Working Paper

Notes on habit formation and socially optimal growth

Author(s):
Valente, Simone

Publication Date:
2006-02

Permanent Link:
https://doi.org/10.3929/ethz-a-005237203 →

WIF - Institute of Economic Research

Notes on Habit Formation and Socially Optimal Growth

Simone Valente

Working Paper 06/48

February 2006

Economics Working Paper Series

ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Notes on Habit Formation and Socially Optimal Growth

Simone Valente
Institute of Economic Research, ETH Zurich

February 24, 2006

Abstract

The interaction between habit formation and pollution-type externalities modifies the social optimum through discount effects and elasticity effects. If the substitution elasticity does not exceed unity, both effects reduce optimal consumption and capital in the long run, and the optimal capital-income tax increases with the relative importance of habits. Similar results hold with high elasticity if the relative importance of habits is sufficiently high.

Keywords: externalities, habit formation, pollution, optimal growth.

JEL codes: D62, D91, E21.

Address:

WIF-ETH, Zurichbergstrasse 18 - ZUE F15, CH-8032 Zurich, Switzerland.

E-mail: svalente@ethz.ch.

Phone: +41 44 632 47 24. *Fax*: +41 44 632 13 62

1. Introduction

There is a general consensus on the importance of habits in consumer behavior. At the theoretical level, the idea that private utility depends on relative, rather than on absolute consumption levels, is receiving considerable attention in the recent literature on economic growth. Models with habit formation - also labeled as 'internal habits', or 'inward–looking preferences' - assume that agents compare current consumption with a weighted average of own past consumption levels. In a seminal paper, Ryder and Heal (1973) showed that internal habits affect transitional dynamics, but do not modify the long-run equilibrium in the neoclassical growth model, characterized by a steady-state capital stock corresponding to the standard modified golden rule. That is, in a world with constant returns to scale and complete markets, habit formation *per se* does not matter in the long run. More recent literature, however, suggests that habit-induced deviations arise in more general contexts: internal habits affect long-run equilibria when production possibilities are improved by virtue of exogenous productivity growth (Alvarez-Cuadrado *et al.* 2004) or increasing returns (Carrol *et al.* 1997); moreover, inward-looking behavior may interact with status-seeking, so that optimal allocations are modified by consumption externalities with outward-looking behavior - the so-called 'Catching-Up with the Joneses' feature (Alonso-Carrera *et al.* 2005).[1]

A question that naturally arises is whether habits interact with other types of externalities, and in which direction socially optimal equilibria deviate by virtue of time-dependent preferences. In particular, negative pollution externalities stemming from economic activity heavily affect private welfare, and are widely recognized as crucial issues for today's policymakers. In this regard, two contributions by Wendner (2000) and Ono (2002) considered possible interactions between environmental externalities and habit formation in a general equilibrium setting. Wendner (2000) points out that habits may reverse the effects of conventional environmental policies when environmental quality is harmed by production. Ono (2002) shows that habits have both positive and negative effects on environmental quality, assuming that consumption is harmful for the environment. This paper differs from these analyses in major ways. At the formal level, Wendner (2000) and Ono (2002) use an overlapping generations model: in this setting, habits modify

[1] Carrol *et al.* (1997) and Alvarez-Cuadrado *et al.* (2004) mix inward-looking with outward-looking preferences: in this framework, individuals compare current consumption not only with their own past history, but also with lagged cross-sectional average consumption in the economy. Alonso-Carrera *et al.* (2005) show that outward-looking preferences determine deviations from the habit-free socially optimal allocation.

the long-run competitive equilibrium in a decentralized economy (Wendner, 2002; Abel, 2005), contrary to the Ramsey-Cass-Koopmans framework with infinitely-lived agents employed here (Alvarez-Cuadrado *et al.* 2004).[2] At the conceptual level, Wendner (2000) and Ono (2002) focus on competitive decentralized equilibria, and investigate the consequences of habit-induced deviations for environmental quality. This paper studies whether, and to what extent, habits modify *socially optimal* levels of consumption and capital by interacting with pollution externalities. An immediate implication of this interaction is that habits modify the optimal tax rate on capital income which implements the social optimum in a decentralized competitive equilibrium.

