in the current period is increased in return, this can well be interpreted as an investment of the future in favor of the present and further elucidates why the FV- and the PV approach are equivalent in this case. In the case of productivity risk this symmetry breaks down: If the payoff in the future is to be increased by 1 Euro with
certainty this would mean differentiation of the payoffs in the present before uncertainty is resolved. Neither does this fit precisely to the two-period model nor is it feasible for real-world decisions on intergenerational allocation. Applying the PV method to risky situations is tantamount to making a consideration in retrospect and corresponds to a purely hypothetical decision.

4 Why the FV approach is warranted and how it may produce Weitzman’s results

Both Gollier (2004) and Hepburn & Groom (2007) take a relativistic position: the safe payoff or the vantage point for the intertemporal evaluation can in principle lie everywhere on the time axis. Our considerations, however, have shown that – because time and risk go in only one direction – it is not very useful to adopt a reference point in the future. So in contrast to Gollier’s own assertion neither Weitzman nor he himself are both wrong. Rather much more is in favor of Gollier’s approach because he puts the risk to the right place, i.e. to the future period. By applying the PV method to situations with productivity risk, Weitzman implicitly seeks to avoid risks for the future period and thus gives the future generation some claim to a safe payoff. This privileged position of the future is clearly reflected in his main result, i.e. in the convergence of the certainty equivalent to the lowest possible value.

If we are interested in the well-being of posterity it is the inevitably uncertain future value of income or utility that has to count. Concerning decisions on intergenerational risk sharing, we are in Gollier’s world – like it or not. In the framework of expected utility theory the obvious way to give our descendants more protection is to explicitly introduce some risk aversion. With risk neutrality and Weitzman’s PV approach future-friendliness only comes indirectly and has no solid conceptual foundation.

Allowing for risk aversion, the picture changes considerably. Consider the familiar class of isoelastic von Neumann-Morgenstern utility functions which are – for any constant elasticity of marginal utility \( \eta \) – defined by

\[
    u(x) = \begin{cases} 
    \frac{x^{1-\eta}}{1-\eta} & \text{for } \eta \geq 0, \eta \neq 1 \\
    \ln x & \text{for } \eta = 1
    \end{cases}
\]

where \( x \) is the payoff level. Again let \( M(t) = e^{rt} \) where \( r \) is the exogenously given discount rate. Then, with the FV approach, in our simple model the certainty

\[\text{footnote}{\text{2}}\]

\[\text{footnote}{\text{3}}\]
equivalent discount rates \( r^\eta_F(t) \) for some given \( \eta \) are defined by

\[
e^{(1-\eta)r^\eta_F(t)t} = \frac{1}{2} \left( 1 + e^{(1-\eta)rt} \right)
\]

(7)

for any point of time \( t > 0 \). For \( \eta = 0 \) we are in the case of risk neutrality. Then, clearly, \( r^\eta_F(t) = r_F(t) \), i.e. the interest rates derived from (7) coincide with those in the Gollier approach. If, however, \( \eta = 2 \) we have \( r^2_F(t) = r_P(t) \), i.e. the same discount rates as with Weitzman’s PV approach. So Gollier’s more sensible conceptual basis can be used to justify Weitzman’s solution.

For arbitrary values of \( \eta \)

\[
r^\eta_F(t) = \begin{cases} 
  r_F \left( (1 - \eta)t \right) & \text{for } \eta < 1 \\
  r_P \left( (\eta - 1)t \right) & \text{for } \eta > 1 
\end{cases}
\]

(8)

results, which, as a general result, is demonstrated in Appendix A2. Hence, as in Gollier’s approach, the function \( r^\eta_F(t) \) is increasing in \( t \) if inequality aversion expressed by \( \eta \) is rather low, whereas it is – as in Weitzman’s conception – decreasing if \( \eta \) exceeds 1. With \( \eta = 1 \) we get \( r^1_F(t) = \frac{r}{2} \), i.e. a constant discount rate.

