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Evaluating Real World Income Distributions behind the Veil of Ignorance: How Risk Averse Do You Have to Be to Prefer Europe over the US?

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Evaluating Real World Income Distributions behind the Veil of Ignorance

How Risk Averse do You have to be to Prefer Europe over the US?

by

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Abstract

The paper uses a veil of ignorance approach and income distribution data of developed countries to arrive at inequality corrected income rankings. While a risk neutral individual (based on year 2000 data) would have preferred to be born into the US rather than any European country in our sample except Luxembourg, a coefficient of relative risk aversion of 2 suffices to make several European countries look preferable. The paper also sheds light on the risk corrected average income on a gender basis and scans for times of diminished expectations, i.e. periods where the expected utility of being born into a country has reduced over time.

Keywords: Income distribution, veil of ignorance, cross country comparison

JEL classification: D31, H23

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1. Introduction

Economics as a discipline can be thought of as the art of trading off benefits and costs of decisions and finding optimal solutions to these trade-offs. Despite this omnipresence of trade-offs in economics, a 'big' one that sticks out as particularly prominent is the trade-off between efficiency and equality (Samuelson and Nordhaus 2001, chap. 19). While average income and economic equality could in principle go hand in hand, at least when efficiency has already been optimized and the economy operates on its Pareto frontier, redistribution in favor of the poor will very likely come at a cost in terms of average income achieved.

The inequality within an economy will be partly predetermined by history, like the detection and appropriation of natural resources or the inheritance of colonial roots, to give some obvious examples. At the same time, there are different ways in which countries can influence the 'big' trade-off. Redistribution via taxes and government transfers, which usually leads to deadweight losses, is an obvious candidate.[1] Unequal income and accumulation of wealth may also be fostered by certain educational systems, ethical heterogeneity, restrictions on competition in output markets, the shape of labor market rules, and the definition of property rights more generally.

The present paper sheds light on how different developed economies fare in this trade-off between efficiency and equality by taking a bird's eye view. That is, we will not go into the details of which specific factors may have shaped the actual outcome and we therefore leave aside the topical question of how globalization has influenced income distributions over time.[2] Instead we aim at ranking the actually observed income distributions of countries from the point of view of a potential entrant who only cares about the income distribution of countries after redistributive measures. From the point of view of policy makers who cannot be held responsible for inherited factors shaping the income distribution, ranking countries according to such a bird's eye view may be considered unfair. Indeed, it may be deemed unfair to the same extent as comparing the gross domestic product per capita of countries with very different histories and natural resources. Still, those comparisons are ubiquitous and generally considered helpful and illustrative. It is in the same sense that we think the rankings produced in this paper are illustrative and indicative.

[1] It has been pointed out that government redistribution may be efficiency enhancing when private insurance markets are incomplete (Sinn 1995).
[2] See Sutcliffe (2004) for a recent survey.

Clearly, a ranking of country characteristics will strongly depend on the assumed preferences of an 'impartial' potential entrant and it will therefore not be possible to arrive at a unique ranking. The answer to the question of whether, say Denmark, with mild inequality, but also a lower average income has a 'better' income distribution than the U.S. is certainly a value judgment that, irrespective of its specific result is open to debate. At the very least, a scientifically based comparison requires that the result of the comparison is objective and the basis of the judgment is interpersonally communicable. The approach taken in this paper is to use the veil of ignorance approach as suggested by Rawls (1971) and Harsanyi (1953). Given that our potential entrant, when born into a certain country, receives a random draw of income from the same income distribution as it is represented by the income of the individuals already present in that country, what country would this entrant prefer to be born into? As an example, would she prefer to be born into the U.S. rather than into Denmark? This question cannot be answered without defining a preference structure. The crucial issue for the choice between a high income and a lower risk of being poor is the amount of risk aversion assumed. A risk neutral individual will prefer the country with the higher average income, while a strong risk averter may prefer the country where the poor are relatively better off. Therefore, the topic of this paper may be paraphrased by the following question. How risk averse does a person need to be to prefer to be born into Denmark, rather than into the U.S., which would obviously promise the higher expected income? More generally, we will rank a whole set of industrialized countries based on different assumptions about the risk aversion of a potential entrant.

This potential entrant is conceptually different from real world migrants who can base their migration decisions on more precise information about the prospective income that they may earn as they know their occupation, age, gender, etc. Conversely, our fictitious entrant is assumed to find herself in the shoes of any inhabitant that is living in the respective economy with the same probability.

The idea of evaluating income distributions from behind a fictitious veil of ignorance has been around for decades. As to our knowledge, however, this paper is the first study to fill this concept with empirical content and apply it to countries' actual income distributions. While the assumed risk preferences of our entrant are open for discussion, it may be noted that the sheer introduction of her utility function as a benchmark for the evaluation of distributions

already implies a value judgment. Again, this is nothing new as it is well-known from Atkinson (1970) that the complete ranking of income distributions requires the formulation of some sort of a social welfare function. The novelty of this paper is that we do not restrict the use of the social welfare function (the expected utility of the 'impartial' observer) to the evaluation of different degrees of inequality, as done in Atkinson's seminal paper, but allow it to also make an evaluation of the trade-off between inequality and per capita income.

The basic methodology of the paper will imply using utility functions with different but constant degrees of relative risk aversion and to apply these to large representative samples of the income distributions of OECD countries. Observed net disposable income in these samples is then used to calculate expected utility indices and certainty equivalent incomes (CEI). Comparing these CEIs allows rankings of countries that indicate in which country an individual should prefer to be born into, given a certain coefficient of risk aversion.

2. Methodology

2.1 Comparison of countries behind the veil of ignorance

Consider a set of countries $i = 1 \ldots m$ with populations of mass N_i. In each country we observe an income distribution $F_i(y_i) = P_i\ (Y_i \leq y_i)$ and the density function $f_i(y_i)$. With respect to the preferences of a potential hypothetical entrant in one of these countries we make

Assumption 1. The hypothetical entrant is endowed with an exogenous utility function $U(y)$, where y is real income. That is, the utility function is independent of the country he or she chooses.

Assuming an exogenous utility function to gauge the attractiveness of income distributions is a natural way to proceed and to preserve objectivity. It also follows the spirit of Atkinson (1970), who suggests a uniform inequality aversion for comparing income distributions. At the same time, it may be mentioned that it could be argued that risk preferences may actually be correlated with the inequality in a country because individuals with a low risk aversion may lead to high risk taking and hence high inequality (Friedman 1953). There may also be an adaptation of preferences to the country one lives in. Patriotism and nationalism are self evident examples of the endogeneity of preferences and people may also adapt to 'like' the

amount of redistribution they see in their country. For the sake of objectivity, we push aside these issues.

Employing the concept of the veil of ignorance, which implies that each position in an economy is equally likely for an entrant, the expected utility from being introduced into country *i* is given by

$$(1) \qquad E_i[U(y_i)] = \int_0^1 U(y_i)\mathrm{d}F_i(y_i)\,.$$

The hypothetical entrant will prefer country *i* over *j* if $E_i[U(y_i)] > E_j[U(y_j)]$.
Several additional assumptions are necessary to apply this concept to real world comparison between countries. First, data on income distribution typically contain information on family income, while income distributions for individuals are not directly available. Empirical researchers have evaded this problem by postulating equivalence scales that are used to transform observed family income into effective individual income. The dominant way of doing so is to use a scaling factor that decreases in family size, which is used to multiply by family income to arrive at the effective individual income. We will follow this approach and make[3]

Assumption 2. Family size *z* and real family income *w* lead to effective per capita income *y* such that for each member of family *h* in country *i* we have $y_{hi} = w_{hi} / z_h^{\alpha_i}$ with $\alpha_i = \alpha \forall i$.
The utility of a member of family *h* in country *i* can be written as $U = U(y_{hi})$.

Assuming that our hypothetical entrant is introduced into his or her preferred country and takes on any position with the appropriate probability implies that he or she can be 'born' as a child, an adult or even as a retiree.[4] Lifetime happiness will in general depend on the age he or she finds herself in after entrance. An alternative assumption could be that the entrant is indeed born into the respective country as a child, but then a prediction of his or her income over the lifecycle would be necessary. Indeed, since utility during childhood depends on the

[3] Phipps and Garner (1994) compare equivalence scales for Canada and the U.S. and conclude that "equivalence scales for the two countries are not, in general, statistically different when estimated in the same way." Lancaster, Ray and Valenzuela (1999) conclude that the developed countries in their sample confirm the finding by Phipps and Garner.
[4] For this reason, in the reminder of the paper, the word born will be put in quotation marks to make clear that our hypothetical entrant is not assumed to be born as an infant.

income of the parents, detailed information about intergenerational income mobility would also be required. In the absence of cross-country data on income mobility we decided to make

Assumption 3. The hypothetical entrant is born into any position of his or her preferred country and lives for one period, only.

While this assumption is stark, it is appropriate to emphasize that an equivalent assumption is implicitly behind any normative cross-country comparison of income distributions. Comparing those distributions across countries makes sense only if there is agreement that a snapshot of observed yearly income is welfare relevant.