2. The model

The habit stock h of each agent equals the weighted average of her own past consumption levels. Following Alvarez-Cuadrado *et al.* (2004), the dynamic law of h is given by

$$\dot{h} = \rho \left(c - h \right), \tag{1}$$

where c is individual consumption, and $\rho > 0$ is the adjustment speed. Instantaneous individual utility is

$$v \left(c, h, e \right) = u \left(c, h \right) - d \left(e \right) = \left[c^{1-\varepsilon} h^{\gamma(\varepsilon-1)} - 1 \right] \left(1 - \varepsilon \right)^{-1} - d \left(e \right), \tag{2}$$

where e are pollutant emissions per capita, and the emission-disutility function is $d \left(e \right) = e^{\omega}$ with $\omega \geq 1$. Parameter $\gamma \in (0, 1)$ represents the relative importance of the habit stock, and setting $\gamma = 0$ rules out habit formation. The instantaneous elasticity ε is strictly positive. As $\varepsilon \to 1$, instantaneous preferences $v \left(c, h, e \right)$ become separable between c and h, since $u \left(c, h \right) \to \log c - \gamma \log h$. Aggregate output is represented by the linearly homogeneous function $F \left(K, L \right)$, concave, twice differentiable, and satisfying Inada conditions. Labor L is supplied inelastically and normalized to unity, so that output per worker equals $y = f \left(k \right)$, with $f_k > 0$, $f_{kk} < 0$. The aggregate resource constraint is

$$\dot{k} = f \left(k \right) - c. \tag{3}$$

Emissions are linear in output levels: $e = \psi y$, with $\psi > 0$ constant. Consider a command optimum problem where a benevolent social planner is able

[2] Another difference is that we specify habits in the multiplicative form (Carrol, 2000) instead of the subtractive form used by Wendner (2000) and Ono (2002), which may generally have quite different implications (see Wendner, 2003).

to observe pollution externalities, and therefore to implement the socially optimal allocation. The planner solves

$$\max \int_0^\infty v(c,h,e)\exp[-\delta t]\,dt$$

subject to (1) and (3), with $e = \psi f(k)$ and $k(0)$ taken as given. The constant discount rate $\delta > 0$ equals individual time-preference rates. First-order conditions read

$$u_c = \mu^k - \rho\mu^h, \tag{4}$$

$$\dot{\mu}^k = \mu^k(\delta - f_k) + d_e\psi f_k, \tag{5}$$

$$\dot{\mu}^h = \mu^h(\delta + \rho) - u_h, \tag{6}$$

where μ^k and μ^h represent social marginal shadow values of k and h. Defining $\mu = \mu^h/\mu^k$, the equilibrium path is described by the four-by-four dynamic system formed by (1), (3) and

$$\dot{\mu} = \mu\left[f_k\left(1 - d_e\frac{\psi}{\mu^k}\right) + \rho\left(1 - \gamma\frac{c}{h}\right)\right] + \gamma\frac{c}{h}, \tag{7}$$

$$\frac{\dot{c}}{c} = \frac{1}{\varepsilon}\left[\frac{f_k + \rho^2\mu}{1 - \rho\mu} + \rho\gamma\frac{c}{h} - \delta - \frac{d_e\psi}{u_c}f_k\right]. \tag{8}$$

We now characterize the long-run equilibrium, implicitly assuming that parameter values are compatible with dynamic stability conditions.[3] Setting $\dot{\mu}^k = 0$ in (5) yields

$$f_k - \delta = d_e\psi f_k/\mu^k. \tag{9}$$

Condition (9) differs from the decentralized-equilibrium condition holding in the same economy when emissions are beyond the agents' control: in this case, we would obtain the Ryder and Heal (1973) model, where the steady-state equilibrium corresponds to the standard modified golden rule $f_k = \delta$. From (9), social optimality requires instead $f_k > \delta$ in the long run: not surprisingly, due to the presence of negative production spillovers,

