Miserly Developments

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II Conferência IESE

"Dinâmicas da Pobreza e Padrões de Acumulação Económica em Moçambique"

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Paper to be presented at II Conferencia do IESE "Dinamicas da Pobreza e Padrões de Acumulação em Moçambique", Maputo, 22 e 23 de Abril de 2009.

Abstract

In many countries extreme poverty is unnecessary. Yet it persists. We propose a simple index, denoted the Miser index, to measure the extent to which societies have poverty in the midst of affluence. It builds on the generalized Lorenz curve, but can also be seen as a measure of polarization between the rich and the poor. We calculate the index for a number of developing and emerging economies and rank them according to their revealed miserliness. We also identify important correlates of the Miser index. Countries that score high on the index tend to be socially fractionalized, bureaucratically inefficient, and politically corrupt. They provide their citizens with a low level of health care and education. Democracy and high growth rates do not moderate miserliness. Finally, considering the world as a single entity, we find a dramatic rise in global miserliness over the last 30 years.

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For one very rich man, there must be at least five hundred poor, and the affluence of the few supposes the indigence of the many.

Adam Smith (1776: Book V, ch 1. p 232)

1 Introduction

While a miser, according to the dictionary, is a person who hoards wealth and lives miserably, a miserly society is one where the rich hoard wealth and let the rest live miserably. In the midst of the industrial revolution, Giammaria Ortes (1777) claimed that this kind of polarization of the wealth of nations was the rule as "advantages and evils always balance one another: The great richness of a small number are always accompanied by the absolute privatization of the first necessaries of life for many others. The wealth of a nation corresponds with its population, and its misery corresponds with its wealth."[1] Obviously not a mechanical law, this special form of inequality is yet the sad situation in many developing countries today. Equally remarkable, however, is the huge variation in the distribution of advantages and evils across these countries.

Tanzania, for instance, has 90 per cent of its population below 2 PPP$ per day which is not surprising since annual GNI is 555 PPP$ per capita. Nicaragua, however, has almost the same level of poverty (80 per cent below 2 PPP$ per day), but is more than five times as rich per capita. Jamaica, with an income level at par with Nicaragua (3500 vs 3210 PPP$ per capita), has only 13 per cent of its population below two dollars a day. Clearly the three countries cannot be equally generous.

In this paper we try to measure how stingy societies are as indicated by their revealed willingness to let people live miserably in spite of a financial ability to provide for all. To measure miserliness we have to decide what it means to live miserably. In this paper we focus on the extremely poor – those who live below two dollars a day.[2] Next, we have to derive criteria for evaluating different degrees of miserliness – our Miser index.

The Miser index is a proxy for the attitudes that allow poverty in the midst of affluence. It can be written as actual poverty multiplied with a weight that is higher the higher the total income of the non-poor and the lower the income of the poor. A society is therefore considered to be more miserly the more unnecessary any poverty would be and the higher actual poverty is. Miserliness shows up as unused opportunities to do good.

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[1]Cited from Marx (1867, p.709) who also had his own version of the same story: "Accumulation of wealth at one pole is...at the same time accumulation of misery, agony of toil, slavery, ignorance, brutality, mental degradation, at the opposite pole...".

[2]In a companion paper we plan to discuss the cases of OECD countries.

We use the index to rank countries according to their miserliness. Large middle income countries like South Africa, Argentina, Mexico, China and the Philippines are all found among the most miserly countries in world. To see what characteristics miserliness is associated with we correlate the index with social indicators such as health care, military spending, foreign aid, life expectancy, fertility and education and with indicators of the quality of institutions and governance. We are interested in the relationship between economic growth and miserliness. Does stronger miserliness generate higher growth or does higher growth reveal stronger miserliness? In order to address questions like these we test whether early miserliness explains later growth, or whether early growth explains later miserliness.

Since moral concerns should not follow national borders we also incorporate the developed countries that do not have extreme poverty themselves, but nevertheless should be concerned with the extent of extreme poverty in other countries. We are interested in how miserliness evolve as countries grow richer. Are the world becoming more or less parsimonious over time?

The type of poverty related miserliness that we focus on is a special form of inequality between the poor and the non-poor. We denote it absolute inequality as it builds on generalized Lorenz curves that reflect the total amount of resources distributed, i.e. on Lorenz curves that are scaled up by the average incomes as discussed by Shorrocks (1983). While a rise in income that does not benefit the poor indicates higher miserliness, any redistribution from the rich to the poor indicates a lower degree of miserliness. Miserliness as absolute inequality also implies that a poor country cannot become as miserly as a rich one at its worst.

Since a miserly society must have a high level of polarization between the rich and the poor, the Miser index is conceptually close to measures of polarization (Esteban and Ray 1994, Duclos, Esteban, and Ray 2004). It can also be interpreted as a measure of public policy failures. Just as a miser would not have to live miserably if he reallocated some of his wealth for consumption, we have to account for social allocation failures at the society level. In this respect, the Miser index complements the recent paper by Kanbur and Mukherjee (2007) who develop an index of poverty reduction failures with a different axiomatic foundation and a somewhat different structure to ours. We return to the indexes of polarization and redistribution failures in Appendix B. Like the measures established by Esteban and Ray and Kanbur and Mukherjee our index builds on the huge literature on the evaluation of opulence, poverty and inequality (see e.g. Cowell 2000, Dutta 2002, and Bojer 2003 for surveys). It is closest to the works that derive their measures axiomatically from welfare concerns starting with Atkinson (1970), Kolm (1969), Sen (1976a), Foster et al. (1984), and Thon (1982). As poverty can be seen as an important form of deprivation, our approach complements Yitzhaki's (1979) study of the relationship between deprivation and the Gini coefficient, but we focus on poverty and a strict dichotomy between the poor

and the non-poor.[3]

Below, we first discuss our Miser index and provide some interpretations. We then use the measure to rank countries and to identify important correlates of the measure. We conclude by a discussion of whether the world as a whole in fact has become more or less miserly over time. In Appendix A we derive the index axiomatically.

2   Miserly measured

An income distribution is characterized by a vector $\mathbf{Y} = (y_1, \ldots, y_n)$. The poverty line is given by z. Assume that agents are ranked according to income so

$$y_1 \leq y_2 \leq y_q < z \leq y_{q+1} \leq \ldots \leq y_n,$$

and hence that q is the number of people below the poverty line z and $h = q/n$ is the head count measure of poverty, denoted $h = h(\mathbf{Y}, z)$. We call h the *poverty rate*. When comparing different societies, the poverty line z is assumed constant. For any income distribution $\mathbf{Y}$, let $\bar{Y}$ denote the mean $\sum_{i=1}^{n} y_i/n$, $\bar{Y}_p$ denote the mean $\sum_{i=1}^{q} y_i/q$ among the poor, and $\bar{Y}_R$ denote the mean $\sum_{i=q+1}^{n} y_i/(n-q)$ among the non-poor.

Recall that a miserly society is one where the rich hoard wealth and let the rest live miserably. Thus our basic idea is that a society can be thought of as miserly if it is rich and unequal. The relevant inequality is between the poor and the rest of society, where the poverty line divides society in two groups: the poor below the line, and the rich above the line. To gain in focus we restrict attention to this dichotomy implying that inequality between the two groups is more decisive poverty related miserliness than inequality within the two groups.

To establish a simple and transparent measure of poverty related miserliness that can be computed from readily available aggregate data, we suggest the following index:

$$M = h(1-h)\left(\bar{Y}_R - \bar{Y}_P\right) = h\left(\bar{Y} - \bar{Y}_P\right) \tag{1}$$

The second equality follows since average income is equal to $\bar{Y} = h\bar{Y}_P + (1-h)\bar{Y}_R$. Below we elaborate on why this index is suitable to capture poverty related miserliness and discuss some of its properties. In Appendix A we derive the index axiomatically.

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[3]Our index should not be confused with the misery index initially proposed by Arthur Okun and later popularized by Robert Barro. Their index is simply equal to the inflation rate plus the unemployment rate of a country and is meant to be a proxy for economic and social costs of bad macroeconomic policies.

2.1 Interpretations

This Miser index can be interpreted in several ways. Consider first the form $M = h(1 - h)\left(\bar{Y}_R - \bar{Y}_P\right)$. When a rich and a poor person meet both experience a social divide. The average economic cleavage between the two in such encounters is $\left(\bar{Y}_R - \bar{Y}_P\right)$. Whenever either two rich or two poor persons meet they feel no divide as they belong to the same group. With random matches the probability that a rich and a poor person meet is $2h\left(1 - h\right)$ and the unconditional expected disparity is just proportional to $h\left(1 - h\right)\left(\bar{Y}_R - \bar{Y}_P\right) = M$. Thus the Miser index can be interpreted as the expected disparity with random matches. This interpretation is closely related to the literature on polarization and fractionalization, particularly the part focusing on the social distance between groups (see Esteban and Ray 1994 and Lind 2007).

Consider next the form $M = h\left(\bar{Y} - \bar{Y}_P\right)$. This way of writing the Miser index expresses the total income shortfall of the poor from the average income. Hence, miserliness is high when there are many poor whose incomes deviate heavily from the average income in society. M expresses the cost of bringing all the poor persons up to the average income of society. Miserliness, however, would vanish long before everybody gets $\bar{Y}$. As soon as all poor persons pass the poverty line, the poverty rate h becomes zero and so does the Miser index. Yet, miserliness can be be seen as the cost of the poor of deviating from the mean. The rich can transfer some of their wealth to help the poor, but their social concern is sufficiently low that they do not. Miserliness is hence associated with low social empathy with the poor. Most likely, a high value of M reveals a combination of low empowerment of the poor, weak social institutions to their benefit, and a low empathy with the worst off by the better off in society.

