

The ethical poverty line as a tool to measure global absolute poverty

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Introduction

The Millennium Development Goals (MDGs) have set the target of halving 'extreme' poverty by 2015, 'extreme' poverty being defined by the World Bank as living on less than one dollar-a-day. Responding to the MDG challenge, in early 2005 Gordon Brown called for a 'Marshall Plan' for the world's poor arguing that there is a moral duty on the rich to ensure that economic growth and redistribution benefit those in 'extreme' poverty. Setting out his ideological standpoint, Brown invoked global interdependence plus duty, stating that:

"We are one moral universe. And the shared moral sense common to us all makes us recognise our duty to others" (The Guardian, 7 Jan 2005: 2)

Brown's plan calls for pro-poor economic growth complemented by more substantial redistribution from the rich to the poor, or at least for debt relief to reduce redistribution from the poor to the rich. But, while Brown acknowledges the interdependence of *poverty*, *income inequality* and *economic growth* in the global economy, his invocation of a 'moral duty', if such a duty exists, must be seen as only partial. On one hand, he invokes morality to 'invent' an obligation on the rich to reduce poverty. On the other though, he, along with most of the international community, seems to base his understanding of the extent of global poverty simply on the World Bank's dollar-a-day poverty-line.

The dollar-a-day threshold is the average of a limited number of national poverty lines. It is not derived from any assessment of individual basic needs for survival let alone from any consideration of moral obligation. If we genuinely want to argue that there is a moral duty to remove poverty then surely we also need to consider what would constitute a morally defensible or, in the terminology of this paper, 'ethical' poverty-line.

This paper starts by briefly reviewing the derivation of the World Bank's dollar-a-day poverty-line to highlight the absence of a robust moral basis for setting that line. The paper then describes how the same World Bank dataset used to monitor dollar-a-day poverty can also be used to derive an alternative, morally-defensible international poverty line. This is done by linking a model of world income distribution, incorporating both within-country and between-country income inequality, with life outcome data.

The paper draws on established health literature to show that below an income threshold, life-expectancy is found to fall rapidly with falling income. Above this threshold, life-expectancy rises only very slightly with income so that the threshold can form a moral basis for an international poverty-line. Linking health relationships at the individual level with the income inequality model described above and with macro-data on national life expectancy, this threshold income level is quantified as the Ethical Poverty Line (EPL).

The EPL is found to be slightly less than twice the \$1-a-day 'extreme' poverty-line used by the World Bank. Given that the World Bank, UN Development Programme (UNDP) and governments of developing countries all regularly use poverty-lines higher than \$2-a-day, the EPL does not seem unreasonable. However its implications are significant. From an analysis of the distribution of economic growth in the 1990s, it is shown that while dollar-a-day poverty can probably not be eliminated by growth alone, it might yet be eliminated with relatively modest economic impact on the developed world. Elimination of 'ethical' poverty however would require significant socio-economic change in the developed world.

By quantifying the problem of poverty in this way, the dollar-a-day poverty-line is found both to disguise the current scale of absolute poverty and to understate the challenges that the elimination of absolute poverty poses for the developed world. The EPL therefore raises challenging conclusions and issues about the true price of removing global poverty today. It demonstrates through quantification that the problem of absolute poverty cannot be resolved in a sustainable way without also addressing issues of the over-development of the affluent world. In doing so, it raises substantial doubts as to whether the rich world really is ready to pay the price of accepting a moral obligation to remove global absolute poverty.

Dollar-a-day – the World Bank poverty estimates

The World Bank's own poverty estimates unfortunately are less definitive than they might at first appear, as the following two relatively recent quotes demonstrate:

- "The absolute number of those living on \$1-a-day or less continues to increase. The world-wide total rose from 1.2 billion in 1987 to 1.5 billion today." (World Bank, 1999: 25)
- "The number of people subsisting on less than \$1 per day rose steadily for nearly two centuries, but in the past 20 years it has ... fallen by as much as 200 million, even as the world's population has risen by about 1.6 billion." (World Bank, 2002: 3)