[3] To have dynamic stability, it is sufficient to assume that parameters satisfy the conditions as in Alvarez-Cuadrado *et al.* (2004). This is because, for δ sufficiently low, the emission-augmented steady-state (9) is stable if the pollution-free equilibrium ($f_k = \delta$) is stable. As shown by Alvarez-Cuadrado *et al.* (2004), explicit dynamic stability conditions are intractable under neoclassical production functions, and cyclical convergence may arise even under simple Cobb-Douglas technology $y = k^\alpha$. Being restricted to steady-state considerations, our results do not depend on whether the economy converges monotonically or cyclically to the steady state.

the socially optimal level of capital is lower than that corresponding to the modified golden rule. More interestingly, habits induce a wedge between the marginal shadow-value of capital and the marginal utility from current consumption: setting $\dot{\mu}^h = 0$ in (6) we have $\mu^h(\delta+\rho) = u_h = -\gamma u_c$, which from (4) yields

$$\mu^k = u_c(\delta+\rho-\gamma\rho)(\delta+\rho)^{-1}. \qquad (10)$$

In (10), the wedge between μ^k and u_c is exclusively due to habits ($\gamma = 0$ yields $\mu^k = u_c$): this is the first channel through which habits modify the long-run equilibrium, the *habit-discount effect.* The second channel is the *consumption-elasticity effect*: substituting steady-state levels $u_c = c^{-[\varepsilon+\gamma(1-\varepsilon)]}$ and $d_e = \omega\psi^{\omega-1}f(k)^{\omega-1}$ in (10) we have

$$c^* = \left[\frac{1}{\omega\psi^{\omega}}\overbrace{\left(\frac{\delta+\rho-\gamma\rho}{\delta+\rho}\right)}^{\text{Habit-discount effect}}\left(1-\frac{\delta}{f_k}\right)f(k)^{1-\omega}\right]^{\underbrace{[\varepsilon+\gamma(1-\varepsilon)]^{-1}}_{\text{Elasticity effect}}}, \qquad (11)$$

where c^* is used to denote the locus $\dot{c} = 0$. The consumption-elasticity effect is represented by the long-run elasticity of substitution $[\varepsilon+\gamma(1-\varepsilon)]^{-1}$, which depends on γ as long as ε differs from unity. The role of the habit-discount effect is peculiar to this model, since it derives from the interaction between habits and pollution externalities: the wedge between u_c and μ^k affects the long-run equilibrium because c^* is decreasing in the (c,k) plane due to pollution disutility[4]. Differently from the Ramsey model, where $\dot{c} = 0$ corresponds to a unique level of capital, stationary consumption is here associated with a continuum of values of μ^k. As a consequence, the equilibrium $\dot{c} = \dot{k} = 0$ depends on μ^k/u_c, which is in turn a linear function of γ. In Figure 1.(a), the socially optimal equilibrium (c_{ss}, k_{ss}) is represented by point S, lying at the intersection between c^* and the locus for steady-state capital, $k^* = \{\bar{k} : f(\bar{k}) = c\}$.

A first result regards the existence of long-run effects of habit formation. Inspection of (11) reveals that habits modify the long-run equilibrium even if $u(c,h)$ is separable between c and h. As $\varepsilon \to 1$ the elasticity effect vanishes, but the habit-discount effect still occurs, implying

Proposition 1 *Habits modify c_{ss} and k_{ss} for any $\varepsilon \gtrless 1$.*

[4]Differentiation of (11) shows that the sign of $\partial c^*/\partial\gamma$ is the same as that of

$$\partial\left[(f_k-\delta)f_k^{-1}f(k)^{1-\omega}\right]/\partial k = \delta f_{kk} - (1-\delta)(\omega-1)f_k^2 f(k)^{-1},$$

which is surely negative for any $\delta < 1$.