The miser index may finally be interpreted as the Gini coefficient of group-wise inequality (social cleavage) as $\mathcal{G} = h(1 - h)(\bar{Y}_R - \bar{Y}_P)$ is the absolute rich-poor Gini coefficient. As incomes have to be taken relative to the poverty rate z, however, it does not have the usual independence of scale property. An illustration of the construction of the Miser index from a generalized Lorenz curve (Shorrocks 1983) is shown in Figure 1. The figure shows two cases, where the poverty rate h and the average income of the poor, $\bar{Y}_P$, is the same in both cases. In the first case, average income is $\bar{Y}$ and the miser index is given by the area of the fully drawn triangle. This area is easily calculated as equal to $h\left(1 - h\right)\left(\bar{Y}_R - \bar{Y}_P\right)$ (where $\bar{Y}_R = \left(\bar{Y} - h\bar{Y}_P\right) / \left(1 - h\right)$). In the second case, the average income of the non-poor is higher so average income is $\bar{Y}'$ and the Miser index is given by the area of the stipulated triangle equal to $h\left(1 - h\right)\left(\bar{Y}'_R - \bar{Y}_P\right)$ (where $\bar{Y}'_R = \left(\bar{Y}' - h\bar{Y}_P\right) / \left(1 - h\right)$). As seen, this increases the area and thus the Miser index goes up.

Figure 1: Relationships between the miser index and generalized Lorenz curves.
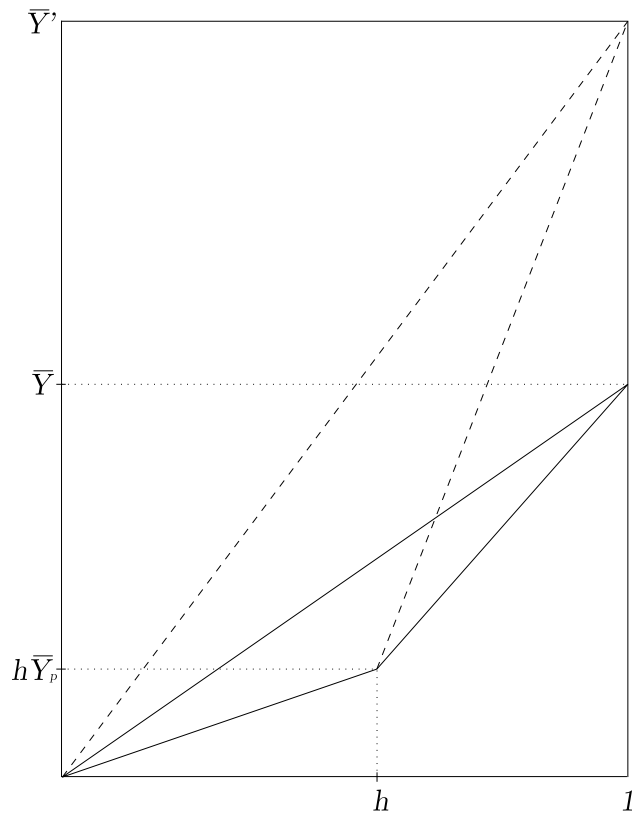
2.2 Intuitive Properties

The Miser index satisfies basic intuitions about miserly societies: Firstly, intuition tells us that poverty in the midst of affluence is an indication of miserliness. Miserliness M can be expressed as the poverty rate h multiplied by affluence of the rich $(1-h)\left(\bar{Y}_R - \bar{Y}_P\right)$. It also appeals to intuition that for a given affluence the revealed miserliness is higher the more poverty there is.

Secondly, intuition tells us that for a given average income of the country $\bar{Y}$ the maximum miserliness refers to a situation where all incomes go to one person and where all others get nothing (and thus remain poor) and the minimum miserliness is guaranteed by sharing the total income equally.

Thirdly, intuition tells us that the impact of a higher $\bar{Y}_R$ on the revealed miser attitudes should not be particularly high when either the poverty rate is extremely high or extremely low. When the poverty rate is extremely high there are consequently few contributors to poverty relief and the burden on each of them becomes high. To denote a rich person a social miser if he does not contribute under these circumstances, may therefore require that he has a higher income $\bar{Y}_R$ than in cases with lower poverty rates and more potential contributors. When the poverty rate is extremely low the impact of a higher $\bar{Y}_R$ on the revealed miser attitudes should be low as the poverty problem is less severe. Thus for a given average income of the rich $\bar{Y}_R$, revealed miserliness should be highest at intermediate levels of poverty. This is captured by our measure as M is highest when $h = 1/2$ (for given $\bar{Y}_R$) which implies that the dependency ratio $h/(1-h)$ the number of poor relative to non-poor members is equal to 1.

2.3 Implicit taxes

Below we also report the costs of alleviating poverty expressed as implicit tax rates. Consider therefore the poverty gap

$$g = \frac{1}{q}\sum_{i=1}^{q}\frac{z - y_i}{z} = \frac{z - \bar{Y}_P}{z}$$

implying that the total shortfall from the poverty line is hgz (a conservative estimate of the amount of resources needed to bring the poor out of poverty). It can be expressed as a share of the total income per capita $\bar{Y}$ or as a share of the total income of the non-poor $(1-h)\bar{Y}_R$. Specifically,

$$t_x = \frac{hgz}{\bar{Y}} \quad \text{and} \quad t_I = \frac{hgz}{(1-h)\bar{Y}_R} \tag{2}$$

where we label t_x the *production tax* and t_I the *income tax*. It should be noticed, however, that these rates are not necessarily feasible taxes in any sense. As stated we use them as indications of the magnitude of poverty relative to the countries' ability to transfer resources

to the poor. Inserting the production tax in the expression of the Miser index gives us

$$M = hz \frac{g - (1 - g)\, t_x}{t_x}$$

showing that all else being the same, miserliness is higher the lower the tax rate t_x.

3 Miser rankings and its correlates

To calculate the miser index it is sufficient to know some numbers that are readily available. The World Bank, for instance, reports the average income (GNI) per capita $\bar{Y}$, the head count ratio of poverty h for the relevant poverty line z, and the poverty gap ratio g, which are sufficient to calculate the Miser index M.[4]

3.1 GNI and miserliness

Our data includes an unbalanced panel of 100 countries and 373 observations. Figure 2 shows a scatter plot of the calculated miser index against GNI per capita. As we see there is a considerable variation among miserly countries. Many of them have reasonably high incomes, and could therefore easily afford to alleviate extreme poverty at a quite low cost. Both quite poor countries and quite rich countries are among the countries with high levels on the miser index. This confirms that the index measures something beyond income.

A worry one may have is that the miser index is just a reinvention of Sen (1976b). In this paper, he derives axiomatically the welfare index $\bar{Y}(1 - \mathcal{G}^I)$ where $\mathcal{G}^I$ is the ordinary Gini coefficient using individual incomes instead of the group incomes used to calculate the miser index. The Sen measure gives weight both to income levels and distribution. Thus his index measures something that might be related to miserly attitudes. Figure 3 shows the relationship between the miser index and Sen's welfare measure. It is seen that the relationship is very weak; the correlation between the two is only 0.02. Hence, it is clear

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[4]In World Bank publications the poverty gap $\hat{g}$ is (somewhat strangely) defined as

$$\hat{g} = h \frac{\left(z - \bar{Y}_P\right)}{z}$$

implying that $\bar{Y}_P = z\left(1 - \hat{g}/h\right)$. The average non-poor excess income $\left(\bar{Y}_R - \bar{Y}_P\right)$ becomes

$$\bar{Y}_R - \bar{Y}_P = \frac{\overline{Y} - h\bar{Y}_P}{1 - h} = \frac{\overline{Y} - z\left(h - \hat{g}\right)}{1 - h},$$

We find data on $\overline{Y}, h, \hat{g}$ for a large number of countries, and for some countries for several years, in the World Development Indicators (World Bank 2007). When $\bar{Y}_R$, $\bar{Y}_P$, and h are known we can easily calculate the miser index $m = h\left(1 - h\right)\left(\bar{Y}_R - \bar{Y}_P\right) = h\left[\overline{Y} - z\left(h - \hat{g}\right)\right]$.

Figure 2: The relationship between the Miser index and national income
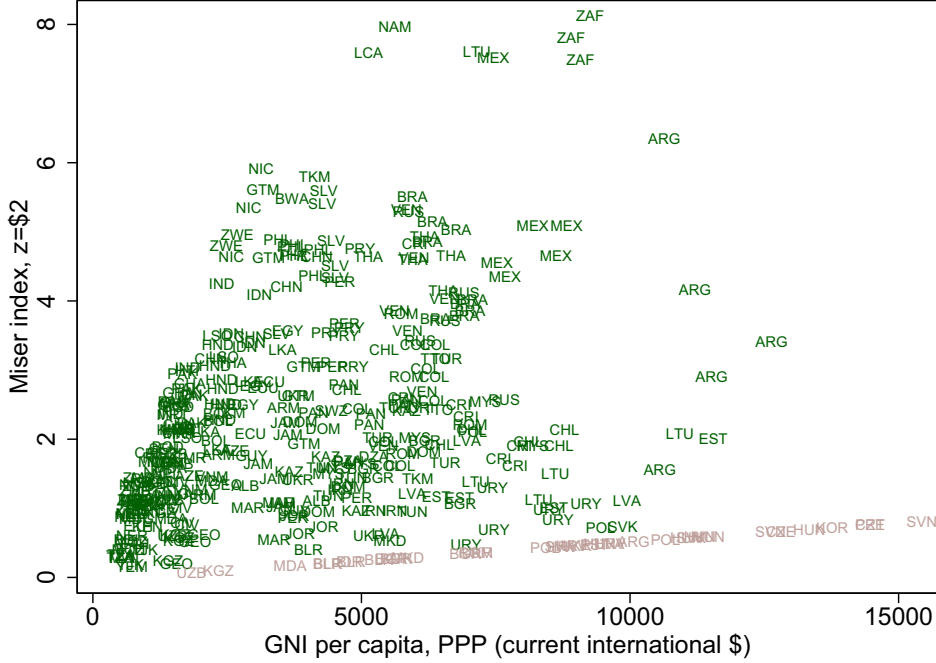
Countries with head count rates below 2% are depicted in grey

that the miser index captures something else than Sen's measure[5] because it is designed to capture something else. Consider for instance a situation where inequality and poverty go up for a given $\bar{Y}$. While Sen offers a simple formula to assess how welfare declines in this case, we offer a simple formula to assess how revealed miser attitudes may have risen under these circumstances. In fact, a measure that is increasing in inequality – as $\bar{Y}\mathcal{G}^I$ – would be more in line with our reasoning. But again, the correlation between our miser index and $\bar{Y}\mathcal{G}^I$ is only 0.43.