Assumption 4. To make our approach operational, we will restrict our attention to utility functions with a constant Arrow-Pratt measure of relative risk aversion, ε:

$$U(y_i) = \begin{cases} y_i^{(1-\varepsilon)}/(1-\varepsilon) & for\ \varepsilon \neq 0 \\ \ln(y_i) & for\ \varepsilon = 1 \end{cases} \tag{2}$$

It may be noted that given two income distributions indexed 1 and 2, an increase in ε may have a non-monotonous effect on the relative preference for the two income distributions. For $\varepsilon \neq 1$, the difference in the expected utility of the two distributions with density functions f_1, f_2 may be written as

$$\Delta \equiv E[U(y_1)] - E[U(y_2)] = \int (1/1-\varepsilon) \cdot y^{(1-\varepsilon)} \cdot \left(f_1(y) - f_2(y)\right) dy .$$

Hence $d\Delta / d\varepsilon = \int y^{-\varepsilon} \cdot \left(f_1(y) - f_2(y)\right) dy$.

The sign of the difference of the densities may change arbitrarily often as *y* increases. Since a change in ε will accentuate the difference at different incomes in a nonlinear way the sign of $d\Delta / d\varepsilon$ may change. We may note this as

Observation 1. Changing the assumption about the preference parameter ε can lead to multiple preference reversals when is changed. In other words, given two income distributions, F_1, F_2, it may be that at a low levels of ε, F_1 is preferred over F_2, at medium levels F_2 is considered better than F_1, but at high levels of ε, we again observe that F_1 is preferred over F_2.

2.2 Comparisons across countries and across time using the Atkinson index

Comparing the well-being of heterogeneous individuals across countries is one possible way of applying the veil of ignorance approach to real-world data. Another, related use is to compare a welfare index for a given country over time. A sizeable literature has questioned the practice to concentrate on observing per capita income growth and has developed the idea of pro-poor growth. A growing number of scholars in recent years have taken up ideas by Ahluwalia and Chenery (1974) and other have demanded that the income of particularly needy groups should increase and/or particular measures of poverty should decrease (see, e.g., Kakwani and Pernia (2000), Son (2004), Kraay (2004) or Son and Kakwani (2008)) to provide for 'pro-poor growth'.

In line with these contributions we suggest that a growth in real per capita income is not enough to warrant an improvement. Rather, our concept invokes the assumptions made in the section above to evaluate whether, behind a veil of ignorance, there has been a preferable change of income. Intuitively, the question that we pose here is whether a hypothetical risk-averse entrant would prefer to be 'born' into a specific country at year $t = 0$ or rather at a later year $t = 1$ with the expected utility index (or equivalently CEI) from these two options indicating the preference order. Since the income distribution of future years is unknown, the question more appropriately may be phrased as whether the hypothetical entrant would have preferred to be 'born' into a previous time period. Given the availability of a country's micro data on the income distribution at two or more points in time, it is possible to calculate the change in expected utility using (1).

Ideally, accurate calculation of the change in expected utility requires knowledge about the complete income distribution at two or more points in time or for two countries. Our access to such micro data has given us the opportunity to undertake this kind of analysis. We may note, however, that access to micro data becomes dispensable if information on the value of average income and of the Atkinson's (1970) index of inequality is provided by agencies with access to the micro data. Invoking the veil of ignorance interpretation of Atkinson' index (Dahlby 1987), where the utility function follows the functional form of equation (2), the Atkinson $A(\varepsilon)$ index is given by the expected income μ and the certainty equivalent $C(\varepsilon)$ of the income distribution:

(3) $$A(\varepsilon) = 1 - \frac{C(\varepsilon)}{\mu}.$$

Hence, the risk premium $R = \mu - C(\varepsilon) = \mu \cdot A(\varepsilon)$ and the certainty equivalent can be written as

(4) $$C(\varepsilon) = \mu \cdot (1 - A(\varepsilon))$$

At the same time,

(5) $$\mathrm{E}[U(y)] = \int_0^1 U(y)\,\mathrm{d}F_i(y) = U(C(\varepsilon)) = U(\mu \cdot (1 - A(\varepsilon))).$$

From (5) it is clear that for any expected utility function U with constant relative risk aversion (CRRA), as assumed for the calculation of the Atkinson index, comparisons of income distributions across countries and across times can be carried out by restricting attention to μ and A. If, as a special case, we consider the special case of logarithmic utility, i.e. $U(y) = \ln(y)$, then we can rewrite the expected utility and any change of it as

(6) $$E[U(y)] = \ln(\mu) + \ln(1 - A(1))$$

(7) $$\Delta E[U(y)] = \Delta\ln(\mu) + \Delta\ln(1 - A(1))$$

There are two obvious applications of equations (5) and (7). One has been mentioned above and relates to the comparison of a country's income distribution over time. From our veil of ignorance approach, the change in income distribution may be evaluated by simply looking at the change in the logarithm of average income and the change in the logarithm of one minus the Atkinson index. Clearly, for small changes the differences in logarithms can be approximated by the respective growth rates.

In addition, we can also apply the result in equation (5) and (7) to perform cross country comparisons. If we are prepared to restrict attention to the logarithmic case, a comparison of the income distributions of two countries can be carried out by looking at average income and the Atkinson index when going from one to the other country. While for some countries

individual household data on income distribution may be confidential and sometimes difficult to access, the Atkinson measure for the logarithmic case ($\varepsilon = 1$) is more broadly reported. Therefore, the result derived in equation (7) tends to extend the applicability of the veil of ignorance approach proposed here.

We should mention that Son and Kakwani (2008) have recently observed in passing the potential usefulness of the Atkinson measure to evaluate the existence of pro-poor growth, but without implementation into an expected utility or veil of ignorance setting and without acknowledging its value in cross country comparisons. In their empirical implementation they discard the Atkinson measure and give preferences to an alternative measure of pro-poor growth. A paper that discusses the application of the Atkinson measure to arrive at inequality corrected measures of income is Gruen and Klasen (2008). There are several differences to the present paper, though. First, Gruen and Klasen derive their results from aggregate figures of the World Income Inequality Database (WIID) that for example disallow discussion of gender issues. Unlike the present paper, Gruen and Klasen do not report explicit country rankings of certainty equivalent incomes, nor does their paper discuss inequality from a veil of ignorance perspective. A correction of effective income based on the Atkinson index has been proposed by Jenkins (1997), but his study is restricted to the development of inequality in the UK, only.

3 Empirical cross country comparisons

In this section we will make use of the data from the Luxembourg Income Study (2009-2011) (LIS; www.lisdatacenter.org) to compare income distributions across developed countries using the framework proposed above. The LIS data base brings together large representative household survey samples for most OECD countries. The LIS data consist of (so far six) different waves. Although we report results for all waves, the last wave (wave 6) with data from 2005 is currently available for considerably fewer countries. Thus, our cross country comparison concentrates mainly on wave 5 with data from (or around) year 2000. As of June 2009, data for 24 countries were considered as closely comparable. While, in principle, data were available for three additional countries, these were excluded because of further data limitations.[5]

[5] Australia was excluded because income in the LIS files is based on gross income. While after tax income is modeled, social assistance is not reflected. Similar concerns about the inclusion of social assistance suggested exclusion of Mexico and Russia.

The main variable of interest is the effective per capita disposable income on the household level that reflects the income tax and social security payments by households and the transfers to households. The micro data, which are accessible via job submission, were handled according to standards set by numerous studies. To compare households with different sizes we invoked Assumption 2 and, in line with the vast majority of the existing literature, we set $\alpha = 0.5$. As a standard LIS procedure to limit the effect of dubious data, for each country we bottom coded disposable income at the one percent of disposable personal income and top coded at ten times the median income (see Gottschalk and Smeeding 1997, p. 661) and dropped observations with zero or missing disposable income. For sake of comparability, all income data were converted into US dollars by using purchasing power parities. To allow for differentiated results depending on household characteristics we merged the LIS household files, which contain disposable household income, with the underlying LIS person files, which inform about age and gender of household members.

An obvious issue is the range of the risk aversion considered. For several reasons, we decided to restrict attention to $0 \leq \varepsilon \leq 2$. A first reason is plausibility. Table 1 illustrates a situation where an individual with equal probability receives either \$100,000 in a good state of the world or \$10,000 in a bad state, so μ = \$55,000. The certainty equivalent income $C(\varepsilon)$ and the maximum premium $[\mu - C(\varepsilon)]$ of course depend on the assumed value of ε. As the reader may judge from Table 1, ε values larger than two lead to unrealistically high insurance premia the individual would be willing to pay for receiving the certainty equivalent.[6] Confronted with a fifty-fifty chance of either receiving a yearly income \$100,000 or \$10,000 CRRA with $\varepsilon = 2.5$ produced a certainty equivalent of \$15,548 and an insurance premium of roughly \$40,000.