Of course we might explain this contradiction as the result of the complexity of working with global time-series data. Indeed problems with survey interpretation and comparability, sampling validity, and differences in assumptions and methodologies, do all arise here. More significant though may be the fact that the years between these two statements saw the departure of Joseph Stiglitz from the Bank. The earlier argument, that globalization had seen poverty numbers increase by 300 million, was meant to highlight the growing importance of the Bank's anti-poverty mission but instead had created an anti-Bank reaction in Washington. The more recent statement, following Stiglitz's resignation, reflects the current orthodoxy at the Bank that the number of people in poverty fell from 1.4 billion in 1980 to 1.2 billion in 1998 (World Bank, 2003a: 2). The Bank's new message was clear: globalization, trade liberalization and world economic growth, underpinned by the poverty-reduction work of the World Bank, are all ultimately benefiting the poor and should be supported.²¹

This manipulation of these statistics, or at least of their presentation, raises questions about the reliability and relevance of the Bank's estimates of absolute global poverty. The history of the dollar-a-day poverty line is revealing in itself. Briefly, the threshold was first set by the Bank in 1985 Purchasing Power Parity (PPP) prices based on an

²¹ Even more recent figures from World Bank staff estimate an even higher fall from 1.5 billion in 1981 to 1.1 billion in 2001 however this includes a contentious fall of 0.2 billion in China between 1981 and 1984. (Chen and Ravallion, 2004)

assessment of the national poverty lines in 33 of the least developed countries.²² By 1993, US consumer-price inflation would have pushed the \$1 figure up to around \$1.30 dollars-a-day. However, that year the line was 'recalculated', using a different set of reference countries. As a result, the poverty-line was rebased, some would say deflated, to \$1.08 per day in 1993 PPP prices. It is this 1993 \$1.08 dollar-a-day line which the Bank uses today.²³ (Ravallion et al, 1991; Chen and Ravallion, 2001; Pogge and Reddy, 2003)

Grounding the poverty-line in life outcomes

This dollar-a-day poverty-line, indirectly derived and changing over time, therefore appears to have, at best, only a tangential link to any rigorous or defensible ethical basis. In this vein, Pogge and Reddy (2003) consider that rather than being based on the averaging of a changing selection of national poverty lines, the Bank's poverty-line needs to be grounded less in financial comparisons and more directly in an assessment of basic human needs. Additionally, Sen (1999: 87) has well demonstrated that income alone does not automatically translate into access, or 'entitlement', to the needs for survival and well-being so that income alone is a poor proxy for measuring basic needs satisfaction. To this we might add the observation that access to basic needs (ie to well-being inputs) might not automatically translate into improved well-being outcomes.

While Pogge and Reddy (2003: 12) argue that it should be 'straightforward' to develop a poverty line derived more directly from basic needs satisfaction, others such as Streeten (1984) pointed out long ago that it is actually extremely difficult to define an internationally-standard basic-needs bundle of goods, a problem which tends to return us to income-level as the most readily available and calculable proxy measure for poverty.

²² PPP exchange rates attempt to convert national currencies spent in their country of origin into an equivalent purchasing power stated in terms of US dollars spent in the USA. In other words, \$1 converted into Indian Rupees at PPP rates would, in theory, give you just enough Rupees to buy the same basket of goods in India as you could buy if you spent \$1 in the USA. Obviously this is a much lower exchange rate than international currency-market exchange rates which convert \$1 into a much higher buying power in India than the same \$1 has in the USA.

²³ Interestingly, the 'extreme' designation was applied in 1985 not to the \$1-a-day line but to a lower line of 75-cents a day (Ravallion et al, 1991: 349). In real US\$ terms, the rebasing in 1993 effectively set today's dollar-a-day line just 10% above that earlier 75-cent line. The use of the term 'extreme' to refer nowadays to the rebased 1993 \$1-a-day line might be read as a tacit indication that the 1993 \$1-a-day line is lower than the original 1985 \$1-a-day line.