3.2 Rankings of miserly countries

Table 1 shows the 20 most miserly countries.[6] In Appendix C we report the full ranking of all developing (and emerging) countries.

As seen from Table 1, South Africa turns out to be the most miserly country according to our data. South Africa is rich by African standards, but has nevertheless a very high poverty rate of more than 34 per cent in year 2000. The total poverty gap is less than one per cent (the production tax) of GNI. The huge inequalities of the country is inherited from

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[5]There is some tendency for a hump-shaped relationship between the two variables though. A regression of the miser index on the Sen measure and the square of the Sen measure yields a R^2 of 0.10.

[6]For each country, the most recent data are used.

Figure 3: The relationship between the Miser index and the Sen (1976) welfare measure

Table 1: The 20 most miserly countries

Country	Survey year	Production tax (%)	Income tax (%)	Head count ratio (%)	GNI/cap	Miser index
South Africa	2000	1.21	1.32	34	9260	8.12
Namibia	1993	4.82	5.42	56	5623	7.97
St. Lucia	1995	4.52	5.19	60	5136	7.59
Argentina	2003	0.71	0.77	23	10638	6.34
Nicaragua	2001	11.70	14.06	80	3134	5.91
Botswana	1986	7.38	8.86	61	3707	5.48
Zimbabwe	1995	17.29	21.24	83	2487	4.8
Philippines	2000	3.78	4.58	47	4200	4.74
Mexico	2002	0.70	0.77	21	8618	4.65
China	2001	3.94	4.78	47	4170	4.64
El Salvador	2002	3.93	4.67	41	4511	4.5
India	2000	13.43	17.61	81	2400	4.24
Thailand	2002	0.86	0.98	26	6526	4.14
Venezuela	2000	1.64	1.91	28	5620	3.85
Brazil	2003	1.05	1.19	22	7026	3.85
Peru	2002	2.58	3.09	32	4683	3.67
Egypt	2000	2.78	3.56	44	3630	3.57
Paraguay	2002	3.33	4.02	33	4347	3.54
Indonesia	2002	4.70	6.28	52	2985	3.39
Sri Lanka	2002	3.05	3.92	41	3532	3.29

apartheid. But since ANC took over in the early 1990s South Africa could have 'eliminated' all its extreme poverty by a rather small tax on the non-poor of just above 1 per cent in year 2000. Having not done so can be interpreted as a sign that the process of social and political conciliation after the war has lead to continued miserly behavior towards the poor – as our index indicates.

Moving down the list there is an interesting contrast between Argentina - the fourth most miserly country - and Nicaragua - the fifth most miserly country on our list. While Argentina is almost four times as rich as Nicaragua (measured by GNI per capita) and could have eliminated its poverty of 23 per cent of the population by an income tax on the non-poor of 0.6 per cent (or a production tax of a little more than 0.5 per cent only), Nicaragua would need an income tax of almost 11 per cent (or a production tax of almost 10 per cent) to eliminate its poverty rate of close to 80 per cent of the population. In spite of these huge differences the two countries end up as almost equally miserly according to our index. The basic reason for this is that the average income of the non-poor in Nicaragua is at the same level as the average income of the non-poor in Argentina. This can actually be read from the table as a poverty rate h around 20 per cent (in Argentina) and around 80 per cent (in Nicaragua) yielding the same value of the product $h(1-h)$. Thus the two countries must have similar average incomes per non-poor member as they end up with an almost equal index score of $M = h(1-h)\left(\bar{Y}_R - \bar{Y}_P\right)$. In fact, while the higher affluence $(1-h)\left(\bar{Y}_R - \bar{Y}_P\right)$ in Argentina is mitigated in the miser index by a lower poverty rate, the four times higher poverty rate in Nicaragua is mitigated in the miser index by a lower affluence.

Since the China - India comparison is often emphasized (see for instance ch 11 in Drèze and Sen 1989) it should be noted that Table 1 ranks China way above India in miserly attitudes (6th place versus 12th place). The head count measure of poverty in India is almost twice as high as the Chinese level. The reason why China is considered more miserly than India is basically that China is more affluent and has more potential contributors to alleviate poverty than potential receivers of poverty support. This is in contrast to the poorer India that has more than 80 per cent potential receivers of poverty relief and only 20 per cent contributors.

It is also interesting to see from Table 1 that Botswana, the African growth success par excellence, actually ends up among the top twenty miserly countries (on 18th place on our list). Although the country since independence has experienced the highest economic growth in the world, it has been much less successful in eliminating poverty. In 1986 (the most recent observation of poverty levels in the country) the poverty rate was still more than 60 per cent. Sri Lanka on the 20th place is also considered a success story according to some social indicators. For instance, the population of Sri Lanka has a life expectancy at birth of almost 73 years, which is way beyond what other countries at this income level have. Yet Sri Lanka has not been equally successful in eliminating income poverty.
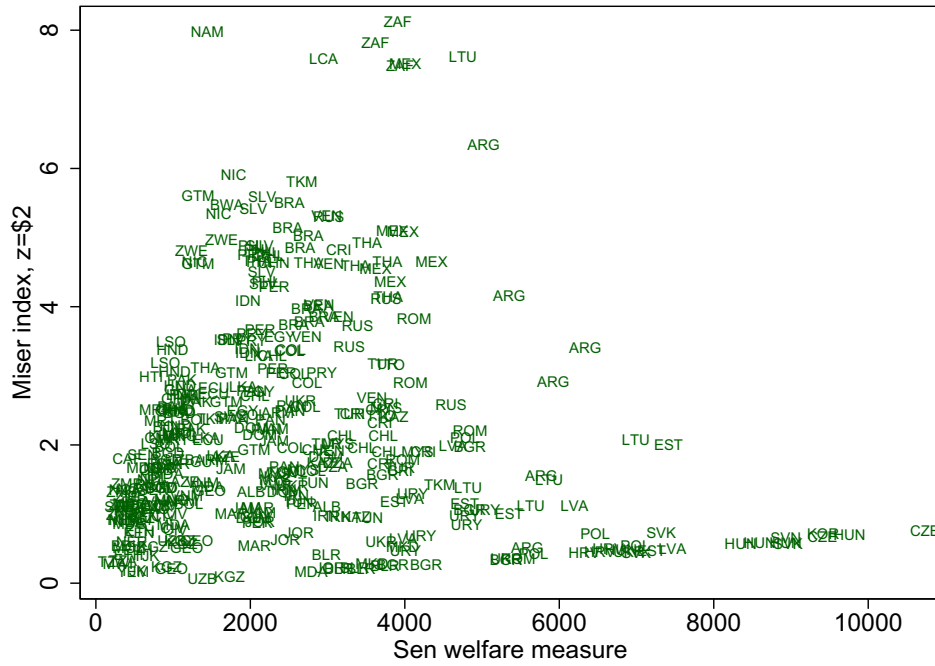
Table 2: The 20 least miserly countries

Country	Survey year	Production tax (%)	Income tax (%)	Head count ratio (%)	GNI/cap	Miser index
Yemen	1998	18.42	-407.75	45	726	0.16
Malawi	1998	58.85	1134.17	76	580	0.29
Tanzania	2001	82.05	514.05	90	537	0.33
Tajikistan	2003	11.78	59.77	42	969	0.4
Ethiopia	2000	33.87	173.57	78	780	0.49
Mozambique	1997	46.00	220.72	78	713	0.51
Burundi	1998	70.08	262.9	88	622	0.55
Kyrgyz Republic	2003	2.50	5.31	23	1608	0.57
Ukraine	2003	0.15	0.18	5	5135	0.6
Jordan	2003	0.26	0.33	7	4298	0.73
Slovak Republic	1996	0.08	0.08	3	9867	0.73
Kenya	1997	19.35	61.21	56	1017	0.73
Mali	1994	81.21	172.64	91	665	0.92
Niger	1995	67.97	156.22	86	717	0.92
Tunisia	2000	0.20	0.23	7	5950	0.95
Iran	1998	0.23	0.27	7	5618	0.96
Benin	2003	28.54	74.68	73	988	0.96
Guyana	1998	0.90	1.17	11	3742	0.96
Jamaica	2000	0.70	0.93	13	3500	1.02
Bulgaria	2003	0.13	0.15	6	6838	1.07

The table only reports countries with a head count ratio above 2%.

Let us then move to the other end of the list. Table 2 ranks the least miserly countries according to our measure. As seen on the top of this list the least miserly country is Yemen. It is evident from the table that most of the least miserly countries should be classified as extremely poor - half of them have a GNI per capita less than 1000 USD per year. The richer countries included, like the Slovak Republic, typically have rather low poverty rates, and hence do not reveal strong miser attitudes.

3.3   Poverty and hypothetical tax rates

Table 3 shows what the hypothetical tax rate is like for countries of different levels of poverty as measured by the head count ratio. We concentrate on the income tax rate t_I – the tax rate that measures the magnitude of the poverty problem relative to total affluence.

As the table demonstrates, there are 11 country observations with poverty in the range between zero and five per cent, all of which could eliminate their poverty with a tax rate of less than 0.1 per cent. Of the 17 observations of poverty rates in the range between 20 to 40 per cent, 18 per cent could eliminate their poverty by a tax rate of less than 1 per cent, and all of them by a tax rate less than 10 per cent. Similarly, of the 17 observations of poverty rates between 40 and 60 per cent, more than half of them could eliminate their poverty by a tax rate in the range between 1 and 10 per cent. Finally, only 9 observations of the 97 could not eliminate their poverty by a tax rate of less than 100 per cent.

Table 3: Income tax by level of poverty

	Tax rate							
	0-0.1%	0.1%-1%	1%-10%	10%-20%	20%-50%	50%-100%	Above 100%	Total
0-5%	9	2	0	0	0	0	0	11
10%-20%	0	8	4	0	0	0	0	12
20%-40%	0	3	14	0	0	0	0	17
40%-60%	0	0	9	4	2	2	0	17
60%-80%	0	0	1	2	10	2	3	18
80%-100%	0	0	0	1	2	2	6	11
Total	9	24	28	7	14	6	9	97

The table shows the number of countries within each interval of the head count measure which fall into the interval of the tax rate on excess income, i.e. income above the poverty line z. For each country, the most recent data are used.