[6] A similar upper level of ε was suggested by Feldstein and Ranguelova (2001) based on a different thought experiment. Assume the there are two equally likely states of the world with the lucky state providing twice as much wealth. Then the maximum sacrifice s an individual (with CRRA) is prepared to make in the good state to receive \$1 in the bad state equals 2^{ε}. Observing that individuals with CRRA report that they do not want to trade in \$8 in the good state for \$1 in the bad state implies $\varepsilon < 3$. As the literature on the equity puzzle suggests, efforts to derive risk attitudes from stock market behavior lead to puzzling rather than plausible results, although some extreme results have received wrong interpretations (Meyer and Meyer 2005).

Table 1: Certainty equivalent incomes, a simple example

Good state	Bad state	$C(\varepsilon)$	ε	Maximum insurance premium
100,000 $	10,000 $	55,000 $	0.00	0 $
100,000 $	10,000 $	43,311 $	0.50	11,689 $
100,000 $	10,000 $	31,623 $	1.00	23,377 $
100,000 $	10,000 $	23,089 $	1.50	31,911 $
100,000 $	10,000 $	18,182 $	2.00	36,818 $
100,000 $	10,000 $	15,548 $	2.50	39,452 $
100,000 $	10,000 $	14,072 $	3.00	40,928 $

Another reason for not considering more extreme values of ε is that the value of the Atkinson measure becomes extremely sensitive to low values of incomes and data errors at the bottom of the distribution. For a discussion see Jenkins (1997). Starting with Atkinson (1970) the range $0 \leq \varepsilon \leq 2$ is the standard range assumed by studies that compare inequality across countries. Finally, the literature on experimental results suggests that risk aversion outside this range is implausible (cf., e.g., Harrision and Rutström 2008).

Making use of Assumptions 1-4, Table 2 reports on our calculations of the certainty equivalents for 24 specific countries. When a potential entrant is risk neutral ($\varepsilon = 0$) effective per capita income in 2000 was highest for Luxemburg (USD 31,040) and the US (USD 29,018). Leaving aside Luxemburg, the US is clearly outperforming European countries in term of expected disposable income and this holds even more so when we compare the US to the EU countries in our sample, leaving aside rich non-EU Norway and Switzerland. Effective disposable per capita income in the US exceeds that in Germany by 40% and that in France by 58%.

Is it possible to revert the ordering by introducing risk aversion for our hypothetical entrant? While the top-5 positions keep unchanged if we introduce moderate levels of risk aversion, the US is overtaken by Switzerland for $\varepsilon \geq 1$, by Norway for $\varepsilon \geq 1.5$, by Denmark for $\varepsilon = 1.75$ and by Austria, Germany, Belgium, Netherlands and Taiwan for $\varepsilon = 2$. In Table 2, all countries that either lose or gain at least four notches when moving from $\varepsilon = 0$ to $\varepsilon = 2$ are highlighted. All three Anglo-Saxon countries, UK, US and Canada, are in this group since they are losing at least 4 ranks. Denmark, Finland, Germany, Taiwan, the Netherlands and Slovenia are all gaining at least 4 notches. Although some affluent EU countries still fail to overtake the US, the relative distance of equivalized income is significantly smaller than with risk neutrality. For $\varepsilon = 2$, the equivalized US per capita income is only 11% higher than that of France.

Does it matter that our hypothetical entrant is allowed to be 'born' as a child or pensioner? A variant of the calculations of certainty equivalents restricts the opportunity to be 'born' into a country by looking at prime age persons between age 25 and 59 and the income distribution that is relevant for the chances of becoming a poor or rich member of a given economy is derived from this age group only. While there are some changes in rankings, the picture with respect to the Europe/US comparison is quite similar. For values up to $\varepsilon \leq 1.75$, the US is overtaken by the same set of European countries and, with the exception of Germany, the set is also the same for $\varepsilon = 2$.

3.3.1 Cross Country Comparisons and Gender Differences

An additional consideration of our cross-country comparison is the consideration of gender specific distributions. Does it matter whether we lift the veil of ignorance to inform a hypothetical entrant about his or her gender? Since by assumption the intra-family distribution is homogenous, the differences in the welfare of men and women must come from single households. Table 4 presents the rankings and the certainty equivalents derived for our set of 24 countries in year 2000. For each country, the population is separated by gender. Therefore, for each value of ε, a country is ranked twice and certainty equivalents are reported for men and women separately. The appendix " _f" denotes the ranking for females, "_m" the ranking of males. In the case of risk neutrality ($\varepsilon = 0$) all countries follow the expected pattern and the expected income of men exceeds that of women. The same holds for all countries and $\varepsilon = 0.5$ or $\varepsilon = 1$. With $\varepsilon = 1.5$, the first reversal occurs for Poland; $\varepsilon = 1.75$ brings about reversals in

Table 2: Country rankings and Certainty Equivalent Incomes 2000 (US$ & PPP adjusted), General Population

Rank	ε	0	0.5	0.75	1	1.25	1.5	1.75	2
1	LU	31040	LU	29365	LU	28578	LU	27820	LU	27088	LU	26381	LU	25694	LU	25000
2	US	29018	US	25692	US	24118	CH	22586	CH	21511	CH	20119	CH	18126	TW	16026
3	CH	26184	CH	24393	CH	23516	US	22535	US	20869	NO	19270	NO	17757	DK	15723
4	NO	23888	NO	22475	NO	21809	NO	21111	NO	20309	US	19007	DK	17199	NO	15456
5	CA	23355	CA	21370	CA	20384	CA	19342	DK	18782	DK	18127	US	16804	NL	15361
6	TW	21581	DK	20245	DK	19789	DK	19313	NL	18296	NL	17610	TW	16750	CH	15244
7	AT	21220	TW	20106	AT	19419	NL	18863	CA	18161	TW	17425	NL	16693	BE	15038
8	DK	21161	AT	20024	TW	19414	AT	18783	TW	18084	AT	17219	AT	16065	DE	14663
9	NL	20792	NL	19851	NL	19371	TW	18743	AT	18076	BE	16777	BE	16001	AT	14368
10	BE	20775	BE	19360	BE	18719	BE	18092	BE	17455	CA	16701	DE	15674	US	14164
11	UK	20739	DE	19054	DE	18431	DE	17809	DE	17168	DE	16476	CA	14758	FI	13605
12	DE	20358	UK	18654	UK	17660	UK	16641	SE	15661	FI	15011	FI	14423	FR	12706
13	IE	19098	IE	17514	SE	16769	SE	16243	UK	15515	SE	14962	SE	14032	SE	12690
14	FR	18364	SE	17274	IE	16751	FR	16079	FI	15492	FR	14817	FR	13953	CA	12195
15	SE	18298	FR	17196	FR	16638	IE	15974	FR	15490	IE	14146	IE	12860	IE	11086
16	ES	17772	FI	16786	FI	16356	FI	15930	IE	15134	UK	14145	UK	12339	UK	10000
17	FI	17712	ES	16105	ES	15301	ES	14483	ES	13607	ES	12596	ES	11332	SI	9911
18	IT	16882	IT	15298	IT	14537	IT	13765	IT	12942	IT	12003	IT	10845	ES	9690
19	IL	16393	IL	14781	IL	14016	IL	13256	IL	12467	IL	11591	IL	10529	IT	9355
20	GR	13698	GR	12437	SI	11957	SI	11603	SI	11233	SI	10838	SI	10404	IL	9149
21	SI	12983	SI	12302	GR	11813	GR	11176	GR	10495	GR	9719	GR	8763	GR	7536
22	EE	7278	PL	6631	PL	6366	PL	6076	HU	5750	HU	5547	HU	5333	HU	5089
23	PL	7152	EE	6490	HU	6159	HU	5952	PL	5725	PL	5251	PL	4564	PL	3628
24	HU	6842	HU	6374	EE	6114	EE	5730	EE	5308	EE	4804	EE	4160	EE	3355

Annotations: AT: Austria; BE: Belgium; CA: Canada; CH: Switzerland; DE: Germany; DK: Denmark; EE: Estonia; ES: Estonia; FI: Finland; FR: France; GR: Greece; HU: Hungary; IE: Ireland; IL: Israel; IT: Italy; LU: Luxemburg; NL: Netherlands; NO: Norway; PL: Poland; SE: Sweden; SI: Slovenia; TW: Taiwan; UK: United Kingdom; US: United States. Certainty equivalents are calculated in 2000 US dollar using OECD purchasing power parities (PPP). PPPs for ES and IL have been taken from Penn World Tables. LIS data for HU, NL, PL, SI, and UK are for 1999. The calculations presented assume that all household incomes in these countries between 1999 and 2000 have risen according to the average growth rate of disposable household income (HU, PL, SI: growth rate of GDP).

