INTERNATIONAL INEQUITY AVERSION AND THE SOCIAL COST OF CARBON

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Abstract

I define the rate of inequity aversion, distinguishing between the pure rate and the consumption rate. I measure the rate of aversion to inequality in consumption as expressed in the development aid given by rich countries to poor ones between 1965 and 2005. There is an ambiguous relationship between the pure rate of inequity aversion and the consumption rate, driven by the rate of risk aversion. However, for a reasonable choice of the rate of risk aversion, rich countries are shown to be inequity averse, and increasingly so over time. The social cost of carbon is very sensitive to equity weighting and assumptions about the rate of risk and inequity aversion. Estimates for the consumption rate of inequity aversion for recent data suggest that the equity-weighted social cost of carbon is less than 50% larger than the unweighted estimate.

Key words

Inequity aversion, risk aversion, income distribution, development aid, climate change, social cost of carbon

JEL Classification

D31, D63. Q54

1. Introduction

As globalisation intensifies, so does the need for evaluating policies, such as climate policy, from the perspective of a global planner. There is no global planner, but considering what she would do provides a useful yardstick against which to measure more realistic policy interventions. Policy analyses at the global scale are immediately confronted with income differences that are greater than in any individual country, and with income redistribution policies that are less effective. This paper focuses on the effect of income distribution on policy evaluation, with an application to greenhouse gas emission reduction.

While many analysts consider a strictly utilitarian welfare function with risk-averse agents, this implies that uncertainty and inequality are evaluated with a single parameter – even though they are conceptually and numerically different (Atkinson et al. 2009;Carlsson et al. 2005). This spells trouble for policies that are both risky and affect the income distribution, climate policy being a clear example. A straightforward generalisation of the welfare function introduces a second parameter, so that inequality aversion and risk aversion can assume different numerical values. In this paper, I seek to measure the rate of inequality aversion and to assess the implications for the Pigou tax.

The procedure for this is as follows. I assume that the global planner has the power to redistribute income from the countries of the OECD to the rest of the world, and that this is a measure of inequality aversion at the global scale. As OECD countries voluntarily disburse development aid, the measured inequality aversion is that of "the OECD", not that of the world.[1] However, a similar model is followed in problems such as climate change, where it is proposed to spend money on reducing greenhouse gas emissions in the OECD, primarily to the benefit of the poor (Schelling 1995). The measured rate of inequality aversion can be used to evaluate problems in which rich countries are the donors and poor countries the beneficiaries. Applying the measured inequality aversion in other contexts should be done with great care, if at all.

The paper proceeds as follows. Section 2 defines inequity aversion, drawing on previous research. Section 3 presents the exact method of measurement, combining the literature in Section 2 with another literature on income redistribution. Section 4 presents the empirical findings. Section 5 applies the results to equity-weighting the social cost of carbon. Section 6 concludes.

2. Defining inequity aversion

Consider a social welfare function in the sense of (Bergson 1938) and (Samuelson 1975):

$$(1) \qquad W(U_1, U_2, ..., U_I) = \begin{cases} \sum_{i=1}^{I} \frac{U_i^{1-\omega}}{1-\omega} & \omega \neq 1 \\ \prod_{i=1}^{I} U_i & \omega = 1 \end{cases}$$

where W is social welfare, U_i is utility of actors i=1,2,…,I, and ω is a parameter, that can be interpreted as the pure rate of inequity aversion (Boadway et al. 1984). At the margin, an increase in utility for a relatively happy actor r compares to a utility increase for relatively unhappy actor p (U_r>U_p) as

[1] Alternatively, this could be interpreted as altruism (Johansson-Stenman 2005).