3.4   The correlates of miserliness

To see some of the characteristics of miserly countries, Table 4 shows the results from regressions of a number of indicators of policies and social outcomes on the miser index, controlling for log income. There is no clear direction of causality in these estimates, so they should be seen more as correlations than structural relationships.

Table 4: The correlation of the miser index with some outcome measures

	Miser index		Observations	R^2
	Coefficient	t-value		
Health expenditure, public (% of GDP)	-0.251	(2.46)**	146	0.39
Military expenditure (% of GDP)	0.197	(0.64)	283	0
Fertility rate, total (births per woman)	0.129	(2.28)**	225	0.54
Life expectancy at birth, total (years)	-0.34	(0.73)	220	0.59
Literacy rate, adult total (% of people ages 15 and above)	3.29	(0.91)	10	0.26
Aid (% of GNI)	-0.066	(0.27)	360	0.44
Labor force with primary education (% of total)	4.185	(2.45)**	63	0.14
Labor force with secondary education (% of total)	-4.568	(3.14)***	61	0.29
Labor force with tertiary education (% of total)	0.028	(0.02)	62	0
School enrollment, primary (% gross)	2.322	(2.72)***	120	0.22
School enrollment, secondary (% gross)	-3.558	(2.98)***	114	0.49
School enrollment, tertiary (% gross)	-3.62	(3.06)***	109	0.46

*The table shows the estimates from a regression of the outcome on the miser index and log income. T-values clustered at the country level in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%*

First, we see that more miserly countries on average have lower public expenditures on health. This is what we should expect. A general provision of health care is a pro-poor policy, and since miserly countries are considered to reveal little care for the poor one should expect that they do not spend much on general health care. As Table 4 demonstrates, there is a tendency that fertility rates are higher in more miserly countries. This may be interpreted as a side effect of a low level of health care, low education, and most likely the absence of social insurance. As seen from the table, primary education is positively associated with miser attitudes, while secondary and tertiary education are negatively associated with miser attitudes. In sum Table 4 demonstrates that miserly countries educate their populations to a limited extent, and do neither provide them with health care nor with higher education.

As Table 4, also demonstrates we find no relationship between (i) military expenditures and miser attitudes, and between (ii) the inflow of foreign aid and miser attitudes. Thus we find no support for our hunch that miser attitudes go together with canons for butter policies (but the data on military spending are not particularly reliable). Neither does it seem to be the case that miserly countries are favored by the international aid community.

Next we attempt to identify what institutional arrangements affect miser attitudes. Table 5 shows the results from regressions of the miser index on measures of democracy from the Polity IV database (Marshall and Jaggers 2000).

The first thing we notice is that, controlling for log income, democratic regimes do not seem to be more miserly than autocratic regimes. From columns (1) to (3), this effect is seen to hold when using the measure of democracy, the measure of autocracy, and the composite of the two. This finding is in line with views emphasizing that democracy in developing

Table 5: The relationship between the miser index and measures of democracy

Log GNI	0.670***	0.603***	0.630***
	(3.13)	(2.95)	(2.99)
Institutionalized democracy score	0.000654		
	(0.02)		
Institutionalized autocracy score		-0.0519	
		(-1.25)	
Democracy-Autocracy			0.0117
			(0.58)
Constant	-2.968*	-2.318	-2.677*
	(-1.92)	(-1.46)	(-1.70)
R^2	0.115	0.123	0.117
Observations	281	281	281

Dependent variable is the Miser index with poverty line $z = 2$\$. T-values clustered at the country level in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

countries is more efficient in fighting temporary poverty related to famines and catastrophes than they are in fighting chronic poverty, which shows up as a high level of persistent extreme poverty (see for instance Drèze and Sen, 1989, and Sen, 2000). Building on this, one possible assertion is that the chronic poor can be more of a threat to autocratic regimes than to democratic. Hence democracy in developing countries is no guarantee against miser attitudes towards the worst off.

Regressions reported in Table 6 focus on different proxies for institutional quality. From the table we notice that good institutional quality seems to reduce the level of miser attitudes. In column (1), the index used is an average of five indexes that capture the rule of law, bureaucratic quality, corruption in government, risk of expropriation and government repudiation of contracts, taken from Sachs and Warner (1997). One reading of this finding is that miserly countries tend to have more rule bending and to be more venal and bureaucratically inefficient. Columns (2) to (8) corroborate these findings using the six dimensions of Kaufmann et al.'s (2006) governance indicators.[7]

The two findings that (i) democracy and (ii) bad institutions both tend to go along with miser attitudes also hold when we control for them simultaneously (results not reported here, but available upon request). It is therefore tempting to assert that many miserly countries tend to be imperfect democracies with bad institutions.

A final variable we include in these regressions is the measure of ethno-linguistic fractionalization (ELF) derived from Bruk and Apenchenko (1964), and popularized by e.g.

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[7]We use the 2005 observations of the indicators to maximize the size of the sample. As institutions are not changing quickly, this should be an innocent approach.

Easterly and Levine (1997) who find that ELF has a detrimental effect on growth as well as most factors known to boost growth. Controlling for per capita income, we find that more fractionalized countries tend to be more miserly. This suggests that miserly behavior is associated with low social cohesion.

3.5 Growth

A final point that we consider is the relationship between miser attitudes and growth. On the one hand, one could imagine that miserly countries, by hoarding wealth among the rich, would boost investments and hence grow faster, potentially generating a trickle down effect to the poor at some stage of development. If this were true we may have misclassified countries as miserly while they instead may follow a strategy of growth-mediated poverty alleviation. The high levels of poverty that they presently have may be due to some non-monotonicity between growth and extreme poverty (à la Kuznets 1955). On the other hand, miserly countries may simply be very unequal countries with a high level of social exclusion that both can be viewed as obstacles to growth and development.

Table 7 show the results from some growth regressions. We look at growth during three periods, 1960-2000, 1975-2000, and 1990-2000. In columns (1) to (3), we use the earliest measure of the miser index available in an attempt to capture the causal effect of miser attitudes on growth. There seems to be essentially no impact from the miser index to the subsequent growth.

In columns (4) to (6) in table 7, we instead use the most recent measure of the miser index available. Now there seems to be a positive relationship between miserliness and growth, albeit not a strongly significant one. In addition we have to admit that it is not easy to interpret the causality of this relationship. Given the results in columns (1) to (3), the most reasonable assertion may be that growth increases the affluence of the country without reducing poverty very much. Thus miserly countries can be seen as countries with inequitable growth that makes the non-poor richer and leave the worst off further behind.

Consider the Miser index M in a case where the income of the poor is negligible low ($\bar{Y}_P = 0$). In a society where the income of the rich grows with a certain rate, how fast does poverty have to decline in order to have non-increasing miserliness? From $M = h\left(1 - h\right)\bar{Y}_R$ we obtain

$$\frac{\dot{M}}{M} = \frac{\dot{\bar{Y}}_R}{\bar{Y}_R} + \left(\frac{1 - 2h}{1 - h}\right)\frac{\dot{h}}{h}$$

implying that

$$\dot{M} \geq 0 \Rightarrow \frac{\dot{h}}{h} \geq -\frac{1 - h}{1 - 2h}\frac{\dot{\bar{Y}}_R}{\bar{Y}_R}\text{for} \quad h \neq 1/2$$

Table 6: The relationship between the miser index and measures of institutional quality end ethnolinguistic fractionalization

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log GNI	0.890***	0.545***	0.694***	0.706***	0.664***	0.752***	0.799***	1.137***
	(4.91)	(3.22)	(4.35)	(3.70)	(3.46)	(4.43)	(4.58)	(4.23)
Quality of institutions	-0.242*							
	(-1.80)							
Voice and accountability		-0.0397						
		(-0.20)						
Political stability and absence of violence			-0.363**					
			(-2.23)					
Government effectiveness				-0.346				
				(-1.21)				
Regulatory quality					-0.260			
					(-1.02)			
Rule of law						-0.550**		
						(-2.28)		
Control of corruption							-0.630**	
							(-2.25)	
Ethno-linguistic fractionalization								0.0125*
								(1.69)
Constant	-3.553**	-2.237*	-3.602***	-3.628**	-3.244**	-4.134***	-4.546***	-7.125***
	(-2.39)	(-1.71)	(-2.92)	(-2.38)	(-2.15)	(-3.07)	(-3.23)	(-3.10)
R^2	0.177	0.066	0.094	0.078	0.075	0.098	0.102	0.236
Observations	242	373	373	373	373	373	373	236

*Dependent variable is the Miser index with poverty line $z = 2\$$. T-values clustered at the country level in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%*

<div align="center">Table 7: Growth and misery</div>

	(1)	(2)	(3)	(4)	(5)	(6)
	Earliest measure of Miser index			Latest measure of Miser index		
	1960-2000	1975-2000	1990-2000	1960-2000	1975-2000	1990-2000
Miser index	0.000938	0.000377	0.000110	0.00251**	0.00161	0.00176
	(0.74)	(0.29)	(0.08)	(2.03)	(1.26)	(1.24)
Log initial GDP	-0.00359	-0.000650	0.00310	-0.00487*	-0.00156	0.000553
	(-1.30)	(-0.22)	(1.02)	(-1.82)	(-0.55)	(0.20)
Constant	0.0408**	0.0163	-0.0121	0.0462**	0.0203	0.00360
	(2.07)	(0.75)	(-0.52)	(2.43)	(0.97)	(0.16)
R^2	0.030	0.001	0.015	0.086	0.022	0.021
Observations	60	74	81	60	75	86

*Dependent variable is average annual growth rates over the given period. The measure of the Miser index employed is either the earliest available observation or the last available observation. T-values in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%*

Miserly countries may have a growth of the average income of the non-poor $\overline{Y}_R$ that is higher than $(1 - 2h)/(1 - h)$ times the reduction in poverty. Growing incomes to the rich with a yearly rate of say k per cent is consistent with a constant miser index if it is met by (i) a yearly reduction in the number of poor people that is higher than k per cent when $h < 1/2$, and (ii) a growth in poverty that is less than k per cent when $h > 1/2$.