Table 3: Country Rankings and Certainty Equivalent Incomes 2000 (US$ & PPP adjusted), Prime Age Population

Rank	ε	0		0.5		0.75		1		1.25		1.5		1.75		2	
1	LU	30367	LU	28806	LU	28065	LU	27348	LU	26653	LU	25979	LU	25323	LU	24691
2	US	28209	US	24915	US	23356	CH	22102	CH	21104	CH	19826	CH	18005	NO	16474
3	CH	25464	CH	23794	CH	22972	US	21795	US	20165	NO	18980	NO	17952	TW	15873
4	NO	23031	NO	21680	NO	21060	NO	20435	NO	19765	US	18369	DK	16884	DK	15552
5	CA	22807	CA	20855	CA	19886	CA	18866	DK	18338	DK	17727	TW	16622	CH	15337
6	TW	21459	TW	19990	DK	19305	DK	18843	TW	17968	TW	17306	US	16285	NL	14925
7	DK	20659	DK	19752	TW	19299	TW	18628	NL	17849	NL	17182	NL	16278	BE	14535
8	AT	20452	NL	19351	NL	18887	NL	18397	CA	17717	AT	16625	AT	15559	AT	14025
9	NL	20265	AT	19294	AT	18710	AT	18100	AT	17428	CA	16308	BE	15425	US	13812
10	BE	20024	BE	18655	BE	18031	BE	17422	BE	16807	BE	16158	DE	14851	DE	13624
11	UK	19959	DE	18463	DE	17833	DE	17197	DE	16525	DE	15772	CA	14451	FI	13569
12	DE	19764	UK	17974	UK	17033	UK	16080	SE	15168	FI	14722	FI	14218	SE	12376
13	IE	18594	IE	16936	FR	16303	FR	15744	FI	15159	SE	14505	SE	13635	FR	12195
14	FR	18014	FR	16857	SE	16239	SE	15727	FR	15148	FR	14453	FR	13536	CA	12005
15	SE	17740	SE	16733	IE	16163	FI	15573	UK	15044	UK	13809	IE	12427	IE	10776
16	FI	17343	FI	16410	FI	15985	IE	15391	IE	14575	IE	13634	UK	12204	UK	10101
17	ES	17319	ES	15668	ES	14871	ES	14055	ES	13173	ES	12140	ES	10828	SI	9718
18	IT	16392	IT	14875	IT	14144	IT	13399	IT	12599	IT	11677	IT	10526	ES	9124
19	IL	16093	IL	14523	IL	13781	IL	13045	IL	12284	IL	11443	IL	10425	IL	9099
20	GR	13429	GR	12166	SI	11766	SI	11410	SI	11037	SI	10640	SI	10207	IT	9033
21	SI	12801	SI	12114	GR	11539	GR	10896	GR	10211	GR	9439	GR	8505	GR	7331
22	EE	7089	PL	6583	PL	6329	PL	6054	PL	5727	HU	5436	HU	5208	HU	4929
23	PL	7087	EE	6326	HU	6053	HU	5846	HU	5643	PL	5288	PL	4653	PL	3768
24	HU	6739	HU	6268	EE	5968	EE	5607	EE	5218	EE	4760	EE	4176	EE	3434

Annotations: See Table 2. Prime age for our purposes is defined as older than 24 and younger than 60.

Table 4. Certainty Equivalent Incomes 2000 (US$ & PPP adjusted) :

General Population by Gender

ε:	0		0.5		1		1.5		1.75		2
Country											
LU_m	31726	LU_m	29941	LU_m	29108	LU_m	28309	LU_m	27541	LU_m	26800
LU_f	30367	LU_f	28806	LU_f	27348	LU_f	25979	LU_f	25323	LU_f	24691
US_m	29862	US_m	26517	US_m	23335	CH_m	20429	CH_m	18255	NO_f	16474
US_f	28209	CH_m	25023	CH_m	23100	CH_f	19826	CH_f	18005	TW_m	16181
CH_m	26931	US_f	24915	CH_f	22102	US_m	19709	NO_f	17952	DE_m	15974
CH_f	25464	CH_f	23794	NO_m	21817	NO_m	19569	NO_m	17559	DK_m	15898
NO_m	24753	NO_m	23291	US_f	21795	NO_f	18980	DK_m	17532	TW_f	15873
CA_m	23916	CA_m	21905	NO_f	20435	DK_m	18549	US_m	17381	NL_m	15798
NO_f	23031	NO_f	21680	CA_m	19843	US_f	18369	NL_m	17137	BE_m	15601
CA_f	22807	CA_f	20855	DK_m	19805	NL_m	18064	DK_f	16884	DK_f	15552
AT_m	22051	AT_m	20830	AT_m	19552	AT_m	17900	TW_m	16879	CH_f	15337
TW_m	21701	DK_m	20756	NL_m	19350	DK_f	17727	DE_m	16659	CH_m	15152
DK_m	21675	NL_m	20368	CA_f	18866	TW_m	17544	BE_m	16654	NL_f	14925
BE_m	21575	TW_m	20220	TW_m	18856	BE_m	17476	AT_m	16647	AT_m	14793
UK_m	21537	BE_m	20127	DK_f	18843	TW_f	17306	TW_f	16622	NO_m	14556
TW_f	21459	TW_f	19990	BE_m	18834	DE_m	17291	US_f	16285	US_m	14535
NL_m	21330	DK_f	19752	TW_f	18628	NL_f	17182	NL_f	16278	BE_f	14535
DE_m	20999	DE_m	19703	DE_m	18495	CA_m	17119	AT_f	15559	AT_f	14025
DK_f	20659	UK_m	19363	NL_f	18397	AT_f	16625	BE_f	15425	US_f	13812
AT_f	20452	NL_f	19351	AT_f	18100	CA_f	16308	CA_m	15086	FI_m	13643
NL_f	20265	AT_f	19294	BE_f	17422	BE_f	16158	DE_f	14851	DE_f	13624
BE_f	20024	BE_f	18655	UK_m	17236	DE_f	15772	FI_m	14644	FI_f	13569
UK_f	19959	DE_f	18463	DE_f	17197	SE_m	15457	SE_m	14465	FR_m	13316
DE_f	19764	IE_m	18110	SE_m	16794	FI_m	15324	CA_f	14451	SE_m	13021
IE_m	19610	UK_f	17974	IE_m	16587	FR_m	15226	FR_m	14428	CA_m	12392
SE_m	18875	SE_m	17843	FR_m	16448	FI_f	14722	FI_f	14218	SE_f	12376
FR_m	18741	FR_m	17567	FI_m	16314	IE_m	14696	SE_f	13635	FR_f	12195
IE_f	18594	FI_m	17186	UK_f	16080	SE_f	14505	FR_f	13536	CA_f	12005
ES_m	18250	IE_f	16936	FR_f	15744	UK_m	14501	IE_m	13325	IE_m	11416
FI_m	18100	FR_f	16857	SE_f	15727	FR_f	14453	UK_m	12480	IE_f	10776
FR_f	18014	SE_f	16733	FI_f	15573	UK_f	13809	IE_f	12427	ES_m	10363
SE_f	17740	ES_m	16573	IE_f	15391	IE_f	13634	UK_f	12204	SI_m	10121
IT_m	17402	FI_f	16410	ES_m	14946	ES_m	13105	ES_m	11907	UK_f	10101
FI_f	17343	IT_m	15753	IT_m	14164	IT_m	12363	IT_m	11202	UK_m	9891
ES_f	17319	ES_f	15668	ES_f	14055	ES_f	12140	ES_f	10828	IT_m	9728
IL_m	16707	IL_m	15053	IL_m	13480	IL_m	11750	IL_m	10639	SI_f	9718
IT_f	16392	IT_f	14875	IT_f	13399	IT_f	11677	SI_m	10618	IL_m	9200
IL_f	16093	IL_f	14523	IL_f	13045	IL_f	11443	IT_f	10526	ES_f	9124
GR_m	13985	GR_m	12729	SI_m	11811	SI_m	11051	IL_f	10425	IL_f	9099
GR_f	13429	SI_m	12502	GR_m	11484	SI_f	10640	SI_f	10207	IT_f	9033
SI_m	13176	GR_f	12166	SI_f	11410	GR_m	10033	GR_m	9057	GR_m	7770
SI_f	12801	SI_f	12114	GR_f	10896	GR_f	9439	GR_f	8505	GR_f	7331
EE_m	7495	PL_m	6684	PL_m	6100	HU_m	5682	HU_m	5487	HU_m	5291
PL_m	7223.3	EE_m	6681	HU_m	6079	HU_f	5436	HU_f	5208	HU_f	4929
EE_f	7088.6	PL_f	6583	PL_f	6054	PL_f	5288	PL_f	4653	PL_f	3768
PL_f	7086.8	HU_m	6500	EE_m	5874	PL_m	5210	PL_m	4468	PL_m	3486
HU_m	6963.1	EE_f	6326	HU_f	5846	EE_m	4856	EE_f	4176	EE_f	3434
HU_f	6739.1	HU_f	6268	EE_f	5607	EE_f	4760	EE_m	4141	EE_m	3267

Annotations: See Table 2.Moreover, appendix " _f" denotes the ranking for females, "_m" the ranking of males.

the ordering of men and women for Norway, Poland and Estonia. The last column ($\varepsilon = 2$) ranks women better than men for these three countries plus Switzerland and the UK. Given such a comparatively large risk aversion it is better to be 'born' into these countries as a woman, although women enjoy a lower expected income.

