31st General Conference of IARIW: Parallel Session 7B

"Economic Insecurity, Demography and Well-Being"

Friday, August 27, 2010

St-Gallen, Switzerland

Measuring Economic Insecurity and Vulnerability as part of Economic Well-being: Concepts and Context

Lars Osberg

Department of Economics
Dalhousie University
6214 University Avenue
Halifax, Nova Scotia, Canada B3L 1R6

Research on Poverty Alleviation (REPOA)
P O Box 33223, Plot 157, Migombani Street, Regent Estate
Dar es Salaam, Tanzania

Email: lars.osberg@dal.ca
Version: July 27, 2010

<u>Abstract</u>

Worrying about future economic dangers subtracts from the well-being of individuals, hence measurement of economic insecurity should be part of the measurement of economic well-being. Because risk-averse individuals are worse off if they have to face uninsured economic hazards, and because 'security' has been defined as a basic human right, affluent societies have created complex systems of private insurance and public social protection to reduce the costs of economic hazards. However, the citizens of poor nations (i.e. most of humanity) typically find both private insurance and public social protection to be largely unavailable – their lives are both poorer and riskier. How should one measure the impact on well-being of economic insecurity and vulnerability in these very different contexts?

In recent years, economic insecurity has been discussed by several authors (e.g. Bossert and d'Ambrosio (2009), Osberg (2009)). The "vulnerability" perspective on economic development (e.g. Dercon, 2005a, b) has also emphasized both the costs of unprotected hazards to individuals and the adverse implications for growth of the risk-avoidance strategies available to them.

Unfortunately, the 'economic insecurity' and 'vulnerability' literatures have evolved in remarkable mutual isolation – Section 1 begins with a conceptual comparison and a discussion of the implications for measurement choices. Section 2 illustrates the measurement of economic insecurity and its importance to trends in relative economic well-being using OECD data on seven affluent countries since 1980. Section 3 then asks how one might estimate the level of economic security in a comparable way in the very different context of poor nations, and uses data from Tanzania in 2006-07 to illustrate that meaningful comparisons are possible. Section 4 concludes.

Measuring Economic Security and Vulnerability as part of Economic Well-being:

Context and Concepts

The present is that split-second of direct experience which separates the remembered past from the anticipated future – but people often spend a lot of it worrying about the future, which affects their happiness/utility/well-being in the present. To avoid such anxieties, individuals may acquire insurance (either public and private), choose less risky options in their decision making or build formal or informal networks of social support. The risk of future adverse outcomes and the anxieties which that risk now produces are therefore important for economics, both as predictive of personal and social behaviour and as a part of the measurement of well-being.

But how should we think about this? Economists have contributed extensively to several different, and curiously unconnected[1], relevant literatures – we address here those which might be labelled the 'economic insecurity' and 'vulnerability' perspectives. Part 1 of this paper discusses at a conceptual level the overlap (large) and the distinctions (subtle) between them, and speculates briefly on why, despite their substantial commonalities, these literatures have evolved in mutual isolation. Sections 2 and 3 then introduce examples of the empirical measurement of 'economic insecurity' in seven affluent OECD nations and in Tanzania to illustrate how the very different context of rich and poor countries should influence empirical measurement. Section 4 concludes.

1.   Is it Insecurity or Vulnerability or lack of Social Protection that should concern us?

   1.1   The Human Rights and Social Welfare Function Perspectives

If we want to know whether 'insecurity' or 'vulnerability' is the more important concept to measure, it is useful first to ask why one wants to know.

One reason might be the conception that the objective of economic and social policy is to maximize 'Social Welfare'. The classic definitions of the 'Social Welfare Function' in economics[2] conceive of it as a weighted sum of individual utilities in which the relative weights attached to the utilities of low-income individuals reflect the degree of inequality aversion in society. In this conception, individuals have diminishing marginal utility of consumption and are

---

[1] For example, in their otherwise excellent survey paper on social protection, Norton, Conway and Foster (2001) do not reference Dercon's work on vulnerability – and Dercon's 2005 survey of vulnerability similarly omits reference to them. Both papers ignore Osberg's (1998) paper on economic insecurity and are in turn not referenced in Bossert and D'Ambrosio's 2009 paper on that subject. Appendix A discusses some of the closely linked terms used in this general literature.