(2) $$\frac{\partial W / \partial U_r}{\partial W / \partial U_p} = \left(\frac{U_p}{U_r} \right)^{\omega} \begin{cases} >1 & \omega < 0 \\ =1 \quad \text{for} & \omega = 0 \\ <1 & \omega > 0 \end{cases}$$

That is, for ω=0, the social planner is indifferent between the actors, regardless of their initial utility. For ω>0 (ω<0), the social planner prefers an increase in the utility of the relatively unhappy (happy) actor over an increase in the utility of the relatively happy (unhappy) actor. The strength of this preference is larger for a larger absolute value of ω, so that ω is indeed a measure of aversion against inequity in the distribution of utility. This is underlined if one considers that

(3) $$\lim_{\omega \uparrow \infty} W = \min_i \{U_i\}; \lim_{\omega \downarrow -\infty} W = \max_i \{U_i\}$$

That is, in the limits, the welfare function equals either the Rawlsian maximin welfare function or the Nietzschean maximax welfare function.

Now consider a CRRA utility function

(4) $$U_i = \begin{cases} \dfrac{C_i^{1-\eta}}{1-\eta} & \eta \neq 1 \\ \ln C_i & \eta = 1 \end{cases}$$

where C is consumption and η is the rate of risk aversion.

Then the social planner evaluates a relative shift in consumption as

(5) $$\frac{\partial W / \partial C_r}{\partial W / \partial C_p} = \left(\frac{C_p}{C_r} \right)^{\eta+\omega(1-\eta)} \begin{cases} >1 & \eta + \omega(1-\eta) < 0 \\ =1 \quad \text{for} & \eta + \omega(1-\eta) = 0 \\ <1 & \eta + \omega(1-\eta) > 0 \end{cases}$$

Note that (5) introduces the consumption rate of inequity aversion: $\eta+\omega(1-\eta)$. For η =0, the *pure* rate of inequity aversion (ω) equals the *consumption* rate of inequity aversion ($\eta+\omega(1-\eta)$). For ω=0, the (social) consumption rate of inequity aversion equals the (individual) rate of risk aversion. For non-zero values of η and ω, pure inequity aversion, consumption inequity aversion, and risk aversion are numerically different.

3. Measuring international inequity aversion in the OECD

The "leaky bucket" (Okun 1975) is a frequently used method to estimate inequity aversion within countries (Amiel et al. 1999). The basic thought is that an inequity-averse social planner would take from the rich and give to the poor. If it were costless to redistribute income, then everyone would have the same income (or the social planner would be inequity-neutral). However, if only a fraction of the income taken from the rich reaches the poor, then it is possible to have both an unequal income distribution and an inequity-averse social planner. The metaphor arises because the social planner uses a "leaky bucket" to transfer income. The leakier the bucket, the more unequal is the optimal income distribution given a degree of inequity aversion. Vice versa, the degree of inequity aversion, implied by the assumption that the observed income distribution is optimal, increases as the bucket gets leakier.

I here measure the degree of inequity aversion of countries in the OECD, implied by the official development aid given to developing countries. Note the leap of faith. I assume that the OECD *collectively* acts as a *global planner* when deciding to aid developing countries. I need one additional assumption, namely that the global planner is only interested in distributional issues between countries, but not within countries. Note that there are few data on how aid is distributed across the income distribution in developing countries. Then, the global welfare function becomes:

$$(6) \qquad W = \begin{cases} \sum_{i=1}^{I} P_i \frac{\left(c_i^{1-\eta}\right)^{1-\omega}}{(1-\omega)(1-\eta)^{1-\omega}} & \omega \neq 1, \eta \neq 1 \\ \prod_{i=1}^{I} P_i c_i & \omega = 1, \eta = 1 \end{cases}$$

where c_i is average per capita consumption in country i and P_i is the number of people in that country. Equation (6) follows from assuming that the global planner considers each individual separately but evaluates each individual in a country at the country average per capita income.