This tendency that a higher coefficient of relative risk aversion leads to a comparatively better evaluation of female income distributions can be observed more generally. While the relative gap in the certainty equivalent of men compared to women on average across countries is 5.1% when $\varepsilon = 0$, it is only 3.5% when $\varepsilon = 2$. Or, put differently, the figures in Table 4 imply that the average risk premium that had to be paid somebody to accept the relevant distributions for women rather than that for men is €979 for $\varepsilon = 0$ and €436 for $\varepsilon = 2$.

These results provide a new perspective on the income distributions of men and women and may be contrasted with the study by Bonke, Deding and Lausten (2003) who calculate Gini coefficients for women in European countries. Their finding is that the coefficient is normally larger for women than for households, with Denmark being an exception. On the other hand, Wiepking and Maas (2005) conclude that lower poverty (receiving less than 50% of the median income) for women in the mid 1990s was less exceptional, with 7 out of 23 countries having such a situation (Belgium, the Netherlands, Denmark, Switzerland, Finland, Sweden and Ireland).

3.3.2 Has there been an Age of Diminished Expectations?

In this subsection we want to discuss the development of individual countries over time. In a well-known book, Paul Krugman (1990) concluded that, since the mid 1970s, prospects for U.S. workers had declined at least at the bottom fifth of the income distribution. The concept of the veil of ignorance leads us to look at expectations from a slightly different angle. Using the concept of expected utility, what was the best time to be 'born' into a specific country? Has it always been best to be 'born' into the latest available year or has there been a time of diminished expectation in the sense that the expected utility and the CEI of our hypothetical entrant was decreasing for some periods?

For this purpose we use all available countries and years provided by the (all) six waves of LIS database with the exception of those countries mentioned in footnote 5. The same procedure and assumptions were adopted for the calculation of the mean equivalized and

certainty equivalent income. (MEI, CEI) as in the former sections of this paper. I.e. individual utilities were aggregated and weighted to receive the overall expected utility and certainty equivalent. The values of MEI and CEI are per capita figures, purchasing power adjusted and transformed into US Dollars.

Beside reporting on CEIs over time and for different values of risk aversion, Table 5 identifies those instances where there was a time of diminished expectations. A cell has been shaded in red when, for the relevant value of ε, CEI has decreased compared to the last survey. The cell is shaded in yellow when there was a improvement compared to the last survey, but a deterioration with respect to the penultimate. Finland (1990-1995), Hungary (1990-1995), and Sweden (1990-1995) are the three countries where we could identify the time of diminished expectations for all four values of ε.[7] The identification of a time of diminished expectation depends on the value of ε. With the exception of Netherlands (1990-1995), where we detect a time of diminished expectations for $\varepsilon \leq 1$,[8] for much more cases, like Austria (1980-1995), Canada (1980-1985), the Czech Republic (1990-1995), France (1980-1985), Israel (1995-2005), Italy (1990-1995), Switzerland (1980-1990), (2000-2005), and the United Kingdom(1980-85), (1990-1995), a time of diminished expectations requires $\varepsilon > 1$. In these cases, the per capita income corrected for inequality decreased, while per capita income increased.

In several cases, exceptional circumstances that are highly plausible reasons for deterioration come into mind. In the first half of the 1990s, Finland, Italy and Sweden experienced deteriorations of expected utility (at least for $\varepsilon \geq 1$). At the same time, these countries were among those that were distressed most severely by the 1992 currency crises, which hit the European Monetary System and its periphery. The transition from a communist economy to a market economy is behind the case of the Czech Republic and Hungary.

Israel (for $\varepsilon = 2$) is the only country in our sample for which the time of diminished expectation expands over more than two five year interval.

[7] Clearly, the occurrence of such an event is dependent on the length of the time periods. Comparing adjacent years may increase the occurrence compared to looking at five year intervals as all years with negative per capita growth of disposable real income would show up for $\varepsilon = 0$.

[8] In the case of the Netherlands, we find a reversal. From 1980 to 1985 there is no reduction for high values of ε, but only for $\varepsilon \leq 1$. Recall that Observation 1 has established the possibility of such reversals.

Table 5: Certainty Equivalent Incomes (in US$ & PPP adjusted), General Population

Country	year	epsilon=0	epsilon=0.5		epsilon=1		epsilon=1.5		epsilon=2	
		CEI=MEI	CEI		CEI		CEI		CEI	
		Absolute value ($)	Absolute value ($)	as % of MEI	Absolute value ($)	as % of MEI	Absolute value ($)	as % of MEI	Absolute value ($)	as % of MEI
Austria	1985	13787	13290	96	12800	93	12299	89	11765	85
Austria	1995	15957	14917	93	13790	86	12503	78	10965	69
Austria	2000	21220	20024	94	18783	89	17219	81	14368	68
Austria	2005	25605	24038	94	22522	88	20819	81	18182	71
Belgium	1985	10329	9906	96	9482	92	9022	87	7675	74
Belgium	1990	13674	13117	96	12552	92	11943	87	11161	82
Belgium	1995	17049	16008	94	14987	88	13816	81	12077	71
Belgium	2000	20775	19360	93	18092	87	16777	81	15038	72
Canada	1970	4721	4283	91	3787	80	3132	66	2191	46
Canada	1975	6694	6184	92	5619	84	4903	73	3824	57
Canada	1980	12016	11161	93	10235	85	9081	76	7278	61
Canada	1985	15663	14617	93	13496	86	12140	78	10060	64
Canada	1990	18281	17037	93	15746	86	14215	78	11876	65
Canada	1995	19650	18285	93	16877	86	15242	78	12821	65
Canada	2000	23355	21370	92	19342	83	16701	72	12195	52
Canada	2005	28305	25879	91	23442	83	20456	72	15576	55
Czech Republic	1990	7028	6761	96	6529	93	6369	91	6181	88
Czech Republic	1995	7392	6978	94	6608	89	6313	85	6011	81
Denmark	1985	12810	12198	95	11430	89	9974	78	6614	52
Denmark	1990	13671	12962	95	12134	89	10760	79	7758	57
Denmark	1995	16402	15734	96	15048	92	14170	86	12407	76
Denmark	2000	21161	20245	96	19313	91	18127	86	15723	74
Denmark	2005	23295	22243	95	21151	91	19682	84	16556	71
Estonia	2000	7278	6490	89	5730	79	4804	66	3355	46
Finland	1985	11854	11471	97	11063	93	10570	89	9775	82
Finland	1990	14794	14240	96	13655	92	12946	88	11765	80
Finland	1995	13913	13356	96	12825	92	12264	88	11481	83
Finland	2000	17712	16786	95	15930	90	15011	85	13605	77
Finland	2005	21662	20485	95	19392	90	18242	84	16639	77
France	1980	8645	8072	93	7510	87	6887	80	6053	70
France	1985	10129	9290	92	8107	80	5875	58	2798	28
France	1990	12744	11805	93	10715	84	8884	70	5467	43
France	1995	16399	15262	93	14232	87	13198	80	11876	72
France	2000	18364	17196	94	16079	88	14817	81	12706	69

Table 5: Certainty Equivalent Incomes (in US$ & PPP adjusted), General Population (continued)

Country	year	epsilon=0	epsilon=0.5		epsilon=1		epsilon=1.5		epsilon=2	
		CEI=MEI	CEI		CEI		CEI		CEI	
		Absolute value ($)	Absolute value ($)	as % of MEI	Absolute value ($)	as % of MEI	Absolute value ($)	as % of MEI	Absolute value ($)	as % of MEI
Germany	1970	5279	4949	94	4623	88	4229	80	3542	67
Germany	1975	7693	7234	94	6804	88	6331	82	5596	73
Germany	1980	9555	9045	95	8537	89	7967	83	7138	75
Germany	1985	12382	11646	94	10932	88	10024	81	8224	66
Germany	1990	15163	14286	94	13396	88	12174	80	9653	64
Germany	1995	16628	15572	94	14510	87	13211	79	11025	66
Germany	2000	20358	19054	94	17809	87	16476	81	14663	72
Germany	2005	22860	21370	93	19994	87	18631	81	17094	75
Greece	1995	10715	9611	90	8468	79	7061	66	5018	47
Greeece	2000	13698	12437	91	11176	82	9719	71	7536	55
Greeece	2005	18344	16681	91	15023	82	13003	71	9766	53
Hungary	1990	7693	7165	93	6673	87	6173	80	5615	73
Hungary	1995	4638	4235	91	3863	83	3476	75	2959	64
Hungary	2000	6842	6374	93	5952	87	5547	81	5089	74
Hungary	2005	8953	8318	93	7752	87		80	6605	74
Ireland	1985	9316	8414	90	7482	80	6202	67	4057	44
Ireland	1995	14822	13455	91	12268	83	11196	76	10173	69
Ireland	2000	19098	17514	92	15974	84	14146	74	11086	58
Israel	1985	12228	11359	93	10530	86	9723	80	8913	73
Israel	1990	13385	12391	93	11475	86	10619	79	9814	73
Israel	1995	15736	14247	91	12816	81	11283	72	9200	58
Israel	2000	16393	14781	90	13256	81	11591	71	9149	56
Israel	2005	16891	14989	89	13118	78	11000	65	8039	48
Italy	1985	10617	9820	92	9066	85	8321	78	7530	71
Italy	1990	12931	11961	93	11068	86	10169	79	9017	70
Italy	1995	13928	12580	90	11215	81	9502	68	6780	49
Italy	2000	16882	15298	91	13765	82	12003	71	9355	55
Italy	2005	18169	16393	90	14746	81	12921	71	10299	57
Luxembourg	1985	14772	14124	96	13489	91	12838	87	12107	82
Luxembourg	1990	24980	23823	95	22761	91	21771	87	20833	83
Luxembourg	1995	27333	26121	96	24966	91	23844	87	22727	83
Luxembourg	2000	31040	29365	95	27820	90	26381	85	25000	81
Luxembourg	2005	41620	39141	94	36777	88	34313	82	31153	75
Netherlands	1985	9604	9048	94	8373	87	7124	74	4437	46
Netherlands	1990	15567	14551	93	13374	86	11385	73	7463	48
Netherlands	1995	15389	14462	94	13325	87	11616	75	8651	56
Netherlands	2000	20792	19851	95	18863	91	17610	85	15361	74