[2] Equal weights for all individual utilities (the original utilitarian position) and a linear utility function implies zero aversion to income inequality while maximal weight on the lowest utility is the strict Rawls criterion. The textbook presentation of Lambert (1989 – especially Chapters 4 and 5) is particularly clear.

therefore risk-averse. Because risk-averse individuals will be worse off if they have to face uninsured economic hazards, but complete insurance protection may create incentive and moral hazard problems, neither complete coverage nor complete risk exposure is optimal. The crucial issue for public policy is *how much* risk and loss mitigation is desirable. Measuring the actual current level of insecurity or vulnerability or social protection is therefore an important intermediate step in the design of public policy to maximize social welfare.

An alternative point of view starts from the perception that "Necessitous men are not free men[3]." – that individuals must actually be in possession of their basic human rights if they are to exercise meaningful free will in their economic and political choices. Because individuals' choices must be meaningfully free if we are to want to maximize the (weighted) sum of individual utilities resulting from individual outcomes, the achievement of basic human rights for all citizens is the primary responsibility of government. If this has been achieved, thereby enabling autonomous individuals to pursue freely their own conception of the good life, maximization of the social welfare to be obtained from production is seen as the secondary objective[4] of public policy.

In this perspective, national constitutions, international human rights covenants and the systems of jurisprudence they establish are what give concrete meaning to the term 'human rights'. Specifically, for present purposes, Article 22 of the United Nations' Universal Declaration of Human Rights stated in 1948 that:

"Everyone, as a member of society, has a right to social security."

Article 25 of the United Nations' Universal Declaration of Human Rights declared:

"Everyone has the right to a standard of living adequate for the health and well being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control."[5]

---

[3] Roosevelt, (1936). See also Sen (1999)

[4] Rawls (1982:162). for example, is quite clear that his 'maxi-min' social welfare criterion is the second criterion of 'social justice' – i.e. subject to the prior attainment of the first principle of 'equal basic liberties for all'.

[5] Today, the gender specificity of the language of 1948 will strike many people as very odd – but Article 2 makes it clear that all rights are to be guaranteed to male and female persons equally. Van Langendonck and contributors (2007) survey the human rights covenants that assert a right to 'social security'. As he notes (2007:3), even before the UN Universal Declaration, the Anglo-American "Atlantic Charter" of 1941 had asserted the goal of "securing for all improved labor standards, economic advancement and social security", an affirmation he attributes to a necessity of counteracting Nazi propaganda about worker security in Germany. [Van Langendonck also conjectures that the US (then a social policy leader, having instituted Social Security in 1935) wanted access to free international trade to be restricted to nations with comparable social protection costs.]

Unlike the social welfare function perspective (which thinks in terms of aggregate individual consumption and utility and rarely identifies particular commodities), the human rights approach identifies specific primary goods (in Article 25, "food, clothing, housing and medical care") and specific contingencies ("security in the event of unemployment, sickness, disability, widowhood, old age"). The residual clause in Article 25 of the Universal Declaration ("or other lack of livelihood in circumstances beyond his control") is meant to expand the generality of protections, but the focus of human rights discourse is clearly on the particular commodities labeled[6] - which are meant to be available to all citizens, in sufficient amounts (by local social standards) .

If one starts from this 'human rights' conception of the objectives of public policy, the measurement of insecurity or vulnerability should therefore first identify how many citizens are deprived of which particular human rights, and only secondarily calculate aggregate utility costs. Since governments are the signatories of human rights conventions, there is an implied onus on public policy to respond, and an implicit specification of concrete objectives.

1.2   Concepts and Definitions

For the most part, both 'vulnerability' and 'insecurity' have been concerned with household level outcomes[7], and this article will maintain that focus. Dercon (2005a) has defined vulnerability as "the existence and the extent of a *threat* of poverty and destitution; the danger that a socially unacceptable level of wellbeing may materialise." Naudé et al (2008) have noted in the same vein: "In economics the concern has mainly been with vulnerability to poverty, which is commonly defined as the risk of households falling into or remaining in poverty."

Osberg (1998) defined 'economic insecurity' as "the anxiety produced by a lack of economic safety – i.e. by an inability to obtain protection against subjectively significant potential economic losses" (1998:17). Dominitz and Manski (1997), Scheve-Slaughter (2004) and Anderson and Gascon (2007) preferred "an individual's perception of the risk of economic misfortune" . Bossert and d'Ambrosio (2009:1) considered the formulation of the United Nations Department of Economic and Social Affairs (2008, p.vi) that "economic insecurity arises from the exposure of individuals, communities and countries to adverse events, and from their inability to cope with and recover from the costly consequences of those events." but chose the

---

[6] The legal texts which articulate human rights are the product of legislatures and constitutional conventions which can, for the most part, claim democratic legitimacy. The human rights perspective therefore has the enormous advantage that it can claim to reflect societal preferences, as expressed by a clearly established and legitimate process. Academic articles which specify social welfare functions cannot credibly make such a claim. Whatever their wisdom, they are the product of individual authors.