With this assumption, for any level and pattern of aid, for any degree of leakiness, and for any degree of risk aversion, the degree of inequity aversion follows from assuming that the aid flows are optimal, that is, the total derivative of welfare is zero, or

$$(7a) \qquad \sum_{i \in OECD} P_i c_i^{\eta\omega-\eta-\omega} a_i + \sum_{i \notin OECD} P_i c_i^{\eta\omega-\eta-\omega} a_i = 0$$

with

$$(7b) \qquad \lambda \sum_{i \in OECD} A_i + \sum_{i \notin OECD} A_i = 0$$

where a is per capita aid received, A is total aid received, and λ is the degree of leakiness. Note that a and A are negative in donor countries.[2] That is, aid is given up to the point that the welfare loss of the OECD exactly equals the welfare gain of the non-OECD.

4. Results

I solved in Equation (7) for λ=0.05, 0.1, 0.2, …, 0.9, 0.95, and consider results for various values of η. I took data on population, GNI, and ODA *received* for 1965-2005 from the World Resources Institute (http://earthtrends.wri.org/). I took data for ODA *given* from the OECD Development Assistance Committee (http://www.oecd.org/dac/stats).[3] I

[2] Note that $(1-\omega)^{-1}$ and $(1-\eta)^{-(1-\omega)}$ drop out of (6); η and ω are thus unconstrained.

[3] Note that there is often a substantial difference between total ODA given and total ODA received. I assume that this is because of statistical errors on the receiver side. The difference between ODA given and ODA received is NOT a measure of leakiness. Leakiness is here defined as the difference between aid given and aid effectively received by those for whom it was intended. The latter is immeasurable.

rescaled aid received per country so that total aid received equals total aid given for each year, times the leakage rate λ.[4]

Figure 1 shows selected results per year. Table A1 has the full results. The top line is the consumption rate of inequity aversion, which equals either parameter if the other equals zero. In 1965, ω=0.79 (for η=0) and it steadily falls by 0.0059 (s.d. 0.0003) per year to ω=0.54 in 2005. That is, OECD countries have grown less averse to income differences with other countries. Figure 1 also shows the sensitivity to the leakiness of the bucket. The leakier the bucket, the smaller λ, the greater the implied rate of inequity aversion.

The numerical value of the consumption rate of inequity aversion is lower than commonly assumed values for η – which is typically set at unity or higher (Evans 2005). As the consumption rate of inequity aversion equals the sum of the pure rate of inequity aversion and the rate of risk aversion minus their cross product, one cannot draw any inference from this for the pure rate of inequity aversion. Figure 2 illustrates this. For η<1 (η>1), ω decreases (increases) in η. For η=1.0, ω is unspecified. Figure 1 confirms this pattern.

No robust pattern for the pure rate of inequity aversion emerges. One cannot assume a probability density function for the rate of inequity aversion (Anthoff et al. 2009b) and compute an expected value of ω. Figure 2 shows that ω goes to minus (plus) infinity if η approaches unity from below (above). Therefore, E(ω) goes to minus (plus) infinity if E(η)<(>)1.

(Evans 2005) measures the rate of risk aversion of 20 OECD countries. He finds a central estimate of η=1.49 with a standard deviation of 0.19. For such values, the pure rate of inequity aversion is positive and increasing over time. See Figure 2.

For a number of applications, the consumption rate of inequity aversion is what matters – see Equations (5) and (6). The consumption rate of inequity aversion is well-defined and measurable.

5. Equity weights and the social cost of carbon

One can add the monetised impacts of climate change per country to estimate the global impact. This approach assumes that countries would compensate one another for the net damages done by their greenhouse gas emissions (Anthoff et al. 2007;Schelling 1984). However, when reasoning from the perspective of a global planner, monetised impacts cannot be added up as that would incorrectly assume that a dollar's worth of damage is valued the same regardless of the initial income of the victims and regardless of the initial income distribution (Azar et al. 1996;Azar 1999). Instead, a global planner would use equity-weighted impacts (Fankhauser et al. 1997;Fankhauser et al. 1998), defined as

$$(8) \qquad SCC = \sum_i \left(\frac{W_i u_i}{W_M} \right) SCC_i$$

[4] Note that GNI is measured in dollars as exchanged on the currency market. Using Geary-Khamis dollars would substantially reduce the number of observations. Furthermore, this would imply λ>1, which does not match the observations below.

where SCC is the global social cost of carbon and SCC_i is the social cost of carbon in country i; u_i is the marginal utility of consumption; W_i is the marginal global welfare of utility to country i; and W_M is a normalising constant.