Table 5: Certainty Equivalent Incomes (in US$ & PPP adjusted), General Population (continued)

Country	year	epsilon=0	epsilon=0.5		epsilon=1		epsilon=1.5		epsilon=2	
		CEI=MEI	CEI		CEI		CEI		CEI	
		Absolute value ($)	Absolute value ($)	as % of MEI	Absolute value ($)	as % of MEI	Absolute value ($)	as % of MEI	Absolute value ($)	as % of MEI
Norway	1980	7300	6953	95	6572	90	6056	83	5074	69
Norway	1985	14859	14295	96	13711	92	12998	87	11723	79
Norway	1990	16982	16180	95	15373	91	14402	85	12804	75
Norway	1995	18299	17354	95	16387	90	15132	83	12804	70
Norway	2000	23888	22475	94	21111	88	19270	81	15456	65
Norway	2005	28569	26827	94	25168	88	23095	81	19231	67
Poland	1995	4846	4395	91	3860	80	2936	61	1524	31
Poland	2000	7152	6631	93	6076	85	5251	73	3628	51
Poland	2005	7803	7118	91	6440	83	5561	71	4013	51
Spain	1990	9468	8780	93	8103	86	7360	78	6337	67
Spain	1995	13899	12430	89	10876	78	8783	63	5583	40
Spain	2000	17772	16105	91	14483	81	12596	71	9690	55
Spain	2005	18689	17144	92	15541	83	13621	73	10718	57
Sweden	1975	4746	4555	96	4334	91	4016	85	3366	71
Sweden	1980	7419	7154	96	6850	92	6435	87	5647	76
Sweden	1985	10506	10099	96	9583	91	8647	82	6361	61
Sweden	1990	14922	14216	95	13396	90	12185	82	9747	65
Sweden	1995	13462	12823	95	12056	90	10873	81	8562	64
Sweden	2000	18298	17274	94	16243	89	14962	82	12690	69
Sweden	2005	20528	19532	95	18536	90	17346	84	15314	75
Switzerland	1980	15692	14287	91	13031	83	11548	74	9009	57
Switzerland	1990	23678	21488	91	18466	78	12682	54	5552	23
Switzerland	2000	26184	24393	93	22586	86	20119	77	15244	58
Switzerland	2005	28466	26649	94	24559	86	21083	74	13966	49
Slovenia	2000	12983	12302	95	11603	89	10838	83	9911	76
Taiwan	1980	4677	4408	94	4166	89	3941	84	3717	79
Taiwan	1985	7693	7225	94	6811	89	6426	84	6017	78
Taiwan	1990	13740	12917	94	12171	89	11475	84	10787	79
Taiwan	1995	18978	17801	94	16727	88	15720	83	14728	78
Taiwan	2000	21581	20106	93	18743	87	17425	81	16026	74
Taiwan	2005	23858	22031	92	20356	85	18734	79	16978	71
United Kingdom	1970	2956	2775	94	2610	88	2448	83	2257	76
United Kingdom	1975	4173	3911	94	3666	88	3415	82	3091	74
United Kingdom	1980	6581	6181	94	5748	87	5144	78	3946	60
United Kingdom	1985	11357	10401	92	9143	81	6834	60	3374	30
United Kingdom	1990	14795	13408	91	12050	81	10423	70	7800	53

Table 5: Certainty Equivalent Incomes (in US$ & PPP adjusted), General Population (continued)

Country	year	epsilon=0	epsilon=0.5		epsilon=1		epsilon=1.5		epsilon=2	
		CEI=MEI	CEI		CEI		CEI		CEI	
		Absolute value ($)	Absolute value ($)	as % of MEI	Absolute value ($)	as % of MEI	Absolute value ($)	as % of MEI	Absolute value ($)	as % of MEI
United Kingdom	1995	15886	14291	90	12649	80	10422	66	6821	43
United Kingdom	2000	20739	18654	90	16641	80	14145	68	10000	48
United Kingdom	2005	25482	22930	90	20547	81	17664	69	12821	50
United States	1975	6267	5709	91	5073	81	4182	67	2779	44
United States	1980	9983	9178	92	8245	83	6963	70	4914	49
United States	1985	16544	15093	91	13440	81	11170	68	7541	46
United States	1990	18916	17098	90	15137	80	12732	67	9285	49
United States	1995	21526	19136	89	16632	77	13623	63	9542	44
United States	2000	29018	25692	89	22535	78	19007	66	14164	49
United States	2005	33228	29294	88	25515	77	21193	64	15314	46

Annotations. CEI: certainty equivalent income; MEI: mean expected income.

3.3.2 Development of Rankings over Time

The detailed rankings in Table 2 to Table 4 were all set up for the year 2000. A natural question to ask is about the stability of these rankings over time.

To address this question we draw on Table 5 to produce rankings for the various years for general population. The resulting rankings are presented in Table 6a. Similarly, Tables 6b-6d exhibit rankings over time for subgroups of the population, namely prime age population (24-60), male population and female population. These additional rankings are based on additional calculations that are available on request. Throughout Tables 6a-6d, Luxemburg retains its highest rank for the time period (1990-2005) and $0 \leq \varepsilon \leq 2$. In all these tables, if one country either loses or gains at least four notches when moving from $\varepsilon = 0$ to $\varepsilon = 2$ in any year are highlighted. On the stability side, for $\varepsilon = 2$ we see that the US is always below Luxembourg, Denmark, Taiwan, and Norway in all kinds of rankings presented in Tables 6a-6d, if the respective data is available. Conversely, a country that has been falling behind is Germany after unification. This is quite understandable as addition of East Germany and comparatively slow growth since the 1980s have decreased average income. Two Nordic countries that have fallen behind are Finland and Sweden. The financial crisis in the early 1990s may be a reason.

Table 6a: Ranking Countries over time (General Population)

Year	2005	2000	1995	1990	1985	1980	1975	1970	2005	2000	1995	1990	1985	1980	1975	1970	2005	2000	1995	1990	1985	1980	1975	1970
Epsilon	Epsilon=0								Epsilon=1								Epsilon=2							
	LU	LU	LU	LU	US	CH	DE	DE	LU	LU	LU	LU	NO	CH	DE	DE	LU	LU	LU	LU	LU	CH	DE	DE
	US	US	US	CH	CA	CA	CA	CA	US	CH	CA	CH	CA	CA	CA	CA	NO	TW	TW	NO	AT	CA	CA	UK
	NO	CH	CA	US	NO	US	US	UK	NO	US	TW	CA	LU	DE	US	UK	AT	DK	CA	CA	NO	DE	SE	CA
	CH	NO	TW	CA	LU	DE	SE		CH	NO	US	NO	US	US	SE		DE	NO	NO	FI	CA	FR	UK	
	CA	CA	NO	NO	AT	FR	UK		CA	CA	NO	US	AT	FR	UK		TW	NL	DK	BE	FI	SE	US	
	AT	TW	BE	NL	DK	SE			AT	DK	DK	FI	DK	SE			FI	CH	BE	TW	IL	NO		
	UK	AT	DE	DE	DE	NO			DK	NL	BE	SE	FI	NO			DK	BE	FR	IL	DE	US		
	TW	DK	DK	SE	IL	UK			UK	AT	DE	DE	DE	UK			CA	DE	FI	SE	BE	UK		
	DK	NL	FR	UK	FI	TW			TW	TW	FR	NL	IL	TW			SE	AT	DE	DE	US	TW		
	DE	BE	AT	FI	UK	NL			DE	BE	AT	BE	SE	NL			US	US	AT	US	IT			
	FI	UK	UK	TW	IT				FI	DE	NL	TW	BE				CH	FI	IE	IT	DK			
	SE	DE	IL	BE	SE				SE	UK	FI	DK	UK				UK	FR	US	UK	SE			
	ES	IE	NL	DK	BE				ES	SE	IL	UK	IT				ES	SE	IL	DK	TW			
	GR	FR	IE	IL	FR				GR	FR	UK	IL	NL				IT	CA	NL	NL	NL			
	IT	SE	IT	IT	NL				IT	IE	IE	IT	FR				GR	IE	SE	ES	IE			
	IL	ES	FI	FR	IE				IL	FI	SE	FR	IE				IL	UK	UK	HU	UK			
	HU	FI	ES	ES	TW				HU	ES	IT	ES	TW				HU	SI	IT	CH	FR			
	PL	IT	SE	HU					PL	IT	ES	HU					PL	ES	ES	FR				
		IL	GR							IL	GR							IT	GR					
		GR	PL							SI	HU							IL	HU					
		SI	HU							GR	PL							GR	PL					
		EE								PL								HU						
		PL								HU								PL						
		HU								EE								EE						