Proposition 1 implies that pollution-type externalities modify a typical result of Ramsey-type models, i.e. that long-run effects of habit formation crucially hinge on non-separability ($\varepsilon \neq 1$) between current and benchmark consumption (Alvarez-Cuadrado *et al.* 2004; Carrol *et al.* 1997). Since production externalities release habit-discount effects, γ modifies (c_{ss}, k_{ss}) even if $\varepsilon = 1$. A second result relates to the direction of the long-run effects of habit formation. The locus $\dot{k} = 0$ does not depend on γ, and is increasing in the (c, k) plane. Consequently, equilibrium capital k_{ss} will move in the same direction as the $\dot{c} = 0$ locus, in response to a marginal increase in γ:

$$\text{sign } dk_{ss}/d\gamma = \text{sign } \partial c^*/\partial\gamma. \tag{12}$$

From (11), the sign of $\partial c^*/\partial\gamma$ depends on the relative strength of habit-discount and elasticity effects. The discount effect is always negative, *i.e.* it tends to reduce c_{ss} and k_{ss}. The direction of the elasticity effect, instead, depends on whether ε is greater or less than unity: if $\varepsilon > 1$ ($\varepsilon < 1$), a higher importance of habits tends to increase (reduce) the long-run capital stock through the elasticity effect. Consequently,

Proposition 2 *If $\varepsilon \leq 1$, an increase in γ reduces c_{ss} and k_{ss}. If $\varepsilon > 1$, the effect of γ on (c_{ss}, k_{ss}) is a priori ambiguous.*

Proposition 2 is proved by differentiating (11), which implies that the sign $\partial c^*/\partial\gamma$ is the same as that of

$$\log\left[\frac{(f_k - \delta) f(k)^{1-\omega} (\delta + \rho - \gamma\rho)}{f_k \omega \psi^{\omega} (\delta + \rho)}\right]^{\frac{\varepsilon - 1}{[\varepsilon + \gamma(1-\varepsilon)]^2}} - \frac{(f_k - \delta) f(k)^{1-\omega} \rho}{f_k \omega \psi^{\omega} [\varepsilon + \gamma(1 - \varepsilon)]},$$

which is surely negative for $\varepsilon \leq 1$. If $\varepsilon > 1$, which is empirically plausible[5], the sign of $\partial c^*/\partial\gamma$ is a priori unknown, and comparative statics exercises yield $dk_{ss}/d\gamma > 0$ or $dk_{ss}/d\gamma < 0$, according to different combinations of parameters. Numerical substitutions suggest that elasticity effects tend to dominate for low values of γ, whereas habit discount effects are stronger for high values of γ. Examples of these hump-shaped reactions to γ are depicted in Figure 1.(b). In numerical terms, Table 1 reports long-run values for interest rates $r_{ss} = f'(k_{ss})$ in the social optimum: for $\varepsilon = 2.5$, the elasticity

[5] Alvarez-Cuadrado *et al.* (2004) set $\varepsilon > 1$ in order to have a long-run elasticity of substitution exceeding the constant elasticity obtained under time-separable preferences, consistent with available evidence. Alonso-Carrera *et al.* (2005) also suggest imposing $\varepsilon > 1$ in order to rule out a priori possible corner solutions in the dynamic optimization problem.

effect (which reduces r_{ss} by increasing k_{ss}) dominates for $\gamma \lesssim 0.65$, whereas discount effects dominate for $\gamma \gtrsim 0.65$. Since $\varepsilon = 2.5$ is a relatively high value and $\gamma > 0.65$ is empirically plausible (Fuhrer, 2000), discount effects likely dominate even with $\varepsilon > 1$. That is, *an increase in γ reduces c_{ss} and k_{ss} if either $\varepsilon \leq 1$, or $\varepsilon > 1$ with γ sufficiently high.* Table 1 also confirms unambiguous effects in the separable case $\varepsilon = 1$: long-run interest rates increase with γ. In this regard, Proposition 2 implies the following

Corollary 3 *If $\varepsilon \leq 1$, the optimal capital-income tax implementing (c_{ss}, k_{ss}) in a decentralized economy increases with γ.*