[7] Guillaumont (2008:2) is an exception – his perspective is that: "the economic vulnerability of a country can be defined by the risk of a (poor) country seeing its development hampered by the natural or external shocks it faces". In his case the macro-micro linkage is assumed, not explored.

definition: "economic insecurity is the anxiety produced by the exposure to adverse events and the inability to recover from them."

If one compares these definitions, a clear difference is the focus of concern. In discussions of "economic insecurity" the anxieties of all citizens are considered – this literature recognizes that even if the affluent do not fear actual poverty, they may still be anxious about their economic future[8]. And if the role of public policy is first to assure the attainment of human rights for all citizens and only second to maximize social welfare, then the outcomes of all citizens should count. Consistent with this perspective, the 'named risks' with which Osberg (1998) operationalized the general concept of 'economic insecurity' were explicitly drawn from those contingencies specified in Article 25 of the UN Universal Declaration of Human Rights.

"Vulnerability" discourse, however, typically concerns only those individuals with a risk of poverty or destitution. As a practical matter, in very poor countries, this may mean most of the population – but the issue is framed as a risk *of poverty* and not as a hazard facing almost everyone. Poverty and destitution are in turn usually thought of in terms of an individual's total expenditure or consumption, aggregated across commodities (typically, using market prices). Consumption of specific commodities (like food or clothing or housing) receives no special attention[9]. Freedom from vulnerability is not interpreted as a basic human right in the literature on 'vulnerability', but there is considerable discussion of the loss in utility produced by uninsured (and possibly uninsurable) risks – as a 'social welfare function' approach would suggest.

However, other differences between the definitions of economic insecurity and vulnerability are best labelled as subtle, or perhaps inconsequential. For example, Dercon's definition of vulnerability phrases the issue as the 'danger' of socially unacceptable outcomes while Osberg refers to a 'lack of safety' – which seems like a semantic, but not substantive, difference. Both make a qualitative distinction between outcome states and both emphasize that real world people face significant constraints on loss avoidance / loss mitigation behaviour.

Common constraints of empirical implementation further narrow the differences between the 'vunerability' and 'insecurity' perspectives. While Dercon, for example, does not discuss the distinction between subjective assessments of "threat" and objective risks of hazards, in practice

---

[8] The 'right to security' in named contingencies (see Article 25 of the UN Universal Declaration) can be interpreted either as avoiding poverty or being able to maintain one's social identity and accustomed patterns of living. The former perspective has often been ascribed to Beveridge, and is popular in the US and UK. The latter point of view goes back at least to Bismark (1884) and continues to inform social insurance plans with earnings related benefits – which dominate social spending in most affluent countries.

[9] Alkire and Santos (2010) are representative of a literature on multi-dimensional poverty which could in principle be used to complement the existing vulnerability literature – but there is no link to human rights discourse in their selection of dimensionalities of poverty.

he relies on data on objective trends in hazard probability. Although definitions of 'economic insecurity' appeal conceptually to ideas of subjective anxiety and subjective assessment of probabilities, in practice the unavailability of such data means this distinction often disappears from empirical work (e.g. Osberg and Sharpe, 2009 assume that subjective assessments are accurately predicted by objective risk). Both the insecurity discussion of Bossert and d'Ambrosio (2009) and the vulnerability analysis of Dercon (2005) refer to general ideas of 'adverse events' or 'dangers', but in practice both use the metric of the money value of total household income or consumption to summarize outcomes.

Hence, the main substantive difference appear to be that vulnerability discourse focuses on the risk of poverty or destitution, while the insecurity perspective concerns the hazards faced by all citizens. Sitting behind these differences in focus is a subtly different conception of the role of public policy.

1.3 Context and Measurement

The major empirical differences between studies of vulnerability and economic insecurity seem to be primarily driven by the very different contexts in which these inherently similar concepts have been applied.