Table 6b: Ranking Countries over time (Prime Age Population)

Year	2005	2000	1995	1990	1985	1980	1975	1970
Epsilon	**Epsilon=0**							
	LU	LU	LU	LU	US	CH	CA	CA
	US	US	US	CH	CA	CA	US	UK
	CH	CH	CA	US	NO	US	SE	
	NO	NO	TW	CA	LU	DE	UK	
	CA	CA	NO	NO	AT	FR		
	UK	UK	BE	NL	DK	SE		
	AT	BE	DE	UK	DE	NO		
	TW	DK	DK	SE	IL	UK		
	DK	TW	UK	DE	FI	TW		
	DE	AT	FR	FI	UK			
	FI	NL	AT	DK	IT			
	SE	DE	IE	TW	SE			
	ES	IE	NL	BE	BE			
	GR	SE	IL	IL	FR			
	IT	FR	ES	IT	NL			
	IL	ES	IT	FR	IE			
	HU	FI	SE	ES	TW			
	PL	IT	FI	HU				
		IL	GR					
		GR	PL					
		SI	HU					
		EE						
		PL						
		HU						

Year	2005	2000	1995	1990	1985	1980	1975	1970
Epsilon	**Epsilon=1**							
	LU	LU	LU	LU	NO	CH	CA	CA
	US	US	US	CH	CA	CA	US	UK
	NO	CH	CA	US	LU	DE	SE	
	CH	NO	NO	CA	US	US	UK	
	CA	DK	TW	NO	AT	FR		
	AT	NL	DK	SE	DK	SE		
	UK	CA	BE	FI	FI	NO		
	DK	BE	DE	NL	DE	UK		
	TW	TW	FR	DE	IL	TW		
	DE	AT	AT	UK	SE			
	FI	DE	NL	DK	BE			
	SE	UK	UK	BE	UK			
	ES	SE	IE	TW	IT			
	GR	IE	FI	IL	NL			
	IT	FI	IL	IT	FR			
	IL	FR	SE	FR	IE			
	HU	ES	IT	ES	TW			
	PL	IT	ES	HU				
		IL	GR					
		GR	HU					
		SI	PL					
		PL						
		HU						
		EE						

Year	2005	2000	1995	1990	1985	1980	1975	1970
Epsilon	**Epsilon=2**							
	LU	LU	LU	LU	LU	CH	CA	UK
	NO	TW	TW	NO	AT	DE	SE	CA
	TW	BE	CA	CA	NO	CA	UK	
	DE	NL	NO	FI	CA	SE	US	
	AT	DK	DK	BE	FI	FR		
	DK	DE	BE	TW	IL	NO		
	FI	CH	FR	DE	DE	US		
	US	NO	DE	SE	BE	UK		
	CA	US	FI	IL	US	TW		
	SE	FI	IE	US	IT			
	CH	FR	AT	IT	DK			
	UK	SE	US	DK	SE			
	ES	AT	IL	NL	TW			
	IT	IE	SE	UK	NL			
	GR	CA	NL	ES	IE			
	IL	SI	IT	HU	UK			
	HU	ES	UK	FR	FR			
	PL	IT	ES	CH				
		UK	GR					
		IL	HU					
		GR	PL					
		HU						
		PL						
		EE						

Table 6c: Ranking Countries over time (Male Population)

Year	2005	2000	1995	1990	1985	1980	1975	1970
Epsilon	Epsilon=0							
	LU	LU	LU	LU	US	CH	DE	DE
	US	US	US	CH	CA	CA	CA	CA
	NO	CH	CA	US	NO	US	US	UK
	CH	NO	TW	CA	LU	DE	SE	
	CA	CA	NO	NO	AT	FR	UK	
	UK	AT	BE	NL	DK	NO		
	AT	TW	DE	DE	DE	SE		
	TW	DK	DK	UK	IL	UK		
	DK	BE	FR	FI	FI	TW		
	DE	UK	AT	SE	UK			
	FI	NL	UK	DK	IT			
	SE	DE	IL	BE	BE			
	ES	IE	NL	TW	FR			
	IT	SE	IE	IL	SE			
	GR	FR	IT	IT	NL			
	IL	ES	FI	FR	IE			
	HU	FI	ES	ES	TW			
	PL	IT	SE	HU				
		IL	GR					
		GR	PL					
		SI	HU					
		EE						
		PL						
		HU						

Year	2005	2000	1995	1990	1985	1980	1975	1970
Epsilon	Epsilon=1							
	LU	LU	LU	LU	NO	CH	DE	DE
	US	US	US	CH	LU	CA	CA	CA
	NO	CH	CA	CA	CA	US	US	UK
	CH	NO	NO	NO	US	DE	SE	
	CA	CA	TW	US	AT	FR	UK	
	AT	DK	DK	FI	FI	SE		
	DK	AT	BE	DE	DK	NO		
	UK	NL	DE	NL	DE	UK		
	DE	TW	FR	SE	IL	TW		
	TW	BE	AT	BE	BE			
	FI	DE	NL	UK	IT			
	SE	UK	IL	DK	UK			
	ES	SE	FI	TW	SE			
	GR	IE	UK	IL	NL			
	IT	FR	IE	IT	FR			
	IL	FI	SE	FR	IE			
	HU	ES	IT	ES	TW			
	PL	IT	ES	HU				
		IL	GR					
		SI	HU					
		GR	PL					
		PL						
		HU						
		EE						

Year	2005	2000	1995	1990	1985	1980	1975	1970
Epsilon	Epsilon=2							
	LU	LU	LU	LU	LU	CH	DE	DE
	AT	TW	TW	NO	AT	CA	CA	UK
	NO	DE	CA	FI	NO	DE	SE	CA
	DE	DK	NO	CA	CA	FR	UK	
	TW	NL	DK	BE	FI	SE	US	
	FI	BE	BE	DE	IL	NO		
	DK	CH	FR	TW	BE	US		
	CA	AT	DE	IL	US	UK		
	US	NO	FI	US	DE	TW		
	CH	US	AT	SE	IT			
	SE	FI	IE	IT	DK			
	UK	FR	US	DK	SE			
	ES	SE	IL	UK	TW			
	IT	CA	NL	NL	UK			
	GR	IE	SE	ES	IE			
	IL	ES	IT	HU	NL			
	HU	SI	UK	FR	FR			
	PL	UK	ES	CH				
		IT	GR					
		IL	HU					
		GR	PL					
		HU						
		PL						
		EE						

Table 6d: Ranking Countries over time (Female Population)

Year	2005	2000	1995	1990	1985	1980	1975	1970
Epsilon	Epsilon=0							
	LU	LU	LU	LU	US	CH	DE	DE
	US	US	US	CH	CA	CA	CA	CA
	NO	CH	CA	US	LU	US	US	UK
	CH	NO	TW	CA	NO	DE	SE	
	CA	CA	NO	NO	AT	FR	UK	
	AT	TW	BE	NL	IL	SE		
	UK	DK	DE	SE	DK	NO		
	TW	AT	FR	DE	DE	UK		
	DK	NL	DK	FI	FI	TW		
	DE	BE	AT	UK	UK			
	FI	UK	UK	TW	IT			
	SE	DE	IL	BE	BE			
	ES	IE	NL	DK	FR			
	GR	FR	IE	IL	SE			
	IT	SE	ES	IT	NL			
	IL	FI	IT	FR	IE			
	HU	ES	FI	ES	TW			
	PL	IT	SE	HU				
		IL	GR					
		GR	PL					
		SI	HU					
		EE						
		PL						
		HU						

Year	2005	2000	1995	1990	1985	1980	1975	1970
Epsilon	Epsilon=1							
	LU	LU	LU	LU	LU	CH	DE	DE
	NO	CH	TW	CH	CA	CA	CA	CA
	US	US	CA	CA	NO	DE	US	UK
	CH	NO	US	NO	US	US	SE	
	CA	CA	NO	US	AT	FR	UK	
	AT	DK	DK	FI	FI	SE		
	DK	TW	BE	SE	DK	NO		
	TW	NL	DE	NL	IL	UK		
	UK	AT	FR	DE	DE	TW		
	DE	BE	AT	BE	BE			
	FI	DE	NL	TW	IT			
	SE	UK	FI	DK	SE			
	ES	FR	IL	UK	UK			
	GR	SE	UK	IL	NL			
	IT	FI	IE	IT	FR			
	IL	IE	SE	FR	TW			
	HU	ES	IT	ES	IE			
	PL	IT	ES	HU				
		IL	GR					
		SI	PL					
		GR	HU					
		PL						
		HU						
		EE						