This result is easily proved as follows. Taxing capital incomes at rate τ in a decentralized economy implies $\lim_{t\to\infty} k(t) = k_{de}$, where k_{de} is the unique level of capital satisfying the distorted equilibrium condition $f'(k_{de}) = \delta(1-\tau)^{-1}$. In order to implement the socially-optimal allocation, a policy-maker would therefore set τ equal to the *optimal tax rate*

$$\tau^*_{ss} = 1 - (\delta / f'(k_{ss})) \tag{13}$$

in the long run. From Proposition 2, $\varepsilon \leq 1$ implies $df'(k_{ss})/d\gamma > 0$, which from (13) implies $d\tau^*/d\gamma > 0$. It also follows from the above discussion that $d\tau^*/d\gamma > 0$ even with $\varepsilon > 1$, provided γ is sufficiently high. The last row in Table 1 suggests that the impact of habits on τ^* may be substantial: in the separable case $\varepsilon = 1$, the optimal tax rate on capital income with $\gamma = 0.8$, which is the value of γ estimated by Fuhrer (2000), equals $\tau^*_{ss} = 3.53\%$, that is more than two times the value obtained when ruling out habits ($\tau^*_{ss} = 1.53\%$ with $\gamma = 0$).

3. Concluding Remarks

This paper investigated the interaction between habit formation and negative externalities from production, and its consequences for the socially optimal equilibrium in the Ramsey-Cass-Koopmans model. We have shown that externalities modify the long-run equilibrium through a peculiar discount effect, in addition to the elasticity effect. As a consequence, habit-induced deviations arise even if utility is separable between current and benchmark consumption. In most cases, the overall effect of habits is to reduce socially optimal levels of consumption and capital, implying that the optimal capital-income tax increases with the relative importance of the habit stock.

With respect to previous literature, our results suggest the following remarks. First, in the representative agent framework with infinite lifetime, most recent contributions show that (i) the existence of long-run effects of habits crucially hinges on non-separability between current and benchmark consumption, and (ii) the direction of long-run effects of habits is unambiguously determined by the elasticity of substitution.[6] In this regard, we have shown that (i) separability does not exclude habit-induced equilibria, because of the peculiar discount effect generated by pollution externalities, and (ii) that the direction of habit-induced deviations is crucially determined by the intensity of such discount effects. Second, with respect to Wendner (2000) and Ono (2002), the logic of the present analysis is driven by fundamental differences in paradigms: in our model, the decentralized long-run equilibrium does not deviate from the modified golden rule, whereas, in the overlapping generations framework, consumption in the competitive equilibrium is affected by habits. As a consequence, the long-run effects discussed here represent habit-induced deviations in socially-optimal levels of consumption and capital, given that private agents would follow the modified golden rule in a decentralized setting. Viceversa, Wendner (2000) and Ono (2002) analyze the deviations induced by habits in private behavior, and the resulting consequences for environmental quality in the decentralized equilibrium. One implication of this different logic is the apparent contradiction with the result of Ono (2002), who shows that habit formation has positive (ambiguous) effects on environmental quality for $\varepsilon > 1$ ($\varepsilon \leq 1$). On the one hand, this result can be explained in terms of different assumptions about preferences, environmental quality, and the nature of spillovers, which imply a different role of the intertemporal elasticity of substitution in Ono (2002).[7] On the other hand, the contrast between this result and our Proposition 2 is only apparent, since the Proposition 2 refers to the socially optimal allocation, and not to the decentralized equilibrium. In a similar vein of comparison, with respect to Wendner (2000), the present model was suitable to derive habit-induced deviations in the optimal level of capital income tax rates, shifting the focus away from two-sided interactions between environmental policies and habits in a decentralized setting. This last issue is an interesting topic which may deserve, in parallel, further analysis in the more appropriate Diamond-Samuelson framework.

[6] Alvarez-Cuadrado *et al.* (2004) find long-run 'elasticity effects' by extending the Ramsey model to include exogenous productivity growth, but these effects require non-separability to take place; similarly, long-run balanced growth in the AK model is affected by habits if and only if $\varepsilon \neq 1$ (Carrol *et al.* 1997).

[7] In Ono (2002), environmental quality: (i) is an intergenerational externality which accumulates over time, (ii) affects only second-period utility, and (iii) is negatively affected by consumption, instead of production. In this setting, ε indicates willingness to substitute first-period consumption with second-period benefits in terms of both consumption and environmental quality: with $\varepsilon > 1$, habits reduce the negative effects of second-period consumption on environmental quality.

References

Abel, A. (2005) "Optimal Taxation when Consumers Have Endogenous Benchmark Levels of Consumption" *Review of Economic Studies* **72**, 21-42.