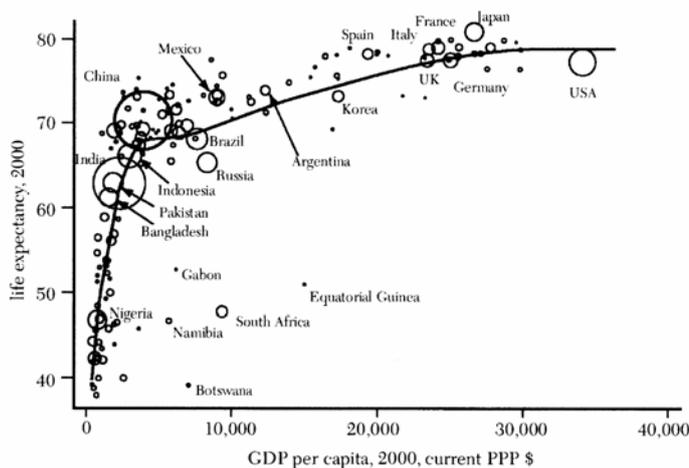
These are all useful critiques but collectively they show that basing a poverty line in needs or entitlements is not only difficult to put into practice but also still remains focused on means not ends. Better still, surely, would be to have a poverty line derived directly from ends, or outcomes. The ethical poverty line proposed here attempts to do just this, to derive a global poverty line not from the complexities of basic needs inputs but instead from globally-standardized and ethically-justifiable well-being outcomes for which data already exists in the World Development Indicators (WDIs).

The specific well-being outcome used here is 'life-expectancy at birth' for which national data are published annually by the Bank. Over 10 years ago, Dasgupta noted that:

"If we had to choose a single, ordinal measure of general well-being, life-expectancy at birth would seem to be the best. At the same time, national income per head is not far behind indices of health." (Dasgupta, 1993: 115).

In other words, not only is life-expectancy the best single measure of well-being but also there is some association between life-expectancy and income. This opens the possibility that life-expectancy outcomes can be used to determine a global poverty line.

Figure 1: The Preston Curve



(source: Deaton, 2003)

In the health economics literature, Preston (1975) first identified such a relationship, producing curves that dramatically show how national average life-expectancy falls rapidly when income levels fall (Figure 1). In the 1990's, research into this relationship led to much debate as to

whether it is community inequality or absolute poverty which affects mortality (Wildman, 2003). Today, the balance of opinion is that while there might be a modest inequality effect in the developed world, the predominant association, particularly in developing countries, is that absolute, not relative, poverty determines subsequent mortality. (Deaton, 2003; Fiscella and Franks, 1997).

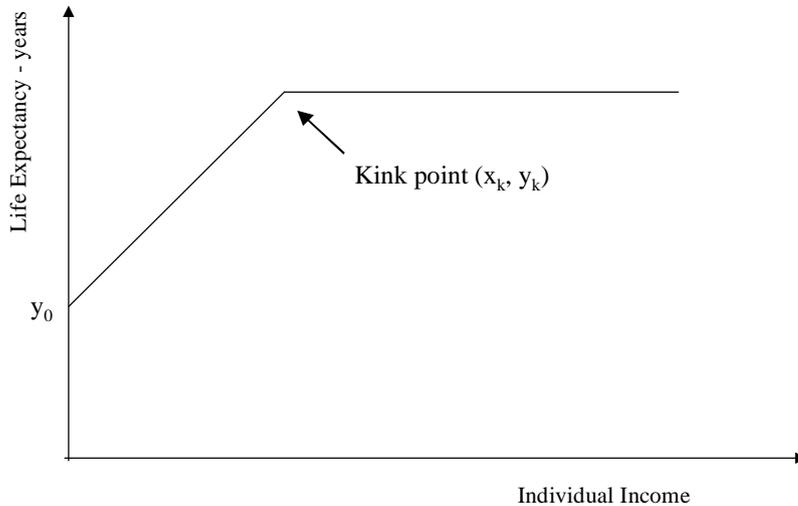
In a 1979 paper that is still relevant today, Rodgers (reprinted 2002) had investigated this relationship between individual income and life-expectancy. He found that there appears to be a maximum individual life-expectancy beyond which increases in income have no further effect and calculated this maximum to be around 73 to 75 years.

So various writers, including Sen, show that although income is important, we would do better to define our poverty-line in terms of well-being outcomes rather than of income – ie ends not means. Dasgupta demonstrates that if we must use a single socio-economic measure as an indicator of well-being then the best one to use is life-expectancy at birth. Finally, the health economics literature shows that relationships that Preston recognised at the national level, between average income and life-expectancy, are the aggregate manifestation of relationships at the individual level between absolute income and mortality. Taken together, these writings point to a way that a poverty-line can be developed that is grounded in well-being outcomes.