Year	2005	2000	1995	1990	1985	1980	1975	1970
Epsilon	Epsilon=2							
	LU	LU	LU	LU	LU	CH	DE	DE
	NO	NO	TW	NO	NO	DE	CA	UK
	AT	TW	NO	CA	AT	CA	SE	CA
	TW	DK	CA	FI	CA	FR	UK	
	DK	CH	DK	BE	FI	SE	US	
	FI	NL	FR	TW	IL	NO		
	DE	BE	BE	SE	BE	US		
	SE	AT	FI	IL	IT	UK		
	CA	US	AT	IT	US	TW		
	US	DE	DE	US	DE			
	UK	FI	IE	DE	DK			
	CH	SE	US	UK	SE			
	ES	FR	IL	DK	TW			
	IT	CA	SE	NL	IE			
	GR	IE	NL	ES	UK			
	IL	UK	UK	CH	NL			
	HU	SI	IT	HU	FR			
	PL	ES	ES	FR				
		IL	GR					
		IT	HU					
		GR	PL					
		HU						
		PL						
		EE						

Annotations: See Table 2. Placement of countries in Table 6a is based on calculations presented in Table 5; for Table 6b-6d calculations are available on request.

Table 7a: General Population

Ranks	Epsilon=0			Epsilon=1			Epsilon=2		
	1985	1995	2005	1985	1995	2005	1985	1995	2005
1	US	LU	LU	NO	LU	LU	LU	LU	LU
2	CA	US	US	CA	CA	US	AT	TW	NO
3	NO	CA	NO	LU	TW	NO	NO	CA	AT
4	LU	TW	CA	US	US	CA	CA	NO	DE
5	AT	NO	AT	AT	NO	AT	FI	DK	TW
6	DK	DE	UK	DK	DK	DK	IL	FI	FI
7	DE	DK	TW	FI	DE	UK	DE	DE	DK
8	IL	AT	DK	DE	AT	TW	US	AT	CA
9	FI	UK	DE	IL	FI	DE	IT	US	SE
10	UK	IL	FI	SE	IL	FI	DK	IL	US
11	IT	IT	SE	UK	UK	SE	SE	SE	UK
12	SE	FI	IT	IT	SE	IT	TW	UK	IT
13	TW	SE	IL	TW	IT	IL	UK	IT	IL

Table 7b: Prime Age Population

Ranks	Epsilon=0			Epsilon=1			Epsilon=2		
	1985	1995	2005	1985	1995	2005	1985	1995	2005
1	US	LU	LU	NO	LU	LU	LU	LU	LU
2	CA	US	US	CA	US	US	AT	TW	NO
3	NO	CA	NO	LU	CA	NO	NO	CA	TW
4	LU	TW	CA	US	NO	CA	CA	NO	DE
5	AT	NO	UK	AT	TW	AT	FI	DK	AT
6	DK	DE	AT	DK	DK	UK	IL	DE	DK
7	DE	DK	TW	FI	DE	DK	DE	FI	FI
8	IL	UK	DK	DE	AT	TW	US	AT	US
9	FI	AT	DE	IL	UK	DE	IT	US	CA
10	UK	IL	FI	SE	FI	FI	DK	IL	SE
11	IT	IT	SE	UK	IL	SE	SE	SE	UK
12	SE	SE	IT	IT	SE	IT	TW	IT	IT
13	TW	FI	IL	TW	IT	IL	UK	UK	IL

Table 7c: Male Population

Ranks	Epsilon=0			Epsilon=1			Epsilon=2		
	1985	1995	2005	1985	1995	2005	1985	1995	2005
1	US	LU	LU	NO	LU	LU	LU	LU	LU
2	CA	US	US	LU	US	US	AT	TW	AT
3	NO	CA	NO	CA	CA	NO	NO	CA	NO
4	LU	TW	CA	US	NO	CA	CA	NO	DE
5	AT	NO	UK	AT	TW	AT	FI	DK	TW
6	DK	DE	AT	FI	DK	DK	IL	DE	FI
7	DE	DK	TW	DK	DE	UK	US	FI	DK
8	IL	AT	DK	DE	AT	DE	DE	AT	CA
9	FI	UK	DE	IL	IL	TW	IT	US	US
10	UK	IL	FI	IT	FI	FI	DK	IL	SE
11	IT	IT	SE	UK	UK	SE	SE	SE	UK
12	SE	FI	IT	SE	SE	IT	TW	IT	IT
13	TW	SE	IL	TW	IT	IL	UK	UK	IL

Table 7d: Female Population

Ranks	Epsilon=0			Epsilon=1			Epsilon=2		
	1985	1995	2005	1985	1995	2005	1985	1995	2005
1	US	LU	LU	LU	LU	LU	LU	LU	LU
2	CA	US	US	CA	TW	NO	NO	TW	NO
3	LU	CA	NO	NO	CA	US	AT	NO	AT
4	NO	TW	CA	US	US	CA	CA	CA	TW
5	AT	NO	AT	AT	NO	AT	FI	DK	DK
6	IL	DE	UK	FI	DK	DK	IL	FI	FI
7	DK	DK	TW	DK	DE	TW	IT	AT	DE
8	DE	AT	DK	IL	AT	UK	US	DE	SE
9	FI	UK	DE	DE	FI	DE	DE	US	CA
10	UK	IL	FI	IT	IL	FI	DK	IL	US
11	IT	IT	SE	SE	UK	SE	SE	SE	UK
12	SE	FI	IT	UK	SE	IT	TW	UK	IT
13	TW	SE	IL	TW	IT	IL	UK	IT	IL

Annotations: See Table 2. Placement of countries in Table 7a is based on calculations presented in Table 5; for Table 7b-7d calculations are available on request.

For a more transparent picture of rank changes over time we also report rankings for selected countries for which data was available for all benchmark years (1980-2005) out of all countries included in the analysis. Results are presented in Table 7. In all these consistent sample based tables, countries that either lose or gain at least three (rather than four) places when moving from $\varepsilon = 0$ to $\varepsilon = 2$ are highlighted. A majority of the countries experience shifts or rank changes for higher assumed levels of risk aversion compared to their rank in mean expected income (MEI). US and UK show particularly pronounced downward shifts for higher values of risk aversion. This prevails in rankings done for sub groups of population. Finland and Taiwan are examples of countries that always see improvements in their ranks as ε goes up. This also holds for sub groups of populations.

4. Conclusion and Discussion

This paper offers an evaluation of real world income distributions from a veil of ignorance perspective in which a hypothetical risk averse individual has to decide on the economy she would like to be 'born' into. A main conclusion that can be drawn from our exercise of calculating certainty equivalent incomes for a large set of developed countries is that the differences in income inequality indeed matter strongly for the ranking of our sample of 24 developed countries. Assuming a coefficient of relative risk aversion of 2, many European countries such as Austria, the Netherlands, Belgium, Switzerland and Norway are able to overtake the US, which gauged by average real household income is outperforming all European countries except Luxembourg.

The magnitude of the risk aversion does also play a role for the question of whether countries have always improved over time. Using data on five year intervals, we have identified spells during which expected disposable income has increased, while the certainty equivalent of that disposable income has not, implying what we call a time of diminished expectation.

Our study compares incomes across countries after deducting from real disposable income a risk premium depending on observed income inequality. This approach combines two sets of problems. It shares the problems inherent in the cross country comparisons of income. At the same time, it also faces the problems that arise in comparing income distributions internationally. This should be kept in mind.

As in simple cross-country comparisons, nominal incomes have to be translated into real income in one common currency, which obviously depends on the reliability of purchasing power parity indices. While we have excluded countries where social assistance is obviously not included in the data, data on disposable income cannot be expected to adequately reflect in kind benefits provided by governments, such as health care. Similarly, publicly provided goods are ignored, probably making countries with a large public sector look inadequately poor. An important caveat is that no correction for different amounts of leisure has been made, which should bias the deck in favor of the U.S., in particular when compared to continental Europe. At the same time, statistics of disposable income may underestimate the amount of capital gains, leading to a bias against economies where share ownership is particularly important.

Although recent efforts such as the Luxembourg Income Survey have greatly contributed to our knowledge of income distributions across countries, comparisons imply some difficult choices and data problems. For example, in some countries, a considerable fraction of the population is not represented because of imprisonment. Perhaps more importantly, the LIS data used represent a snapshot and does not allow comparing income mobility over time.

At the same time, all these problems are inherent in either cross country comparisons of disposable income or in cross-country comparisons of income inequality and are usually not considered sufficient reason to abstain from country rankings.

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