Since \( \eta \geq 1 \) seems to be the more adequate assumption, which is confirmed by experimental studies and regularly invoked in climate change analysis, decreasing discount rates are obtained. In Weitzman’s critique of the Stern Review the value \( \eta = 2 \) is even explicitly suggested as part of a ”trio of twos” (see Weitzman (2007), p. 707). This confirms Weitzman’s result even by using Gollier’s approach based on future expected values.

5 Conclusion

Weitzman’s (1998) postulate to discount benefit and costs that accrue in the long-distant future at the lowest imaginable discount rate has not found unanimous consent. Our analysis has provided a twofold assessment of this debate: On the one hand, the objections raised by Gollier (2004) seem to be justified insofar as they are directed against the use of Weitzman’s present value approach in the case of uncertainty. So Weitzman’s approach would imply full risk-bearing by the present generation which – as has been shown in this paper – is impossible because of the asymmetry of time. On the other hand, the result obtained by Weitzman nevertheless seems to be appropriate for long-run decisions, since introducing a plausible degree of risk aversion into Gollier’s approach can produce the same pattern of declining interest rates as suggested by Weitzman.

\[\text{In the Stern Review on the Economics of Climate Change (Stern (2006)) a value of } \eta = 1 \text{ is used. Other economists as Arrow (2007) also recommend the use of higher } \eta \text{-values. A range for sensible } \eta \text{-values between 1 and 2 has been derived axiomatically by Buchholz \\& Schumacher (2008). For empirical estimates on real-world } \eta \text{-values see e.g. Evans (2005) and Pirtilae \\& Uusitalo (2007).}\]
Appendix A1

Let \( \tilde{M} \) be a random variable which takes on values in an interval \([M, \bar{M}]\) where \( M > 0 \) and \( \bar{M} < \infty \). As a generalization of (3) and (4) we define

\[
M_F = E \tilde{M}
\]

and

\[
M_P = E \tilde{M}^{-1}.
\]

Then, using the Cauchy–Schwarz inequality we obtain

\[
\frac{M_F}{M_P} = E \tilde{M} \cdot E \tilde{M}^{-1} \geq E(\tilde{M}^{1/2})^2 \cdot E(\tilde{M}^{-1/2})^2 \\
\geq \left( E \left( \tilde{M}^{1/2} \cdot \tilde{M}^{-1/2} \right) \right)^2 = 1
\]

which gives the assertion.

Appendix A2

Let, as in Hepburn & Groom (2007), \( \tilde{r} \) be a random variable which takes value in an interval \([r, \bar{r}]\) where \( r \geq 0 \) and \( \bar{r} < \infty \). Quite analogously to (3) and (4) certain equivalent discount rates \( r_F(t) \) and \( r_P(t) \) in this general setting are defined by

\[
e^{r_F(t)t} = E \tilde{e}^{\tilde{r}t}
\]

and

\[
e^{-r_P(t)t} = E \tilde{e}^{-\tilde{r}t}
\]

for any point in time \( t > 0 \).

Given some risk aversion parameter \( \eta > 0 \), \( \eta \neq 1 \) now define \( r_F^\eta(t) \) by

\[
\left( e^{r_F^\eta(t)t} \right)^{1-\eta} = E \left( e^{\tilde{r}t} \right)^{1-\eta}
\]

First assume \( \eta \in ]0, 1[ \). Substituting \( t' = (1-\eta)t \) in (12) gives

\[
e^{r_F((1-\eta)t)(1-\eta)t} = e^{r_F(t')t'} = E \tilde{e}^{\tilde{r}t'} = E \tilde{e}^{\tilde{r}(1-\eta)t}
\]

Combining (14) and (15) yields

\[
e^{r_F^\eta((1-\eta)t)(1-\eta)t} = e^{r_F((1-\eta)t)(1-\eta)t}
\]

which proves the assertion in this case. For \( \eta > 1 \) the proof is quite analogous. Finally, for \( \eta = 1 \) we have

\[
\ln e^{r_F^1(t)t} = E \ln \tilde{e}^{\tilde{r}t}
\]

which yields

\[
r_F^1(t) = E \tilde{r} = \text{const}.
\]
References


Gollier, C. (2004), ‘Maximizing the expected net future value as an alternative strategy to gamma discounting’, Finance Research Letters 1, 85–89.