Equation (8) can be interpreted as follows. SCC_i is the marginal damage to country i, in money terms; u_i transforms into marginal damage measured in country i's utility; and W_i transforms this into marginal damage measured in global welfare. The normalising constant W_M is needed to transform the impacts back into money. Normalisation is not arbitrary (Anthoff et al. 2009a); W_M is here defined as the marginal welfare impact of slackening the global income constraint, distributing the extra money in an optimal fashion to all people on the planet.

For utility function (4) and welfare function (6), Equation (8) becomes

$$(9) \qquad SCC = \sum_i \left(\frac{\bar{y}}{y_i} \right)^{\eta+\omega(1-\eta)} SCC_i$$

As in Equation (5), what matters is the *consumption* rate of inequity aversion.

Table 1 shows estimates of the social cost of carbon for the 16 regions of the FUND model (Anthoff and Tol 2007), as well as some characteristics of those regions. The social cost of carbon is estimate with a 1% pure rate of time preference. The numbers are for illustrative purposes only. A 1% pure rate of time preference ensures that the regional social cost of carbon is positive for all regions – that is, all regions suffer net negative impacts. The impacts range from about 5 cents per tonne of carbon in Australia and New Zealand to \$7.50 in China. One cannot read too much into these numbers. Large regions obviously internalise more of the externality than do small regions. To assist with the interpretation, Table 1 also shows the regional shares in the global social cost of carbon and population. China stands out as particularly vulnerable (on this measure) because of the projected impacts of climate change on water resources and energy demand. Table 1 further shows per capita income, per capita emissions, and the share of income that would be paid in carbon taxes if the carbon taxes would be set equal to the regional social cost of carbon. Again, China stands out, as it also has a relatively carbon-intensive economy.

Table 2 shows estimates of the social cost of carbon for the world. An unweighted addition of the regional social costs of carbon results in a global social cost of carbon of \$15/tC. Keeping the pure rate of inequity aversion at nought, equity-weights based on the standard rate of risk aversion of unity would increase this to \$36/tC. This goes up to \$47/tC for η=1.5 (Evans 2005), \$87/tC for η=2.0 (Weitzman 2007), and \$382/tC for η=3.0 (Dasgupta 2007). This clearly demonstrates the sensitivity of the social cost of carbon to equity weights.

Table 2 also shows the social cost of carbon for η=1.5 and ω=0.5 and ω=0.5. As argued above, equity weights depend on the consumption rate of inequity aversion, which has an ambiguous relationship with the pure rate of inequity aversion. For η=1.5, the social cost of carbon falls with higher inequity aversion to \$36/tC for ω=0.5 and \$24/tC for ω=1.5. The social cost of carbon increases with the consumption rate of inequity aversion.

Finally, Table 2 show the social cost of carbon for the consumption rates of inequity aversion measured above. The average rate is 0.67 for the period 1965-2005 and λ=0.05-

0.20, with a standard deviation 0.18. The social cost of carbon \$22/tC, with a range of \$18-29/tC. The maximum rate is 1.02 for 1965 and λ=0.05. The social cost of carbon is \$29/tC. The minimum rates are for 2005: 0.70, 0.54 and 0.38 for λ=0.05, λ=0.10 and λ=0.20, respectively. The social cost of carbon is then \$22/tC, \$20/tC, and \$18/tC, respectively.

While the social cost of carbon is, in theory, very sensitive to equity weights – equity-weighted estimates can be 25 times as larges as unweighted results – restricting the relative parameter – the consumption rate of inequity aversion – to the range revealed by official development aid gives a much smaller "equity premium" – between 18% and 88% for the entire period, and 18-45% for 2005.