Alonso-Carrera, J., J. Caballè and X. Raurich (2004) "Consumption Externalities, Habit Formation and Equilibrium Efficiency" *Scandinavian Journal of Economics* **106**, 231-251.

Alvarez-Cuadrado, F., G. Monteiro and S. Turnovsky (2004) "Habit Formation, Catching-Up with the Joneses, and Economic Growth" *Journal of Economic Growth* **9**, 47-80.

Carrol, C. (2000) "Solving Consumption Models with Multiplicative Habits" *Economics Letters* **68**, 67-77.

Carrol, C., J. Overland and D. Weil (1997) "Comparison Utility in a Growth Model" *Journal of Economic Growth* **2**, 339-367.

Fuhrer, J. (2000) "Habit Formation in Consumption and its Implications for Monetary-Policy Models" *American Economic Review* **90**, 367-390.

Ono, T. (2002) "Is habitual consumption harmful to the environment?" *Economics Bulletin* **17**, 1-10.

Ryder, H. and G. Heal (1973) "Optimal Growth with Intertemporally Dependent Preferences" *Review of Economic Studies* **40**, 1-31.

Wendner, R. (2000) "Habit Formation and Environmental Policy - An Overlapping Generations Approach" mimeo.

Wendner, R. (2002) "Capital Accumulation and Habit Formation" *Economics Bulletin* **4**, 1-10.

Wendner, R. (2003) "Do habits raise consumption growth?" *Research in Economics* **57**, 151-163.

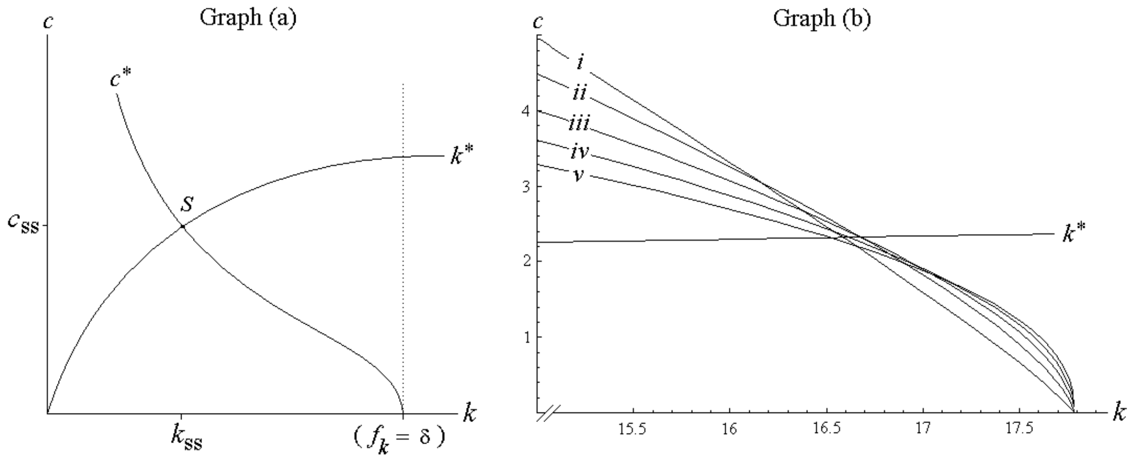

Figure 1. Graph (a): the $\dot{c} = 0$ locus is decreasing, and k_{ss} is lower with respect to the decentralized equilibrium ($f_k = \delta$). Graph (b): the $\dot{c} = 0$ locus for different values of γ ($\gamma_i = 0.9$, $\gamma_{ii} = 0.7$, $\gamma_{iii} = 0.5$, $\gamma_{iv} = 0.3$, $\gamma_v = 0.1$). In this case, deviations in (c_{ss}, k_{ss}) are generally ambiguous (parameter values are the same as in Table 1, with $\varepsilon = 2.5$).