The growth performance of miserly countries reminds us of what Jagdish Bhagwati (1958) denoted immiserizing growth. In Bhagwati's case, economic growth could make the majority worse off as the country, because of high growth, could experience a fall in the terms of trade and thus a fall in real incomes. In our case the growth is real enough but a large fraction can nevertheless be excluded from its gains due to vanishing empathy or socially bad institutions.

Our results do not contradict Dollar and Kraay (2002) who in a sample of 92 countries find that "average incomes of the poorest fifth of a country rise and fall at the same rate as average incomes". To grow with the same rate as the average income (of the non-poor) is not enough, however. A stronger reduction in poverty rates would be achieved by redistributing from rich to poor, but this tool does not seem to be heavily used, as empirically observed poverty alleviation is more strongly driven by rises in average incomes than in changes in the distribution (Kraay 2006). As discussed in Section 2, revealed miser attitudes can rise even when poverty rates are reduced with the same percentage as incomes grow.

4 Is the world becoming more miserly?

Figure 4: The evolution of the Miser index globally

We could also treat the whole world as one society where the rich have a responsibility for helping the poor. How miserly is then the world, and how has this changed over time? To answer these questions, we have made some fairly rough calculations of the global Miser index from 1975 to 2005. The data sources are the same as above. We first calculate the head count ratio and poverty gap ratio for all available countries by linearly interpolating the available data. For countries without data on poverty, we treated poverty as zero if the country had a GNI above 10 000 PPP\$, otherwise as missing. Adding up, we get the results shown in Figure 4.

Related, but different, questions of global inequality (Milanovic 2005, Sala-i-Martin 2006) and global poverty (Chen and Ravallion 2001) have received a lot of attention recently. The debate on how to derive properties of the global income distribution is still not settled, and some of the suggested solutions are both computationally complicated and data demanding. We follow a cruder approach than most of this literature, but do also answer a different question. Our results are reasonable, although they portray a rather pessimistic picture. Global miserliness has been rising almost monotonically over the whole period. The head count ratio has declined somewhat, from about 51 per cent to about 44 per cent, but this is out of proportion to the global GNI per capita, which has almost doubled over the same period. Only a very small fraction of global growth over the last twenty years has gone to alleviate poverty, hence the dramatic rise in global miserliness.

Table 8 shows the corresponding tax rates on production and income of the non-poor to alleviate poverty. Although a tax rate of about 5% on the excess income of the non-poor was

Table 8: Global tax rates to alleviate poverty

Year	Production tax	Income tax
1975	3.34	4.91
1980	3.04	4.41
1985	2.98	4.21
1990	2.56	3.42
1995	2.09	2.67
2000	1.72	2.15
2005	1.56	1.86

All tax rates in percentages

necessary to alleviate poverty in 1975, this has been steadily decreasing due to the growth in global income per capita. In 2005 the tax rate reached 1.86%, or only 1,56% of global GNI.

5   Conclusion

Throughout the world there is a lack of social and political responsibility for the worst off in society. Poverty persists in the midst of affluence. To capture some of this, we have developed a simple yet powerful measure of societies' revealed miserliness – the Miser index. This index is not a passive reflection of how rich the various countries are. Countries with similar levels of national income per capita have in fact huge variations in miserliness.

The Miser index allows us to rank countries according to their tendency to hoard wealth and let the poor live miserably. Almost half of the twenty most miserly countries in the world have a population of 40 million or more. Among them we find two, Argentina and Mexico, which the UN classifies as countries with high human development. Only one of the top twenty, Zimbabwe, is classified as a country with low human development. The rest of the top twenty are countries with medium human development according to the UN's Human Development Report (UNDP 2006).

We also find that high poverty persists in countries with low financial costs of getting rid of it. About a third of our 97 country observations are cases where the government could have eliminated their substantial poverty by transferring resources to the poor that amount to less than 1 per cent of the total incomes of the non-poor. Such transfers are not necessarily the best way to fight poverty, but the numbers put the magnitude of the poverty problems in perspective.

Considering a large set of factors that may potentially be correlated with miser attitudes, we find, among other things, that miserly countries neither provide their populations with good heath care nor do they offer their citizens higher education. It is also clear that democracy is no guarantee against miser attitudes, and that miserly countries tend to be

socially fractionalized, bureaucratically inefficient and politically corrupt.

Indexes like ours may guide the implementation of the Millennium goals (UN Millennium Project 2005, Sachs 2005). As miserly countries could alleviate poverty fairly easily by redistributing domestic resources, one should perhaps concentrate foreign assistance on less miserly countries.

Finally, what we call miserly countries should not be mistaken as countries that follow growth-mediated poverty alleviation. There is no connection between initial miserliness and subsequent economic growth. On the contrary, many countries with high growth tend to have a miserly development. This can be viewed as a special form of immiserizing growth that makes the rich richer and leaves the poor further behind. This development is also true for the miser attitudes for the world as a whole. We find a dramatic rise in global miserliness over the recent 30 years.

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A   An axiomatic characterization of the miser index

Now we want to derive an index of poverty related miserliness $M = M(\mathbf{Y}, z)$ from a set of axioms. ,,, and the poverty line has no other normative effects than separating the poor from the rest. All this is captured by our first axiom:

- **Focus:** Keeping the number of poor persons constant, (i) a change in the poverty line z does not affect miserliness, i.e. if $h(\mathbf{Y}, \mathbf{z}') = h(\mathbf{Y}, \mathbf{z})$ then $M(\mathbf{Y}, z') = M(\mathbf{Y}, z)$, (ii) a transfer from rich to less rich, or from poor to poorer leaves miserliness the same,

i.e. if $\mathbf{Y}'$ is obtained from $\mathbf{Y}$ by a redistribution among the poor or a redistribution among the rich so that $h\left(\mathbf{Y}', z\right) = h\left(\mathbf{Y}, \mathbf{z}\right)$, then $M(\mathbf{Y}', z) = M(\mathbf{Y}, z)$.

One reason why the poverty line ought not to have a separate influence on miserliness beyond its impact via the poverty rate is simply its somewhat arbitrary determination. Changing the poverty line z alters the position of both the rich and the poor relative to the poverty line - but does not alter the income gap between them. For a given poverty rate, experienced miserliness should be thought of as this income gap between the rich and the poor where the poverty line z plays no other role than separating the poor from the rich. Miserliness therefore characterizes the lack of warranted redistribution, and any redistribution in favor of the poor reduces miserliness:

- **Transfer**: A transfer from rich to poor decreases miserliness, implying that our index satisfies the Pigou-Dalton criterion. Formally, if $\mathbf{Y}'$ is obtained from $\mathbf{Y}$ by a transfer from rich to poor, then $M\left(\mathbf{Y}, z\right) > M\left(\mathbf{Y}', z\right)$.

The measures that satisfy Focus and Transfer constitute the class of measures of miserliness. To further structure the measure we need some additional restrictions. One reasonable restriction is that special needs that are fully compensated should not affect miserliness. For instance, two societies should be considered equally miserly if they are identical except that some needs are higher in one of them and all incomes and the poverty line are raised correspondingly to these special needs. This is the intuition behind the following axiom:

- **Independence of origin:** If the poverty line and all incomes are raised by an amount b, miserliness is unchanged. Formally, $M(\mathbf{Y} + b, z + b) = M(\mathbf{Y}, z)$ as the poverty rate h is unchanged and as the absolute cleavage between the poor and the rich is unchanged.

If all incomes and the poverty line are raised by the same percentage, however, the poverty rate would still remain constant, but now the absolute economic cleavages would increase by this percentage. Since the absolute inequality drives miserliness, our measure should go up with the same percentage as the absolute inequality. Hence, we assert:

- **Homogeneity:** If the poverty line z and all incomes are raised by the same percentage a, miserliness is also raised by the same percentage. Formally, $M(a\mathbf{Y}, az) = aM(\mathbf{Y}, z)$ as the rate of poverty h is unchanged and the absolute income gap between the poor and the rich has gone up.

If two societies have the same average income and if all poor persons in the two societies have equal incomes, we would think that miserliness in the two countries should be proportional to their poverty rates:

- **Proportionality:** If all the q poor have the same income y, and if a regressive transfer transforms a rich into a poor with income y, then $M(\mathbf{Y}', z) = ((q+1)/q)M(\mathbf{Y}, z)$, i.e. the index is proportional to the number of poor in this context.

Finally, we would naturally think that miserliness does not depend on the size of the society, but that the maximum degree of miserliness does depend on how rich the society is. This intuition is made precise in the following axiom:

- **Population invariance:** Replication of the population leaves miserliness unchanged, i.e. whenever X is obtained by replicating Y any number of times, then $M(\mathbf{Y}, z) = M(\mathbf{X}, z)$.

Proposition 1. *If M satisfies the axioms above it is of the form*

$$M = Ah(1-h)(\bar{Y}_R - \bar{Y}_P) = h(\bar{Y} - \bar{Y}_P) \tag{3}$$

for some positive constant A.

As the constant C can be chosen freely, we have throughout the paper focused on $A = 1$.
Proof: To prove the proposition, we first prove a result for a wider class of indices:

Lemma. *The class of indices satisfying Transfer, Focus, Population invariance, Homogeneity, and Proportionality is given by*

$$M(\mathbf{Y}, z) = \bar{Y}\Phi\left(\frac{\bar{Y}_P}{\bar{Y}}\right)h$$

for any decreasing function Φ .

Proof: Consider a series of transfers among the rich and among the poor where we replace $\mathbf{Y} = (y_1, ..., y_q, y_{q+1}, ..., y_n)$ by the "simplified distribution" $\mathbf{Y}' = (\underbrace{\bar{Y}_P, ..., \bar{Y}_P}_{q}, \underbrace{\bar{Y}_R, ..., \bar{Y}_R}_{n-q})$. By Focus, $M(\mathbf{Y}, z) = M(\mathbf{Y}', z)$. By Population invariance, the index doesn't depends on the size of the groups q and $n - q$, but only the proportion $h = q/n$. Hence, there is a function f so that $M(\mathbf{Y}, z) = f(\bar{Y}_P, \bar{Y}_R, h, z)$. Since $\bar{Y}_R$ is a function of $\bar{Y}$ and $\bar{Y}_P$ one can as well write the function as $f(\bar{Y}_P, \bar{Y}, h, z)$ as well. It must be increasing in $\bar{Y}$.