6. Conclusion

I define the consumption and pure rates of inequity aversion. I measure the consumption rate of inequity aversion as expressed in development aid flows from the OECD to developing countries, parameterised on the effectiveness of such aid. The consumption rate of inequity aversion is smaller than the rate of risk aversion, even if only a small fraction of aid given reaches its target. There is an ambiguous relationship between the consumption rate of inequity aversion and the pure rate of inequity aversion. However, for reasonable values of the rate of risk aversion, the pure rate of inequity aversion is positive and increasing. Note that I measure the rate of *global* risk aversion of the *rich* countries. Therefore, the people at the top end of the global income distribution consider the gap between rich and poor to be unfair, and this unease is growing.

The social cost of carbon is an aggregate of the regional marginal impacts of climate change. A global planner should consider inequity aversion in this aggregation. I reconfirm that estimates of the social cost of carbon are, in principle, very sensitive to assumptions about the consumption rate of inequity aversion. However, restricting inequity aversion to its observed consumption rate reveals that the "equity premium" on the social cost of carbon is less than 50%.

There are a number of caveats to these results. The analysis needs to be repeated with alternative specifications of welfare and utility functions. The numerical results need to be redone with other models and for other scenarios. This would reveal the robustness of the results presented here. Future research should also repeat the analysis under uncertainty, as the framework presented here allows for different values of risk aversion and inequity aversion.

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Table 1. The regional social cost of carbon (SCC) and regional characteristics.

	SCC		Population		Income	Emissions	Tax
	$/tC	share	mln	share	$/p/yr	tC/p/yr	
USA	0.91	5.84%	300	4.63%	37,317	5.51	0.013%
Canada	0.07	0.45%	32	0.49%	25,498	4.62	0.001%
Western Europe	1.54	9.89%	395	6.09%	30,312	2.32	0.012%
Japan and South Korea	0.30	1.93%	176	2.72%	42,872	2.66	0.002%
Australia and New Zealand	0.06	0.39%	24	0.37%	21,437	4.34	0.001%
Eastern Europe	0.12	0.77%	120	1.86%	5,394	1.72	0.004%
Former Soviet Union	0.80	5.14%	286	4.41%	4,493	2.18	0.039%
Middle East	0.38	2.44%	267	4.11%	3,397	1.39	0.016%
Central America	0.26	1.67%	147	2.27%	6,783	0.85	0.003%
South America	0.23	1.48%	373	5.75%	7,920	0.63	0.002%
South Asia	1.07	6.87%	1,488	22.93%	1,984	0.23	0.013%
Southeast Asia	1.27	8.16%	589	9.07%	4,588	0.50	0.014%
China	7.49	48.11%	1,358	20.93%	5,509	0.76	0.104%
North Africa	0.43	2.76%	155	2.40%	2,248	0.57	0.011%
Sub-Saharan Africa	0.57	3.66%	731	11.27%	1,198	0.20	0.010%
Small Island States	0.07	0.45%	45	0.70%	1,545	0.57	0.003%
World	15.57		6,487		8,580	1.07	0.194%

Table 2. The social cost of carbon for selected values of the rate of risk aversion, the pure rate of inequity aversion, and the consumption rate of inequity aversion.

η	ω	η+ω-ηω	SCC	Remarks
0.00	0.00	0.00	$15.57/tC	Simple sum
1.00	0.00	1.00	$36.23/tC	Standard value
1.49	0.00	1.49	$46.85/tC	(Evans 2005)
1.49	0.50	1.25	$36.23/tC	Illustrative
1.49	1.50	0.76	$23.53/tC	Illustrative
2.00	0.00	2.00	$86.81/tC	(Weitzman 2007)
3.00	0.00	3.00	$381.49/tC	(Dasgupta 2007)
		0.67	$22.08/tC	Average estimate (1965-2005, λ=0.05-0.20)
		0.32	$17.76/tC	Average minus twice standard deviation
		1.02	$29.92/tC	Average minus twice standard deviation
		0.38	$18.40/tC	Lowest estimate (2005, λ=0.20)
		0.54	$20.25/tC	Low estimate (2005, λ=0.10)
		0.70	$22.53/tC	Low estimate (2005, λ=0.05)
		1.02	$29.28/tC	Highest estimate (1965, λ=0.05)