2293 M. Hashem Pesaran and Andreas Pick, Forecasting Random Walks Under Drift Instability, April 2008

2294 Steven Brakman, Gus Garita, Harry Garretsen and Charles van Marrewijk, Unlocking the Value of Cross-Border Mergers and Acquisitions, May 2008


2296 Claudia M. Buch and Martin Schlotter, Regional Origins of Employment Volatility: Evidence from German States, May 2008

2297 Helmut Cremer, Philippe De Donder, Dario Maldonado and Pierre Pestieau, Taxing Sin Goods and Subsidizing Health Care, May 2008

2298 Reinhilde Veugelers and Frederick van der Ploeg, Reforming European Universities: Scope for an Evidence-Based Process, May 2008

2299 Jon H. Fiva and Lars J. Kirkebøen, Does the Housing Market React to New Information on School Quality?, May 2008


2302 Jan K. Brueckner, Slot-Based Approaches to Airport Congestion Management, May 2008


2304 Dan Anderberg and Alessandro Balestrino, The Political Economy of Post-Compulsory Education Policy with Endogenous Credit Constraints, May 2008

2305 Tomer Blumkin, Yoram Margalioth and Efraim Sadka, The Role of Stigma in the Design of Welfare Programs, May 2008

2306 Vesa Kanniainen and Paolo M. Panteghini, Tax Neutrality: Illusion or Reality? The Case of Entrepreneurship, May 2008

2307 Thomas Dohmen, Armin Falk, David Huffman and Uwe Sunde, The Intergenerational Transmission of Risk and Trust Attitudes, May 2008
2308 Guglielmo Maria Caporale and Mario Cerrato, Using Chebyshev Polynomials to Approximate Partial Differential Equations, May 2008

2309 Peter Egger and Doina Maria Radulescu, Labour Taxation and Foreign Direct Investment, May 2008

2310 Laurent Linnemer, Dissipative Advertising Signals Quality even without Repeat Purchases, May 2008

2311 Jordi Jofre-Monseny and Albert Solé-Ollé, Which Communities should be afraid of Mobility? The Effects of Agglomeration Economies on the Sensitivity of Firm Location to Local Taxes, May 2008

2312 Andreas Haufler and Ferdinand Mittermaier, Unionisation Triggers Tax Incentives to Attract Foreign Direct Investment, May 2008

2313 Ronel Elul and Piero Gottardi, Bankruptcy: Is it enough to Forgive or must we also Forget?, May 2008

2314 Andreas Irmen and Johanna Kuehnel, Productive Government Expenditure and Economic Growth, May 2008

2315 Beate Henschel, Carsten Pohl and Marcel Thum, Demographic Change and Regional Labour Markets: The Case of Eastern Germany, May 2008

2316 Gabriel Felbermayr, Wido Geis and Wilhelm Kohler, Restrictive Immigration Policy in Germany: Pains and Gains Foregone?, May 2008

2317 Michael Hofmann, Gerhard Kempkes and Helmut Seitz, Demographic Change and Public Sector Budgets in a Federal System, May 2008

2318 Paul De Grauwe, Macroeconomic Modeling when Agents are Imperfectly Informed, June 2008

2319 Johann K. Brunner and Susanne Pech, Optimum Taxation of Inheritances, June 2008

2320 Thomas Eichner and Marco Runkel, Corporate Income Taxation of Multinationals in a General Equilibrium Model, June 2008