Fix z. From Proportionality it follows that there is a function g such that $f(\bar{Y}_P, \bar{Y}, h) = hg(\bar{Y}_P, \bar{Y})$.

Note that for α close to 1, the number of poor in $\alpha(\bar{Y}_P, \bar{Y})$ is the same as the number of poor in $(\bar{Y}_P, \bar{Y})$. Therefore Homogeneity and Focus imply that for some $\varepsilon > 0$ sufficiently small, we have for all $\alpha \in (1 - \varepsilon, 1 + \varepsilon)$ that $M(\alpha\mathbf{Y}, z) = \alpha M(\mathbf{Y}, z)$, hence that $g(\alpha\bar{Y}_P, \alpha\bar{Y}) = \alpha g(\bar{Y}_P, \bar{Y})$ implying that there is some function Φ such that $g(\bar{Y}_P, \bar{Y}) = \bar{Y}\Phi(\bar{Y}_P/\bar{Y})$. By Transfer we require Φ to be decreasing . **QED**

It is now relatively straightforward to prove the main proposition:

Proof of Proposition 1: For d close to 0, the number of poor in $\mathbf{Y} + d$ is the same as in $\mathbf{Y}$, so Independence of origin implies that there is some $\varepsilon > 0$ sufficiently small so that for all $d \in (-\varepsilon, \varepsilon)$, we have $M(\mathbf{Y} + d, z) = M(\mathbf{Y}, z)$, and hence $(\bar{Y} + \Delta) \Phi\left(\frac{\bar{Y}_P + \Delta}{\bar{Y} + \Delta}\right) = \bar{Y} \Phi\left(\frac{\bar{Y}_P}{\bar{Y}}\right)$. Differentiating with regard to Δ and setting $\Delta = 0$, we get $\Phi\left(\frac{\bar{Y}_P}{\bar{Y}}\right) + \bar{Y} \Phi'\left(\frac{\bar{Y}_P}{\bar{Y}}\right)\left[\frac{1}{\bar{Y}} - \frac{\bar{Y}_P}{\bar{Y}^2}\right] = 0$. Hence, Φ satisfies the differential equation $(x - 1)\Phi'(x) = \Phi(x)$ whose solution is $\Phi(x) = C(x - 1)$ for some constant C. Given the condition imposed on Φ from the Lemma, we require $C =< 0$. **QED**

B The miser index vs indexes of polarization and re-distribution failures

As stated, our Miser index M is close to the index by Esteban and Ray (1994) measuring how polarized the income distribution is between any number of specified groups

$$P_\alpha = \sum_i \sum_j p_i^{1+\alpha} p_j d_{ij}$$

where d_{ij} is the social distance between group i and group j with sizes p_i and p_j, and where α is a positive parameter. Their index becomes equal to the Miser index when we consider the two groups situation with poor and rich people, where $d_{ij} = \bar{Y}_R - \bar{Y}_P$, and where $\alpha = 0$.

The miser index is also close to Kanbur and Mukherjee's (2007) index of poverty reduction failure (the PRF-index).[8] Their index is more flexible than ours, whereas ours has the virtue of simplicity. While their axiomatization provides a whole class of measures where two functional forms and one parameter value can be chosen quite freely, our axioms pin down a single index. One way to compare the two is to use the functional forms that make their index as close to ours as possible. In one case, the PRF-index can be written

$$h(1 - h)(\bar{Y}_R - z)(z - \bar{Y}_P)$$

indicating that it is multiplicative whereas ours is additive. This implies that the Miser index tends to give higher values than the PRF-index for richer societies and for societies where the poor are close to the poverty line. [9]

Both indexes associate policy failures and miserliness with a high level of poverty. This

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[8]The two indexes seem to have been developed independently – we first reported preliminary results from the Miser index in the business paper Dagens Næringsliv, April 2006.

[9]Take for instance the case where the incomes of the poor converge to z and the rich have incomes well beyond z. In this case, the index of poverty reduction failure goes to zero whereas the miser index remains strictly positive. For many practical purposes, however, the two indices are quite similar. In the data set studied in this paper, the correlation between the two is 0.93.

is in contrast to those who would emphasize that a *low* level of poverty reveals society's implicit tolerance of a completely unnecessary residual of poor people. A low residual is almost by definition inexpensive to *eliminate*. Thus when it persists, it can be interpreted as a sign of miserliness or grave policy failures since it does not cost much to get rid of it altogether.

A *high* level of poverty, however, reveals society's implicit tolerance of mass suffering. Such a high level of poverty can be more expensive to eliminate, but its persistence is a sign of miserly attitudes if it is associated with high inequality between the poor and the non-poor implying that poverty is inexpensive to *reduce.*

The two intuitions seem to be almost opposite; the first associates policy failures and miserliness with low poverty and the second with high poverty. Both aspects are relevant and therefore we report numbers on each of them. It should be noted, though, that the differences in intuitions may be due to framing. To *eliminate* sounds more drastic and complete than to *reduce*, even though in both cases the same amount of suffering may be eradicated. Suffering should count. With a given ability to fight poverty, a tolerance of mass poverty must therefore reveal stronger miserliness than a tolerance of an unnecessary residual of poor people, hence our focus on the Miser index.

C   The Miser index for the full sample

Country name	Survey year	Production tax (%)	Income tax (%)	Head count ratio (%)	GNI/cap.	Miser index	Rank
Albania	1997	1.54	2.19	23	2840	1.33	241
Albania	2002	0.44	0.55	12	4165	1.11	267
Algeria	1988	0.62	0.74	14	5232	1.74	195
Algeria	1995	0.68	0.83	15	4745	1.68	199
Argentina	1986	0.04	0.05	2	10068	0.52	334
Argentina	1992	0.09	0.10	6	10555	1.55	216
Argentina	1996	0.21	0.22	10	11519	2.91	98
Argentina	1998	0.19	0.20	10	12636	3.40	76
Argentina	2001	0.37	0.40	14	11210	4.16	52
Argentina	2003	0.71	0.77	23	10638	6.34	8
Armenia	1996	4.56	7.62	32	1993	1.20	250
Armenia	1999	4.11	6.22	38	2340	1.78	192
Armenia	2003	1.78	2.32	31	3555	2.46	132
Azerbaijan	1995	7.42	12.81	44	1803	1.47	222
Azerbaijan	2001	3.07	4.43	33	2646	1.83	186
Bangladesh	1984	25.80	54.31	84	1139	1.37	235
Bangladesh	1989	21.96	46.32	80	1196	1.39	233
Bangladesh	1992	25.60	46.10	85	1273	1.78	190
Bangladesh	1996	20.63	36.36	79	1396	1.88	183
Bangladesh	2000	20.38	31.71	83	1590	2.47	131
Belarus	1993	0.10	0.13	2	4378	0.20	367
Belarus	1997	0.12	0.16	5	4014	0.41	349
Belarus	1998	0.10	0.13	2	4364	0.20	368
Belarus	2000	0.09	0.11	2	4810	0.23	364
Belarus	2002	0.08	0.10	2	5326	0.26	362
Benin	2003	28.54	74.68	73	988	0.96	287
Bolivia	1991	3.79	6.24	29	2072	1.14	258
Bolivia	1997	7.58	11.03	39	2295	1.98	173
Bolivia	1999	9.76	13.65	44	2330	2.36	143
Bolivia	2002	8.98	12.70	43	2332	2.27	147
Botswana	1986	7.38	8.86	61	3707	5.48	14
Brazil	1981	1.78	2.04	31	6230	4.86	27
Brazil	1984	2.32	2.66	37	5948	5.51	13
Brazil	1987	1.61	1.82	29	6764	5.03	22
Brazil	1990	1.97	2.24	32	6323	5.15	19
Brazil	1993	1.26	1.45	23	6381	3.74	63
Brazil	1996	1.03	1.17	22	6916	3.78	62
Brazil	1998	1.13	1.28	23	6935	3.97	58
Brazil	2001	1.11	1.25	22	7070	4.01	57
Brazil	2003	1.05	1.19	22	7026	3.85	60

Bulgaria	1989	0.06	0.07	2	6937	0.34	354
Bulgaria	1992	0.08	0.10	2	5555	0.27	361
Bulgaria	1994	0.08	0.09	2	5651	0.27	360
Bulgaria	1996	0.42	0.50	11	5307	1.45	225
Bulgaria	1997	0.41	0.50	13	5041	1.57	215
Bulgaria	2001	0.60	0.69	13	6181	1.98	174
Bulgaria	2003	0.13	0.15	6	6838	1.07	273
Burkina Faso	1994	43.22	95.95	80	909	1.11	266
Burkina Faso	1998	37.15	81.46	81	974	1.17	253
Burkina Faso	2003	25.31	61.16	71	1063	1.07	272
Burundi	1992	44.33	114.38	86	845	0.92	295
Burundi	1998	70.08	262.90	88	622	0.55	330
Cambodia	1997	20.52	33.64	78	1499	2.13	158
Cameroon	1996	17.39	28.24	69	1598	2.10	163
Cameroon	2001	9.61	16.02	51	1797	1.73	196
Central African Rep	1993	49.54	76.49	84	1052	1.80	188
Chile	1987	1.43	1.74	24	4728	2.72	110
Chile	1989	1.30	1.53	25	5422	3.30	82
Chile	1992	0.43	0.50	12	6458	1.93	178
Chile	1994	0.40	0.45	12	7047	2.14	157
Chile	1996	0.18	0.21	10	8109	1.96	175
Chile	1998	0.24	0.26	9	8676	1.90	181
Chile	2000	0.25	0.28	10	8780	2.13	159
China	1987	18.99	34.53	67	1394	1.65	205
China	1990	18.21	29.07	72	1605	2.21	152
China	1993	12.13	16.97	68	2195	3.16	86
China	1996	6.19	8.17	53	2930	3.48	74
China	1999	4.89	6.10	50	3607	4.21	51
China	2001	3.94	4.78	47	4170	4.64	39
Colombia	1980	1.54	1.84	20	4926	2.44	135
Colombia	1988	0.89	1.06	15	5417	1.96	176
Colombia	1989	0.62	0.73	12	5486	1.61	211
Colombia	1991	0.61	0.71	12	5719	1.62	209
Colombia	1995	0.71	0.82	16	6341	2.56	120
Colombia	1996	0.91	1.04	18	6351	2.90	99
Colombia	1998	1.25	1.43	21	6375	3.36	80
Colombia	1999	1.31	1.52	23	5998	3.37	78
Colombia	2003	1.16	1.34	19	6198	3.02	95
Costa Rica	1981	2.16	2.47	32	5993	4.83	28
Costa Rica	1986	1.22	1.42	18	5729	2.59	117
Costa Rica	1990	0.87	1.01	16	6115	2.45	134
Costa Rica	1993	0.69	0.79	15	6811	2.50	126
Costa Rica	1996	0.60	0.68	13	6948	2.32	145
Costa Rica	1998	0.31	0.35	9	7557	1.72	198
Costa Rica	2000	0.34	0.38	9	7940	1.90	182
Costa Rica	2001	0.27	0.31	8	7861	1.62	210