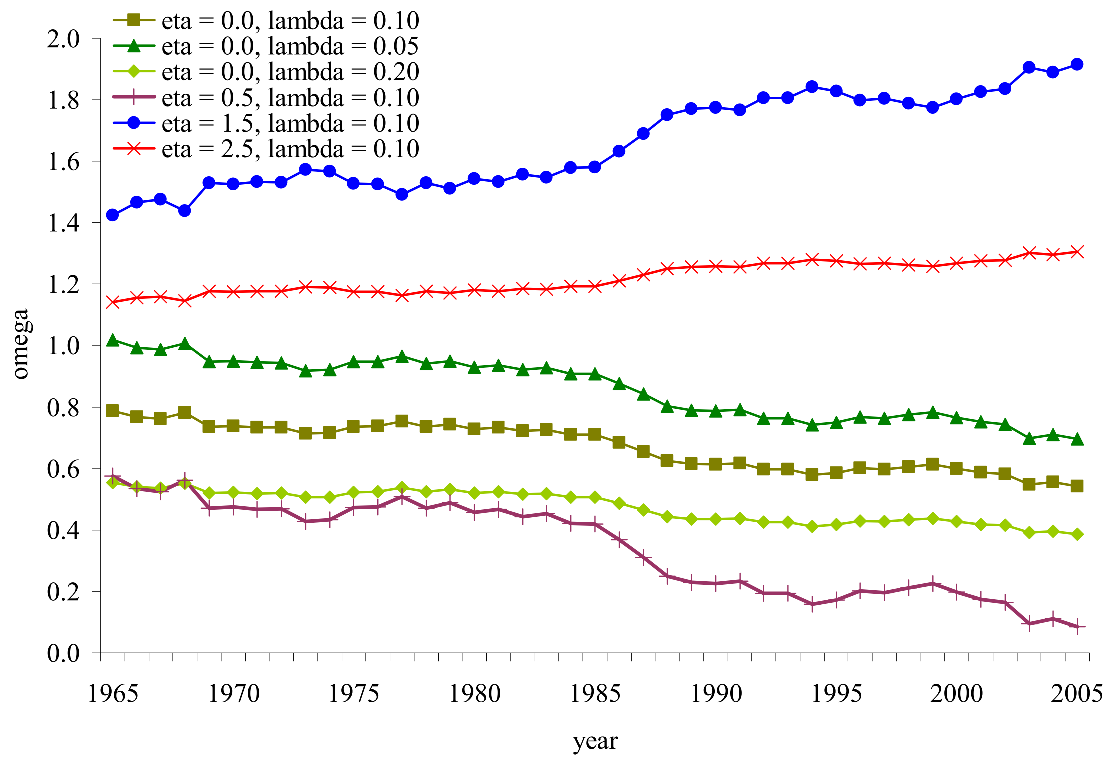

Figure 1. The pure rate of inequity aversion (ω) between 1965 and 2005 for different values of risk aversion (η) and leakiness (λ).