"Economic (In)Security" has most often been studied in the context of affluent nations. In these countries, habituated as they are to high and growing average incomes, fine-tuning the social programmes of the welfare state is the focus of much policy analysis. If the question is whether social policy outcomes can be improved, comparisons are crucial to the interpretation of measurement. (A reader who learns, for example, that economic insecurity in Country A at time t was "83" needs some sort of comparator to know if this is low or high.) Cross-jurisdiction comparison of levels or trends over time in economic insecurity can be useful as a social policy diagnostic – and these comparisons are made easier in affluent nations by the long series of comparable data and nationally representative panel studies available from national statistical agencies and other sources.[10]

Although the transition probabilities of individuals and households into and out of poverty have been much studied in rich countries, poverty analysts there have typically thought of the issue in terms of 'poverty dynamics'. The 'vulnerability' literature, by contrast, has usually focussed on very poor countries[11]. In such countries, when most people are poor or near-

---

[10] For example, in their cross-national comparisons, Osberg and Sharpe (2002, 2005, 2009) use the harmonized micro-data available from the Luxembourg Income Study (LIS).

[11] For a very incomplete list, see citations for Ethiopia, Kenya, Tanzania, Peru, Indonesia and Sichuan in References.

poor if compared to an absolute poverty line[12], there is not in fact much room for empirical differences between measurements of economic insecurity (i.e. hazards affecting all citizens) and measurements of vulnerability which reflect the risk of poverty or destitution.

Comparisons over time or across jurisdictions of the level of vulnerability have not been a major focus of the vulnerability literature. Perhaps because the overriding public policy problem in very poor countries is how to generate high rates of economic growth, the vulnerability literature has instead emphasized behavioural implications – i.e. the connections between household vulnerability and the micro-economic decisions and coping strategies (e.g. on crop choice[13]) which might help explain low rates of macro-economic growth. Perhaps partly because that focus must consider the variation in micro-context of behaviours, researchers on vulnerability have often done their own surveys and have not typically relied on already published data. Different survey designers imply differing questionnaire wording, while budget constraints have dictated infrequency of surveys, relatively small samples and restricted geographic focus. As a result, published estimates of levels of 'vulnerability' are hard to generalize from local samples to national level estimates or to compare across jurisdictions – and national trends have been impossible to assess.

Arguably, however, poor countries are the places where accurate measurement and analysis of insecurity and vulnerability matters most. In these countries, individuals face many dangers (e.g. famine due to drought, cholera) which have largely disappeared in rich nations, and are repeatedly faced with potentially extreme outcomes from hazards that might elsewhere be thought 'minor[14]'. Because they lack access to the welfare state social programmes or private sector risk-pooling financial mechanisms which might cushion the impact of such hazards, these dangers can be expected to have much larger impacts of behaviour and on well-being than in affluent countries.

---

[12] In Tanzania, for example, the $1.25 PPP US per day poverty line implies 89% were poor in 2000 and a further 8% had incomes between $1.25 and $2 per day – see WDI Online series SI.POV.DDAY and SI.POV.2DAY.

[13] See Dercon (1996, 2002), among many other writings.

[14] In a poor country, for example, an axe in the foot while splitting firewood can, if an infected wound produces lameness, cause permanently lower lifetime earnings – both the risk and its consequences are far smaller in affluent nations.

2.   Measuring Economic Insecurity in Affluent Nations[15]

"The actual complaint of the worker is the insecurity of his existence; he is unsure if he will always have work, he is unsure if he will always be healthy and he can predict that he will reach old age and be unable to work. If he falls into poverty, and be that only through prolonged illness, he will find himself totally helpless being on his own, and society currently does not accept any responsibility towards him beyond the usual provisions for the poor, even if he has been working all the time ever so diligently and faithfully."

20 March 1884 - speech of Otto von Bismarck

Uninsurable uncertainty about what the future holds will decrease the well being of risk averse individuals, but there are many types of hazards. If the objective of measurement is to assist in the public policy process, it is not particularly useful to construct a measure of total utility loss from all possible misfortunes, since such a total offers no guide to which specific hazards are of greatest importance. As well, some hazards (e.g. falling out of love) are not seen as legitimate objects of public policy. To construct a useful index of uninsured uncertainty, we must specify both the policy relevant types of misfortune that might produce insecurity and the measures of anxiety or insecurity about such losses. But what is the criterion for selecting those specific hazards that cause economic insecurity which we will measure, while neglecting others?

Over sixty years ago the United Nations' Universal Declaration of Human Rights of 1948 enumerated, in Article 25, the "right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control." With the significant addition of "widowhood", this list reflects fairly directly the insecurities mentioned by Bismark, more than sixty years before – and Bismark also noted that having in place "the usual provisions for the poor" was not enough to prevent economic insecurity.