Cote d'Ivoire	1985	3.83	7.23	25	1751	0.77	304
Cote d'Ivoire	1987	4.17	8.24	29	1667	0.80	303
Cote d'Ivoire	1988	6.30	12.26	36	1625	1.01	279
Cote d'Ivoire	1993	9.45	20.83	45	1392	0.97	284
Cote d'Ivoire	1995	10.55	22.05	49	1422	1.13	260
Cote d'Ivoire	1998	10.74	19.98	50	1565	1.39	232
Cote d'Ivoire	2002	11.88	24.87	48	1392	1.12	265
Croatia	1998	0.05	0.06	2	8914	0.45	344
Croatia	1999	0.05	0.06	2	8747	0.44	345
Croatia	2001	0.05	0.05	2	9628	0.49	338
Czech Republic	1993	0.03	0.04	2	12807	0.67	315
Czech Republic	1996	0.03	0.03	2	14471	0.76	306
Dominican Republic	1986	2.24	2.83	25	3861	2.25	148
Dominican Republic	1989	1.37	1.70	21	4289	2.15	156
Dominican Republic	1992	0.59	0.75	10	4190	0.95	291
Dominican Republic	1996	0.63	0.77	12	4753	1.32	243
Dominican Republic	2003	0.51	0.59	12	6161	1.82	187
Ecuador	1987	4.20	5.69	31	2938	2.08	165
Ecuador	1994	4.76	6.22	37	3169	2.74	107
Ecuador	1998	4.29	5.56	37	3286	2.83	103
Egypt	1991	3.62	5.05	43	2794	2.50	127
Egypt	1995	3.17	4.30	43	3030	2.77	106
Egypt	2000	2.78	3.56	44	3630	3.57	67
El Salvador	1989	5.80	7.28	43	3424	3.53	70
El Salvador	1995	5.20	6.16	53	4300	5.60	12
El Salvador	1996	5.15	6.11	52	4273	5.41	15
El Salvador	1998	4.20	4.99	45	4436	4.88	26
El Salvador	2000	3.68	4.38	39	4510	4.34	48
El Salvador	2002	3.93	4.67	41	4511	4.50	45
Estonia	1988	0.05	0.05	2	9340	0.48	342
Estonia	1993	0.27	0.31	7	6392	1.17	254
Estonia	1995	0.18	0.20	7	6830	1.16	255
Estonia	1998	0.07	0.08	5	8583	1.01	281
Estonia	2003	0.14	0.16	7	11550	2.01	171
Ethiopia	1982	36.95	117.35	83	846	0.75	307
Ethiopia	1995	41.55	273.80	76	706	0.41	348
Ethiopia	2000	33.87	173.57	78	780	0.49	339
Gambia	1998	14.63	25.38	55	1565	1.64	208
Georgia	1996	1.15	2.63	9	1556	0.20	366
Georgia	1999	2.05	3.72	15	1901	0.51	336
Georgia	2001	2.00	3.40	16	2070	0.62	320
Georgia	2003	3.18	4.74	26	2474	1.33	240
Ghana	1988	25.59	38.56	86	1506	2.50	128
Ghana	1989	24.39	36.69	84	1540	2.53	123
Ghana	1992	24.00	35.21	84	1597	2.67	112
Ghana	1999	18.56	26.81	75	1809	2.80	104

Guatemala	1987	11.88	14.18	73	3170	5.60	11
Guatemala	1989	8.82	10.82	59	3271	4.62	42
Guatemala	1998	2.40	3.04	30	3825	2.63	116
Guatemala	2000	1.17	1.49	22	3930	1.94	177
Guatemala	2002	3.17	3.94	33	3916	3.04	91
Guyana	1993	2.92	4.02	27	2953	1.76	193
Guyana	1998	0.90	1.17	11	3742	0.96	286
Haiti	2001	23.87	32.64	78	1758	2.99	96
Honduras	1986	12.20	16.72	61	2275	3.06	90
Honduras	1990	13.27	17.70	64	2328	3.37	79
Honduras	1992	9.99	13.73	54	2396	2.86	101
Honduras	1994	8.55	12.06	48	2371	2.51	125
Honduras	1996	8.88	12.33	51	2419	2.73	109
Honduras	1998	8.32	11.50	44	2477	2.49	130
Honduras	1999	7.61	10.87	44	2371	2.27	146
Hungary	1987	0.04	0.04	2	11300	0.58	325
Hungary	1989	0.04	0.04	2	11468	0.59	324
Hungary	1993	0.05	0.05	2	9436	0.48	340
Hungary	1998	0.04	0.04	2	11050	0.57	327
Hungary	2002	0.03	0.04	2	13340	0.69	313
India	1987	26.19	40.53	87	1448	2.37	141
India	1993	20.27	29.06	86	1765	3.03	94
India	2000	13.43	17.61	81	2400	4.24	50
Indonesia	1987	15.26	23.19	76	1804	2.65	113
Indonesia	1993	7.90	10.78	64	2580	3.53	71
Indonesia	1996	5.80	7.53	59	3101	4.08	55
Indonesia	2000	5.15	7.00	55	2830	3.34	81
Indonesia	2002	4.70	6.28	52	2985	3.39	77
Iran	1986	0.65	0.80	12	4634	1.36	237
Iran	1990	0.62	0.76	12	4608	1.27	246
Iran	1994	0.29	0.35	8	5230	0.97	285
Iran	1998	0.23	0.27	7	5618	0.96	289
Jamaica	1988	2.25	3.08	24	3078	1.65	206
Jamaica	1990	1.21	1.62	19	3382	1.43	228
Jamaica	1993	2.07	2.69	27	3586	2.23	150
Jamaica	1996	1.69	2.19	25	3634	2.06	167
Jamaica	1999	0.94	1.25	14	3495	1.09	269
Jamaica	2000	0.70	0.93	13	3500	1.02	278
Jordan	1987	0.09	0.12	2	4742	0.22	365
Jordan	1992	0.53	0.69	11	3750	0.89	296
Jordan	1997	0.32	0.42	7	3857	0.63	318
Jordan	2003	0.26	0.33	7	4298	0.73	310
Kazakhstan	1993	0.87	1.08	17	4333	1.75	194
Kazakhstan	1996	1.20	1.56	19	3655	1.53	217
Kazakhstan	2001	0.25	0.30	8	4902	0.96	288
Kazakhstan	2003	0.59	0.69	17	5841	2.41	138

Kenya	1992	27.09	65.34	64	1042	1.03	277
Kenya	1997	19.35	61.21	56	1017	0.73	308
Korea	1998	0.03	0.03	2	13766	0.72	311
Kyrgyz Republic	1988	0.19	0.31	2	2338	0.09	372
Kyrgyz Republic	1993	4.45	9.17	17	1595	0.53	332
Kyrgyz Republic	1996	16.40	36.08	37	1257	0.94	292
Kyrgyz Republic	1999	1.67	4.40	12	1400	0.23	363
Kyrgyz Republic	2001	3.41	7.54	27	1533	0.62	319
Kyrgyz Republic	2003	2.50	5.31	23	1608	0.57	328
Lao	1992	21.82	53.62	75	1100	1.08	271
Lao	1997	19.36	35.93	73	1363	1.67	203
Lao	2002	16.75	27.42	74	1603	2.18	154
Latvia	1988	0.05	0.05	2	9631	0.49	337
Latvia	1993	0.08	0.10	5	5453	0.64	317
Latvia	1996	0.33	0.39	8	5946	1.22	248
Latvia	1998	0.34	0.38	12	6966	1.98	172
Latvia	2003	0.09	0.10	4	9942	1.12	264
Lesotho	1987	14.34	22.49	56	1763	2.02	170
Lesotho	1993	14.64	19.22	66	2319	3.50	73
Lesotho	1995	12.08	15.99	56	2443	3.19	84
Lithuania	1993	1.54	1.73	43	7150	7.61	4
Lithuania	1996	0.26	0.29	8	7129	1.38	234
Lithuania	1998	0.14	0.15	5	8303	1.12	262
Lithuania	2000	0.15	0.17	7	8610	1.49	221
Lithuania	2003	0.14	0.15	7	10929	2.08	164
Macedonia	1998	0.10	0.12	4	5535	0.52	333
Macedonia	2003	0.08	0.09	2	5860	0.28	359
Madagascar	1980	33.37	58.63	80	1167	1.67	201
Madagascar	1993	45.89	126.11	80	815	0.85	299
Madagascar	1999	61.95	123.82	90	797	1.12	263
Madagascar	2001	54.98	112.75	85	840	1.14	257
Malawi	1998	58.85	1134.17	76	580	0.29	358
Malaysia	1984	0.82	1.02	15	4498	1.58	214
Malaysia	1987	0.76	0.95	15	4386	1.50	220
Malaysia	1989	0.60	0.73	14	4989	1.65	207
Malaysia	1992	0.50	0.58	14	5995	2.02	169
Malaysia	1995	0.44	0.50	14	7308	2.54	122
Malaysia	1997	0.22	0.24	9	8196	1.90	180
Mali	1994	81.21	172.64	91	665	0.92	294
Mauritania	1987	25.87	39.21	79	1489	2.36	144
Mauritania	1993	25.19	37.48	82	1539	2.51	124
Mauritania	1996	16.42	26.93	69	1609	2.07	166
Mauritania	2000	13.58	21.59	63	1760	2.16	155
Mexico	1984	1.84	2.04	40	7457	7.51	6
Mexico	1992	0.86	0.97	22	7673	4.35	47
Mexico	1996	0.99	1.11	24	7523	4.55	44