Deriving the Ethical Poverty Line

The resulting poverty line, termed here the Ethical Poverty Line or EPL, is derived as follows. From the Preston curve and the observation that a similar relationship exists at the individual level, it is assumed that a model of individual income vs life-expectancy would follow a broadly similar shape. The Preston curve illustrates that a 'kink' point exists below which life-expectancy falls rapidly, and relatively linearly, as income falls. Above the kink, increasing income has only very slight impact on life-expectancy.

Figure 2: Deriving the EPL - the ideal model



The EPL analysis simplifies this to an ideal-type model in which a kink exists at a given income-life-expectancy point (x_k, y_k). Above this point, life-expectancy is assumed to be unaffected by changes in individual income. Below this point, life-expectancy reduces to the intercept (y_0) at zero income. (Figure 2)

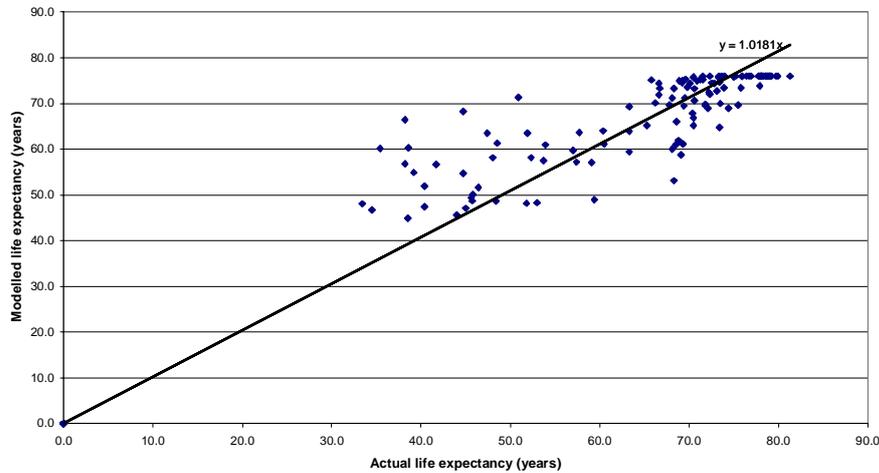
This EPL model can then be combined with an analysis of global income distribution. The analysis used here is based on a model of world income distribution for 2001 which incorporates both within-country and between-country income inequality. Within-country inequality is derived from national quintile/decile data while between-country inequality comes from the combination of Purchasing Power Parity exchange rates with Gross National Income. For maximum consistency, all the data used was taken from a single-source, namely the World Bank's World Development Indicators 2003 (2003b, available on CD).²⁴

By applying the life-expectancy model to each country's population, disaggregated by income level, the three variables (y_0 , x_k and y_k) can be optimised globally to give the best correlation between modelled national life expectancies and the actual life expectancies published in World Development Indicators.

²⁴ Note that subsequent to the preparation of the analysis on which this paper is based, the World Bank made a fuller range of survey consumption data available at its new PovcalNet website (available at: <http://iresearch.worldbank.org/PovcalNet/jsp/index.jsp>). Future papers on this topic will therefore present slightly different numbers but the finding that the EPL is around the \$2-a-day level and the overall conclusions which follow from that regarding the implications of removing poverty at the EPL level remain essentially the same.

Figure 3: Deriving the EPL

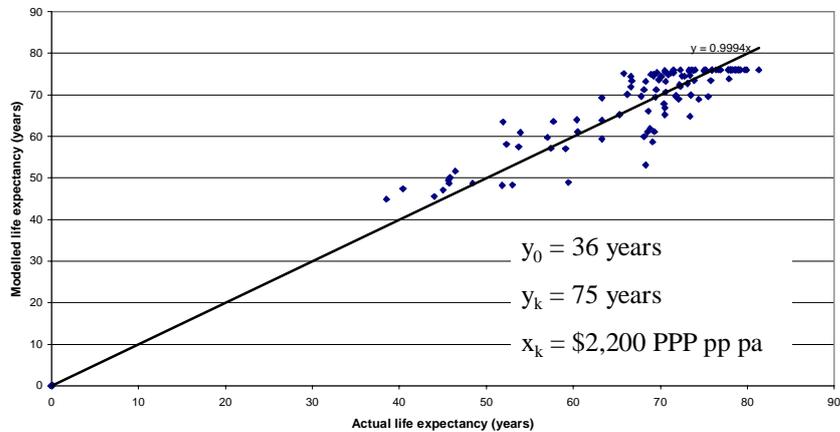
Actual vs modelled life expectancy – all countries