2321 Rainald Borck and Matthias Wrede, Subsidies for Intracity and Intercity Commuting, June 2008

2322 Patricia Apps and Ray Rees, Testing the Pareto Efficiency of Household Resource Allocations, June 2008

2323 Amihai Glazer, Vesa Kanniainen and Panu Poutvaara, Firms’ Ethics, Consumer Boycotts, and Signalling, June 2008

2324 Claudia M. Buch, Jörg Döpke and Kerstin Stahn, Great Moderation at the Firm Level? Unconditional vs. Conditional Output Volatility, June 2008
2325 Helmuth Cremer, Philippe De Donder, Dario Maldonado and Pierre Pestieau, Forced Saving, Redistribution and Nonlinear Social Security Schemes, June 2008

2326 M. Hashem Pesaran and Paolo Zaffaroni, Optimal Asset Allocation with Factor Models for Large Portfolios, June 2008

2327 Harald Badinger and Peter Egger, Horizontal versus Vertical Interdependence in Multinational Activity, June 2008

2328 Jan K. Brueckner and Harris Selod, A Theory of Urban Squatting and Land-Tenure Formalization in Developing Countries, June 2008

2329 Paolo M. Panteghini, Corporate Debt, Hybrid Securities and the Effective Tax Rate, June 2008

2330 Guglielmo Maria Caporale, Juncal Cuñado and Luis A. Gil-Alana, Modelling Long-Run Trends and Cycles in Financial Time Series Data, June 2008

2331 Avi Ben-Bassat and Momi Dahan, Social Identity and Voter Turnout, June 2008

2332 Martin R. West and Ludger Wößmann, “Every Catholic Child in a Catholic School”: Historical Resistance to State Schooling, Contemporary Private Competition, and Student Achievement across Countries, June 2008

2333 Erkki Koskela and Panu Poutvaara, Outsourcing and Labor Taxation in Dual Labor Markets, June 2008

2334 Philippe Choné and Laurent Linnemer, Optimal Litigation Strategies with Signaling and Screening, June 2008

2335 Albert Solé-Ollé and Pilar Sorribas-Navarro, Does Partisan Alignment Affect the Electoral Reward of Intergovernmental Transfers?, June 2008

2336 Antonio Cabrales and Piero Gottardi, Markets for Information: Of Inefficient Firewalls and Efficient Monopolies, June 2008


2338 Ulrich Hange, Tax Competition, Elastic Labor Supply, and Growth, June 2008

2339 Guy Laroque and Bernard Salanié, Does Fertility Respond to Financial Incentives?, June 2008

2340 Adriano Paggiaro, Enrico Rettore and Ugo Trivellato, The Effect of Extending the Duration of Eligibility in an Italian Labour Market Programme for Dismissed Workers, June 2008

2341 Helmut Seitz, Minimum Standards, Fixed Costs and Taxing Autonomy of Subnational Governments, June 2008

2343 Wolfgang Leininger, Evolutionarily Stable Preferences in Contests, July 2008

2344 Hartmut Egger and Udo Kreickemeier, Fairness, Trade, and Inequality, July 2008

2345 Ngo Van Long and Bodhisattva Sengupta, Yardstick Competition, Corruption, and Electoral Incentives, July 2008

2346 Florian Baumann, Employment Protection: The Case of Limited Enforceability, July 2008

2347 Alessandro Balestrino, Cinzia Ciardi and Claudio Mammini, On the Causes and Consequences of Divorce, July 2008


2349 Lammertjan Dam and Ben J. Heijdra, The Environmental and Macroeconomic Effects of Socially Responsible Investment, July 2008

2350 Avner Greif, Contract Enforcement and Institutions among the Maghribi Traders: Refuting Edwards and Ogilvie, July 2008


2357 Wolfgang Buchholz and Jan Schumacher, Discounting the Long-Distant Future: A Simple Explanation for the Weitzman-Gollier-Puzzle, July 2008