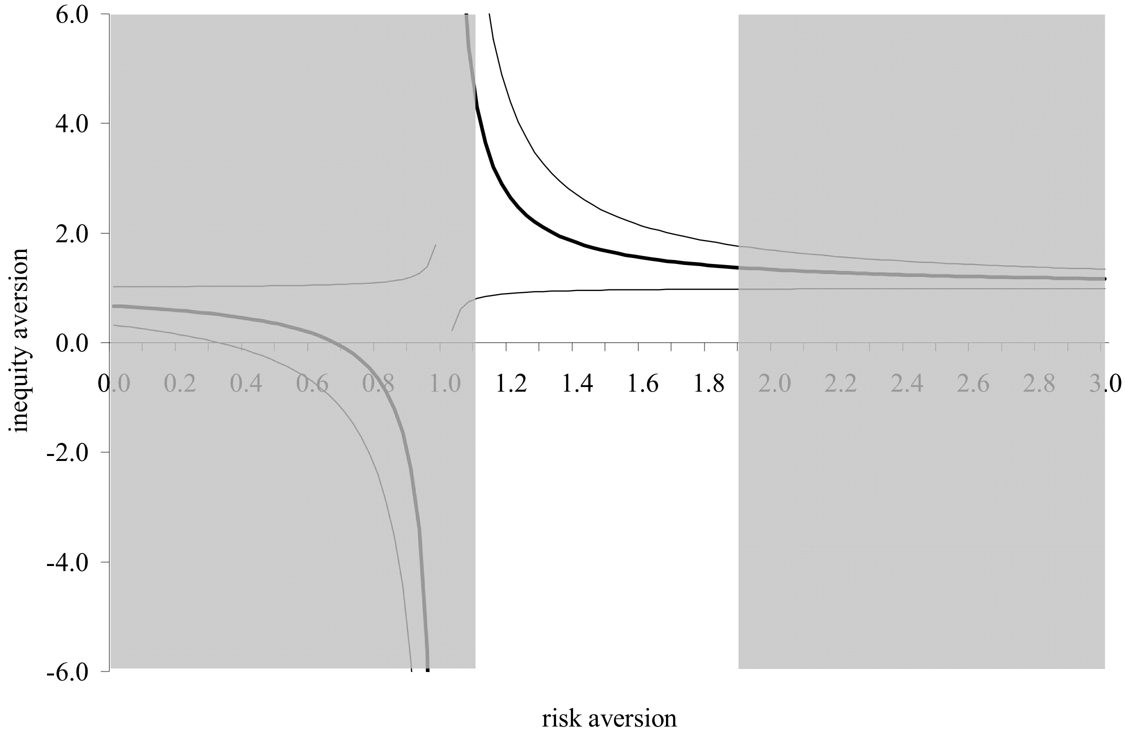

Figure 2. The pure rate of inequity aversion as a function of the rate of risk aversion for a constant consumption rate of inequity aversion (0.67±0.18). The grey areas fall outside the 95% confidence interval of the rate of risk aversion according to (Evans 2005): η=1.49±0.19.

Table A1. The value of the consumption rate of inequity aversion for different leakage rates and different years.