An initial analysis (Figure 3) was less than convincing with a number of outliers where actual life expectancy was more than ten years lower than predicted by the model. On inspection though, these were all sub-Saharan countries in the grip of the AIDS epidemic.²⁵ Once these AIDS countries were omitted a much better fit was found between the model and actual results (Figure 4). The results can be interpreted as showing that, given the current state of world development, it is reasonable to expect to live to around 75 years (remarkably similar to Rodgers' findings of 73 to 75 years) providing you have 'adequate' income. Based on average performance across the world (excluding the distorting effect of AIDS in Africa), \$2,200 PPP per person per annum (pp pa) should be 'adequate'. Incomes above this level add only nominal years to expected lifespan. Incomes below this level reduce expected lifespan dramatically, more than halving the lifespan for the very poorest.

²⁵ The AIDS countries omitted were: Botswana, Burundi, Cameroon, Central African Republic, Cote d'Ivoire, Guinea, Lesotho, Mozambique, Namibia, Rwanda, Sierra Leone, South Africa, Swaziland, Uganda, Zambia, Zimbabwe

Figure 4: Deriving the EPL
African AIDS countries omitted



On this basis, and returning to Gordon Brown's call for a moral duty to others, we might argue that this income of \$2,200 PPP pp pa can be considered to be an “ethical poverty line” which in an equitable world every community should be entitled to achieve as its minimum living standard such that all individuals can reasonably expect to live a full lifespan.

Validating the Ethical Poverty Line

How does the EPL compare with the dollar-a-day poverty line? Because the World Bank uses consumption data in 1993 prices, whereas this analysis is for income data in 2001 prices, the dollar-a-day poverty-line has to be adjusted upwards. It is not valid merely to rule a line at \$365 pa and expect that to be the dollar-a-day threshold applicable to the analysis in this paper. There are in fact a number of ways to deduce the income level that represents the dollar-a-day line for this analysis. The most direct, and therefore least susceptible to differences in assumptions, is to use the World Bank's published dollar-a-day headcounts to deduce the implicit poverty line at both the global and national levels (i.e. the poverty line value that would generate the same headcounts in the income distribution analysis used here).

Table 1: Comparison of Poverty lines

Value (\$ PPP pa)	Description
\$930	Unweighted mean of World Bank estimates of national poverty headcounts at \$1-a-day
\$1,210	Implied from 1998 World Bank estimate of global headcount at \$1-a-day
\$1,460	Population weighted mean of World Bank estimates of national poverty headcounts at \$1-a-day
\$1,880	Unweighted mean of World Bank estimates of national poverty headcounts at \$2-a-day
\$2,200	Ethical Poverty-line – excluding African AIDS countries
\$2,500	Ethical Poverty-line – all countries
\$2,530	Implied from 1998 World Bank estimate of global headcount at \$2-a-day
\$2,780	Population weighted mean of World Bank estimates of national poverty headcounts at \$2-a-day

Note: All poverty-lines are based on use of GNI for national mean income

This derives a dollar-a-day level appropriate to the data in this paper of around \$1,200 PPP pp pa (Table 1). At \$2,200 pp pa, the EPL is obviously higher than this \$1-a-day line. However, the EPL is not unreasonable when compared to a number of other poverty lines in use. For example, it is around 80% to 90% of the \$2-a-day line increasingly quoted by the World Bank (eg Chen and Ravallion, 2001). Meanwhile, Bhalla (2004, 117) notes that the average national poverty line in the developing world is \$2.02 per day while Sala-i-Martin (2002: 17) observes that the UN uses poverty lines as high as \$4-a-day, more than twice the EPL.

The scale of ‘ethical’ poverty

What then are the implications of using the EPL to define absolute poverty? The World Bank estimates there are some 1.2 billion people in dollar-a-day poverty today. The EPL more than doubles this number to 2.4 billion, or 40% of the world population. It also reveals that to remove this poverty we would need to increase by 75% the share of the world's output that goes to these people. Yet this is still only a poverty gap of 5% of global output.