γ		0.0	0.2	0.4	0.6	0.8
r_{ss}	($\varepsilon = 2.5$)	4.22%	4.20%	4.19%	4.18%	4.19%
r_{ss}	($\varepsilon = 1.0$)	4.06%	4.07%	4.09%	4.11%	4.15%
τ^*_{ss}	($\varepsilon = 2.5$)	5.28%	4.81%	4.50%	4.37%	4.52%
τ^*_{ss}	($\varepsilon = 1.0$)	1.53%	1.79%	2.14%	2.67%	3.53%

Table 1. Long-run interest rates in the socially-optimal equilibrium and optimal tax rates on capital for different values of γ and ε. Parameter values are $\omega = 1.5$, $\psi = 0.02$, $\delta = 0.04$, $\alpha = 0.3$, $\rho = 0.1$.

Working Papers of the Institute of Economic Research

(PDF-files of the Working Papers can be downloaded at www.wif.ethz.ch/research.)

06/47 L. Bretschger
Energy Prices, Growth,and the Channels in Between: Theory and Evidence

06/46 M. Schularick and T.M. Steger
Does Financial Integration Spur Economic Growth? New Evidence from the First Era of Financial Globalization

05/45 U. von Arx
Principle guided investing: The use of negative screens and its implications for green investors

05/44 Ch. Bjørnskov, A. Dreher and J.A.V. Fischer
The bigger the better? Evidence of the effect of government size on life satisfaction around the world

05/43 L. Bretschger
Taxes, Mobile Capital, and Economic Dynamics in a Globalising World

05/42 S. Smulders, L. Bretschger and H. Egli
Economic Growth and the Diffusion of Clean Technologies: Explaining Environmental Kuznets Curves

05/41 S. Valente
Tax Policy and Human Capital Formation with Public Investment in Education

05/40 T. M. Steger and L. Bretschger
Globalization, the Volatility of Intermediate Goods Prices and Economic Growth

05/39 H. Egli
A New Approach to Pollution Modelling in Models of the Environmental Kuznets Curve

05/38 S. Valente
Genuine Dissaving and Optimal Growth

05/37 K. Pittel, J.-P. Amigues and T. Kuhn
Endogenous Growth and Recycling: A Material Balance Approach

05/36 L. Bretschger and K. Pittel
Innovative investments, natural resources, and intergenerational fairness: Are pension funds good for sustainable development?

04/35 T. Trimborn, K.-J. Koch and T.M. Steger
Multi-Dimensional Transitional Dynamics: A Simple Numerical Procedure

04/34 K. Pittel and D.T.G. Rübbelke
Private Provision of Public Goods: Incentives for Donations

04/33 H. Egli and T.M. Steger
A Simple Dynamic Model of the Environmental Kuznets Curve

04/32 L. Bretschger and T.M. Steger
The Dynamics of Economic Integration: Theory and Policy

04/31 H. Fehr-Duda, M. de Gennaro, R. Schubert,
Gender, Financial Risk, and Probability Weights

03/30 T.M. Steger
Economic Growth and Sectoral Change under Resource Reallocation Costs

03/29 L. Bretschger
Natural resource scarcity and long-run development: central mechanisms when conditions are seemingly unfavourable

03/28 H. Egli
The Environmental Kuznets Curve – Evidence from Time Series Data for Germany

03/27 L. Bretschger
Economics of technological change and the natural environment: how effective are innovations as a remedy for resource scarcity?

03/26 L. Bretschger, S. Smulders
Sustainability and substitution of exhaustible natural resources. How resource prices affect long-term R&D-investments

03/25 T.M. Steger
On the Mechanics of Economic Convergence

03/24 L. Bretschger
Growth in a Globalised Economy: The Effects of Capital Taxes and Tax Competition

02/23 M. Gysler, J.Kruse and R. Schubert
Ambiguity and Gender Differences in Financial Decision Making: An Experimental Examination of Competence and Confidence Effects

01/22 S. Rutz
Minimum Participation Rules and the Effectiveness of Multilateral Environmental Agremments

01/21 M. Gysler, M. Powell, R. Schubert
How to Predict Gender-Differences in Choice Under Risk: A Case for the Use of Formalized Models

00/20 S.Rutz, T. Borek
International Environmental Negotiation: Does Coalition Size Matter?

00/19 S. Dietz
Does an environmental Kuznets curve exist for biodiversity?