Year \ λ	1.00	0.95	0.90	0.80	0.70	0.60	0.50	0.40	0.30	0.20	0.10	0.05
1965	0.000	0.018	0.037	0.078	0.125	0.179	0.242	0.318	0.417	0.554	0.788	1.019
1966	0.000	0.018	0.036	0.076	0.122	0.174	0.235	0.310	0.406	0.540	0.767	0.993
1967	0.000	0.017	0.036	0.076	0.121	0.173	0.234	0.308	0.403	0.536	0.762	0.986
1968	0.000	0.018	0.037	0.079	0.125	0.179	0.242	0.318	0.416	0.552	0.781	1.008
1969	0.000	0.017	0.035	0.074	0.118	0.169	0.228	0.300	0.392	0.520	0.736	0.948
1970	0.000	0.017	0.035	0.075	0.119	0.170	0.229	0.302	0.394	0.522	0.738	0.949
1971	0.000	0.017	0.035	0.074	0.118	0.169	0.228	0.300	0.391	0.519	0.734	0.945
1972	0.000	0.017	0.036	0.075	0.119	0.170	0.230	0.302	0.393	0.521	0.735	0.944
1973	0.000	0.017	0.034	0.073	0.116	0.165	0.223	0.293	0.382	0.506	0.713	0.918
1974	0.000	0.017	0.034	0.072	0.115	0.165	0.222	0.292	0.382	0.506	0.716	0.923
1975	0.000	0.017	0.036	0.075	0.120	0.171	0.230	0.303	0.394	0.522	0.736	0.947
1976	0.000	0.018	0.036	0.076	0.121	0.172	0.232	0.304	0.396	0.523	0.737	0.947
1977	0.000	0.018	0.037	0.079	0.125	0.177	0.239	0.313	0.407	0.537	0.754	0.966
1978	0.000	0.018	0.036	0.076	0.121	0.173	0.233	0.305	0.397	0.524	0.735	0.942
1979	0.000	0.018	0.037	0.079	0.125	0.177	0.238	0.312	0.405	0.533	0.745	0.949
1980	0.000	0.018	0.036	0.077	0.122	0.173	0.233	0.305	0.396	0.521	0.729	0.929
1981	0.000	0.018	0.037	0.077	0.122	0.174	0.234	0.306	0.398	0.524	0.733	0.935
1982	0.000	0.018	0.036	0.076	0.120	0.171	0.230	0.302	0.392	0.516	0.722	0.922
1983	0.000	0.018	0.036	0.077	0.122	0.173	0.232	0.304	0.394	0.519	0.726	0.927
1984	0.000	0.017	0.035	0.075	0.118	0.168	0.226	0.296	0.385	0.507	0.710	0.908
1985	0.000	0.017	0.036	0.075	0.119	0.168	0.227	0.296	0.385	0.507	0.710	0.908
1986	0.000	0.017	0.034	0.071	0.113	0.161	0.217	0.284	0.369	0.487	0.684	0.877
1987	0.000	0.016	0.032	0.067	0.107	0.153	0.206	0.270	0.352	0.466	0.656	0.842
1988	0.000	0.015	0.030	0.064	0.101	0.144	0.195	0.256	0.334	0.442	0.624	0.803
1989	0.000	0.014	0.030	0.063	0.100	0.142	0.192	0.252	0.329	0.435	0.615	0.790
1990	0.000	0.014	0.030	0.063	0.100	0.142	0.192	0.252	0.329	0.435	0.613	0.787
1991	0.000	0.015	0.030	0.063	0.101	0.143	0.194	0.254	0.331	0.438	0.616	0.791
1992	0.000	0.014	0.029	0.062	0.098	0.140	0.188	0.247	0.321	0.424	0.597	0.765
1993	0.000	0.014	0.029	0.062	0.098	0.140	0.189	0.247	0.322	0.425	0.597	0.764

1994	0.000	0.014	0.028	0.060	0.095	0.136	0.183	0.240	0.312	0.412	0.579	0.741
1995	0.000	0.014	0.029	0.061	0.097	0.138	0.185	0.243	0.316	0.418	0.586	0.750
1996	0.000	0.015	0.030	0.063	0.100	0.143	0.192	0.251	0.326	0.429	0.601	0.767
1997	0.000	0.014	0.030	0.062	0.099	0.141	0.190	0.249	0.324	0.427	0.598	0.765
1998	0.000	0.015	0.030	0.063	0.100	0.143	0.192	0.252	0.328	0.432	0.606	0.775
1999	0.000	0.015	0.030	0.064	0.101	0.144	0.194	0.255	0.331	0.437	0.613	0.783
2000	0.000	0.015	0.030	0.063	0.099	0.141	0.191	0.250	0.324	0.428	0.599	0.765
2001	0.000	0.014	0.029	0.060	0.096	0.137	0.185	0.243	0.316	0.418	0.587	0.751
2002	0.000	0.014	0.029	0.060	0.096	0.137	0.184	0.241	0.314	0.415	0.582	0.743
2003	0.000	0.013	0.027	0.057	0.091	0.130	0.175	0.229	0.297	0.392	0.548	0.699
2004	0.000	0.013	0.027	0.058	0.092	0.131	0.176	0.231	0.301	0.397	0.556	0.710
2005	0.000	0.013	0.026	0.055	0.088	0.125	0.169	0.222	0.290	0.385	0.543	0.697

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