Although this may look like a fairly small proportion of global output, it is far from clear that economic growth can be relied on to fill the gap. We have to note that the economic growth of the 1990s was not evenly spread. Even in PPP terms, two-thirds of global growth was captured by the richest 20% of the world's population while the

poorest 20% received only 2% of global growth.²⁶ Even with this pattern of unequal distribution of global growth, it is estimated that a growth alone approach would only need world output to increase by around 20% to reduce dollar-a-day poverty to the MDG target of 15% of world population. Reducing dollar-a-day poverty to 10% of world population would 'merely' require a 50% increase in global output. Removal of ethical poverty on the other hand is rather more challenging. To halve current ethical poverty levels would require a doubling of world output while to reduce these levels to 10% would probably require world output to triple. These are increases that some, possibly many, might consider unsustainable.²⁷

The alternative to growing our way out of poverty is to consider more extensive redistribution. To put this into context though, assuming no economic growth beyond current levels, the cost of removing ethical poverty today would be comparable, for example, to an additional global tax of 30% on all earnings above the US median income. As a tax levied on anyone, anywhere in the world earning more than the current US median income, it would affect 7% of world population, including (of course) half the US population and 1 in 3 people in the UK. In short, it would cut deeply into the pockets of the middle-class in the developed world.²⁸

The EPL is therefore challenging. It establishes a poverty-line rooted in internationally standardised unequivocal outcomes, i.e. life and death events, and it shows that the cost of removing this poverty is substantial. If a tripling of world output is considered to be unsustainable or unachievable then global society is going to need to do more than merely rely on economic growth to remove poverty. Substantial redistributions are likely to be needed. This is not to suggest that we should institute global redistributive taxes, which would doubtless be politically unacceptable and create large-scale abuse and corruption rather than remove absolute poverty. Instead, we should see this as an indicator of the scale of socio-economic change needed in order to remove absolute poverty. If poverty is to be removed it will not merely be a matter of taking money from the very rich and giving aid to the very poor. Rather it will require changes in the workings of the global economy such that there is a substantial

²⁶ This analysis of growth is not described here but data was drawn from the same World Development Indicators source used throughout this paper

²⁷ Increases quoted are relative to global output in GNI PPP terms for 2001. It should be noted that estimates of the poverty elasticity of growth are notoriously difficult to make and very sensitive to data uncertainties so these estimates of the multiples of global output required to reduce poverty should be treated as indicative only.

²⁸ In comparison, an equivalent tax to remove dollar-a-day poverty would affect fewer than 1 in 10 people in the UK.

loss of income by the middle-class in developed countries and a rise to a more ethical subsistence income for the poorest in the world. This would be highly political and therefore something that is unlikely to arise from economic measures alone.

How much development is justifiable? – the challenge of “catch-down”

But the EPL has another challenge for us. If \$2,200 PPP pp pa is, on average, sufficient for a global citizen today to live a full lifespan then why do citizens of the developed world find they use, and seemingly need, so much more in order to live? In fact less than one-third of global output would be sufficient for the whole world's population to live at the EPL. What real benefit does the world gain from the other two-thirds of global output that we consume each year? Is this a measure of the inefficiency of life in the developed world? Should we be looking to societies where people do live a full lifespan on PPP incomes of only a few thousand dollars-a-year not as economic systems that need to be developed but as exemplars of a more efficient type of living?

These are uncomfortable questions for us in the developed world. Doubtless there are quality of life benefits from the fact that the world consumes three-times more than it actually needs in order to live. The EPL does not really imply that we should give those benefits up. What it does suggest though is that rather than framing poverty solely in terms of how to lift people up to a poverty-line, we should also – and with equal vigour probably – be calling on the developed world to justify its excesses. Perhaps the time has come to stop talking about the developed and developing worlds. Maybe the EPL can help us recognise the 'right' level of development to aspire to. Then we could start to see the world as consisting of under-developed, appropriately-developed and over-developed countries. Then, rather than framing the problem solely as one of catch-up for the developing world, we could ask how the over-developed world can justify not being expected to "catch-down"²⁹ to lower levels of consumption. Of course, this raises tough and unpalatable questions for us in the developed world. Gordon Brown may choose to ignore these implications of his moral stance but should we, as individuals, allow ourselves to also?

²⁹ I am indebted to Peter Rooney for introducing me to this phrase.

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