Mexico	1998	1.00	1.11	24	8189	5.09	20
Mexico	2000	0.79	0.87	23	8820	5.09	21
Mexico	2002	0.70	0.77	21	8618	4.65	36
Moldova	1988	0.12	0.16	2	3673	0.16	370
Moldova	1992	4.12	6.46	32	2211	1.40	231
Moldova	1997	7.27	15.80	36	1457	0.84	300
Moldova	1999	22.18	40.69	74	1318	1.67	202
Moldova	2001	15.52	28.85	64	1445	1.59	213
Mongolia	1995	10.63	21.35	50	1466	1.21	249
Mongolia	1998	17.43	28.84	75	1565	2.13	160
Morocco	1985	1.33	1.89	17	2885	1.01	280
Morocco	1991	0.34	0.46	8	3374	0.54	331
Morocco	1999	0.80	1.06	14	3464	1.09	270
Mozambique	1996	49.62	339.66	78	661	0.40	351
Mozambique	1997	46.00	220.72	78	713	0.51	335
Namibia	1993	4.82	5.42	56	5623	7.97	2
Nepal	1985	37.31	89.45	85	933	1.05	276
Nepal	1996	25.27	48.75	78	1215	1.53	218
Nepal	2004	17.50	33.54	65	1366	1.50	219
Nicaragua	1993	14.82	18.47	78	2580	4.64	38
Nicaragua	1998	12.50	15.29	79	2902	5.35	16
Nicaragua	2001	11.70	14.06	80	3134	5.91	9
Niger	1992	48.88	184.11	84	729	0.60	323
Niger	1995	67.97	156.22	86	717	0.92	293
Nigeria	1986	70.56	162.16	91	702	0.88	297
Nigeria	1993	57.74	123.65	85	803	1.06	275
Nigeria	1996	74.52	121.37	93	789	1.35	239
Nigeria	2003	62.07	107.29	92	856	1.36	236
Pakistan	1987	26.80	40.05	89	1489	2.55	121
Pakistan	1991	23.34	33.39	88	1669	2.94	97
Pakistan	1993	17.93	26.87	81	1742	2.73	108
Pakistan	1999	10.65	17.14	66	1839	2.24	149
Pakistan	2002	12.37	19.05	74	1881	2.63	115
Panama	1979	0.79	0.96	15	4768	1.68	200
Panama	1989	2.53	3.12	24	4111	2.38	139
Panama	1991	2.22	2.67	24	4677	2.78	105
Panama	1995	1.30	1.55	17	5147	2.21	151
Panama	1996	1.38	1.65	18	5179	2.37	142
Panama	2000	1.13	1.32	18	5840	2.57	119
Panama	2002	1.03	1.20	17	5777	2.49	129
Paraguay	1990	1.44	1.74	26	4853	3.04	92
Paraguay	1995	3.37	3.94	38	4973	4.76	32
Paraguay	1998	2.91	3.46	30	4779	3.61	66
Paraguay	1999	2.80	3.34	30	4680	3.50	72
Paraguay	2002	3.33	4.02	33	4347	3.54	69
Peru	1986	0.46	0.56	10	4915	1.15	256

Peru	1990	0.65	0.85	10	3725	0.87	298
Peru	1994	2.42	2.99	32	4155	3.10	89
Peru	1996	2.15	2.62	28	4465	3.04	93
Peru	2000	3.59	4.26	38	4600	4.28	49
Peru	2002	2.58	3.09	32	4683	3.67	65
Philippines	1985	6.36	7.90	61	3445	4.88	25
Philippines	1988	5.05	6.24	56	3699	4.78	31
Philippines	1991	5.14	6.32	55	3742	4.82	29
Philippines	1994	4.87	6.01	53	3745	4.65	37
Philippines	1997	3.58	4.38	45	4098	4.36	46
Philippines	2000	3.78	4.58	47	4200	4.74	33
Poland	1993	0.58	0.66	12	7071	2.10	161
Poland	1996	0.05	0.06	2	8418	0.42	347
Poland	1998	0.08	0.08	3	9453	0.71	312
Poland	2002	0.04	0.05	2	10662	0.55	329
Portugal	1994	0.03	0.03	2	14471	0.76	305
Romania	1989	0.06	0.07	2	7128	0.35	353
Romania	1994	1.08	1.26	28	5740	3.82	61
Romania	1998	0.43	0.51	13	5774	1.78	191
Romania	2000	0.79	0.92	20	5840	2.90	100
Romania	2003	0.37	0.42	13	7026	2.20	153
Russia	1994	1.05	1.21	23	6559	3.72	64
Russia	1996	1.20	1.38	23	6095	3.42	75
Russia	1998	2.13	2.45	36	5877	5.29	18
Russia	2000	1.03	1.17	24	6910	4.11	54
Russia	2002	0.36	0.41	13	7658	2.57	118
Rwanda	1985	26.24	47.87	85	1249	1.72	197
Rwanda	2000	39.46	74.65	84	1030	1.43	227
Senegal	1991	27.28	45.46	73	1326	1.86	184
Senegal	1995	18.57	37.94	66	1281	1.35	238
Sierra Leone	1989	60.53	127.44	74	789	1.10	268
Slovak Republic	1988	0.04	0.04	2	11137	0.57	326
Slovak Republic	1992	0.05	0.06	2	8692	0.44	346
Slovak Republic	1996	0.08	0.08	3	9867	0.73	309
Slovenia	1993	0.04	0.04	2	12615	0.65	316
Slovenia	1998	0.03	0.03	2	15434	0.81	302
South Africa	1993	1.24	1.36	34	8904	7.81	3
South Africa	1995	1.03	1.13	32	9078	7.48	7
South Africa	2000	1.21	1.32	34	9260	8.12	1
Sri Lanka	1985	6.74	10.46	51	2110	2.10	162
Sri Lanka	1990	4.14	6.31	41	2316	1.85	185
Sri Lanka	1996	4.14	5.63	45	2909	2.84	102
Sri Lanka	2002	3.05	3.92	41	3532	3.29	83
St. Lucia	1995	4.52	5.19	60	5136	7.59	5
Swaziland	1995	1.79	2.19	23	4441	2.41	137
Tajikistan	1999	25.20	-1919.01	59	705	0.19	369

Tajikistan	2003	11.78	59.77	42	969	0.40	350
Tanzania	1991	91.58	559.12	92	509	0.31	356
Tanzania	2000	84.62	646.78	90	520	0.29	357
Tanzania	2001	82.05	514.05	90	537	0.33	355
Thailand	1981	7.77	10.59	55	2590	3.11	88
Thailand	1988	4.87	6.02	54	3712	4.67	34
Thailand	1992	2.02	2.38	37	5127	4.63	40
Thailand	1996	0.97	1.11	28	6671	4.65	35
Thailand	1999	1.31	1.52	32	5957	4.60	43
Thailand	2000	1.30	1.49	32	6180	4.92	24
Thailand	2002	0.86	0.98	26	6526	4.14	53
Trinidad & Tobago	1988	0.62	0.71	15	6434	2.43	136
Trinidad & Tobago	1992	0.88	1.01	20	6377	3.16	87
Tunisia	1985	0.88	1.10	16	4263	1.59	212
Tunisia	1990	0.60	0.75	12	4387	1.18	252
Tunisia	1995	0.57	0.70	13	4832	1.45	224
Tunisia	2000	0.20	0.23	7	5950	0.95	290
Turkey	1987	0.66	0.79	16	5302	2.02	168
Turkey	1994	0.79	0.93	18	5618	2.46	133
Turkey	2000	0.33	0.38	10	6560	1.66	204
Turkey	2003	0.77	0.88	19	6593	3.17	85
Turkmenistan	1988	0.13	0.15	10	6051	1.43	229
Turkmenistan	1993	4.98	5.98	59	4130	5.80	10
Turkmenistan	1998	5.39	7.66	44	2550	2.38	140
Ukraine	1988	0.05	0.05	2	8997	0.46	343
Ukraine	1992	0.06	0.07	2	7153	0.36	352
Ukraine	1996	1.00	1.29	16	3815	1.42	230
Ukraine	1999	1.90	2.44	31	3730	2.63	114
Ukraine	2003	0.15	0.18	5	5135	0.60	322
Uruguay	1981	0.06	0.07	4	7466	0.69	314
Uruguay	1989	0.11	0.13	3	6950	0.48	341
Uruguay	1996	0.12	0.14	5	8493	0.98	283
Uruguay	1998	0.12	0.13	5	9184	1.07	274
Uruguay	2000	0.08	0.09	4	8660	0.84	301
Uruguay	2003	0.15	0.17	7	7440	1.29	244
Uzbekistan	1988	0.24	0.47	2	1836	0.06	373
Uzbekistan	1993	4.40	9.95	26	1482	0.61	321
Uzbekistan	1998	12.50	25.16	44	1420	1.13	261
Uzbekistan	2000	15.07	27.30	72	1490	1.79	189
Venezuela	1981	1.21	1.38	25	6552	4.03	56
Venezuela	1987	1.30	1.51	25	5862	3.57	68
Venezuela	1989	0.76	0.90	15	5409	1.91	179
Venezuela	1993	0.74	0.86	18	6132	2.69	111
Venezuela	1996	2.40	2.75	36	5839	5.32	17
Venezuela	1998	2.17	2.48	31	5981	4.62	41
Venezuela	2000	1.64	1.91	28	5620	3.85	59

Vietnam	1993	13.56	29.37	58	1324	1.18	251
Vietnam	1998	5.16	9.17	40	1824	1.27	245
Vietnam	2002	3.49	5.52	34	2217	1.45	223
Yemen	1998	18.42	-407.75	45	726	0.16	371
Zambia	1991	60.67	108.27	86	853	1.32	242
Zambia	1993	66.65	108.32	91	849	1.44	226
Zambia	1996	73.20	136.53	92	746	1.13	259
Zambia	1998	69.60	149.13	88	726	0.98	282
Zambia	2003	70.29	122.48	94	790	1.26	247
Zimbabwe	1991	15.29	18.63	78	2688	4.96	23
Zimbabwe	1995	17.29	21.24	83	2487	4.80	30

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