Because the articulation, and adoption, of human rights covenants such as the UN's Universal Declaration are the result of a political process which (at least in democracies) can claim general societal support, this section starts from a 'human rights' perspective and follows a "named risks" approach addressing the change over time in four key objective economic risks - unemployment, sickness, widowhood and old age. As in Osberg and Sharpe (2002, 2005, 2009),

---

[15] This section is largely reproduced from Osberg and Sharpe (2009)'s construction of a measure of economic security for seven affluent nations as part of their Index of Economic Well-Being (IEWB) – see also Osberg and Sharpe (2002, 2005).

this paper assumes that changes in the subjective level of anxiety about a lack of economic safety are proportionate to changes in objective risk.[16]

As well, this paper starts from the point of view that comparisons – either over time or across jurisdictions – are central to the meaning of economic measurement. This necessarily implies empirical compromises. Comparisons are only possible if comparable data has been gathered at different times and places, which restricts measurement choices to pre-existing data bases. Even within the OECD, there is less internationally comparable data available than there is available domestically within nations (which implies some compromises in international comparisons which can be avoided in within country comparisons – such as interprovincial, or over time, comparisons within Canada).

a.   Security in the Event of Unemployment

The Osberg/Sharpe IEWB measure of the risk imposed by unemployment is conceptually driven by three variables: the unemployment rate, the proportion of the unemployed receiving unemployment benefits, and the average proportion of earnings that are replaced by such benefits.[17] Originally, the conceptual basis of the unemployment security component was the expected value of financial loss – i.e. the probability of financial loss for the "typical" labour force participant, calculated as (probability of not having a job) * (fraction of wage not replaced by unemployment insurance). This probabilistic approach ignored any non-economic costs to non-employment, implicitly assumed it was irrelevant which component of the compound probability of financial loss changed and counted only the immediate wage loss of unemployment – all that mattered was the "bottom line" of short run financial loss due to unemployment.[18]

In the last decade, the economics literature has seen a spectacular growth in the number of papers using self-reported measures of happiness, life satisfaction or well-being. A consistent finding in affluent nations is the larger negative impact of higher unemployment rates compared

---

[16] Green et al (2000:1) report that "subjective employment insecurity tracks the unemployment rate," while Dominitz and Manski (1997) report that "Expectations and realizations of health insurance coverage and of job loss tend to match up closely" for the United States.

[17] This paper models "Security in the event of Unemployment" using just the unemployment rate and the average percentage of lost earnings replaced by unemployment benefits (i.e. the "Gross Replacement Rate") for two earnings levels and three family situations. Source: OECD, Tax-Benefit Models. See Martin (1996) for a fuller discussion. http://www.oecd.org/document/3/0,3343,en_2649_34637_39617987_1_1_1_1,00.html   In analyses using just Canadian data, we can use: (probability of not having a job) * (probability of not getting UI/EI benefits) * (fraction of wage not replaced by UI/EI). See Osberg and Sharpe (2009).

[18] The view that the only costs associated with unemployment are monetary has been strongly criticized – e.g. by Osberg (1988).

to unemployment compensation as a source of self-reported happiness for the working population (see Di Tella, MacCulloch and Oswald 2003:819). The psychological and social impacts of unemployment (Jahoda, 1979) doubtless explain much of this – and there is also the long run impact of job loss on the wages of displaced workers, which many researchers have found to be significant (Ruhm,1991; Chan and Stevens, 1999). Influenced by these literatures, the employment security index was revised to give unemployment a weight of four-fifths, compared to a weight of one-fifth for the financial protection variable – a significant change from the earlier methodology which weighted them equally.

The aggregation procedure for the variables that make up the risk of unemployment component of the economic security domain recognizes two distinct issues – the risk of unemployment and the risk of financial loss from unemployment. Both the unemployment rate and the financial protection index are scaled, using the linear scaling procedure (see Sharpe and Salzman, 2003). The scaled values of the two indexes are weighted to produce the overall index of security from the risk imposed by unemployment. The relative ease of obtaining a job provides employment security by enabling attractive options (in a low unemployment labour market) in the event of unemployment. A higher probability of obtaining unemployment benefits, or higher benefits, provides security by compensating individuals for their earnings loss[19].

Chart 1 presents estimates of our Security from Unemployment sub-index for Canada, Australia, Germany, Norway, Sweden, the United Kingdom and the United States, for the period 1980-2007. For four countries – Canada, Germany, the United Kingdom and the United States – we also use OECD forecasts to produce projections of the index through 2010 using our updated methodology. Chart 2 is a sensitivity analysis that shows – for the illustrative cases of the United States and Canada – what the trend would have been if the unemployment and financial protection variables were weighted as in our original methodology. As one might expect, the more heavily the unemployment rate is weighted, the better the United States tends to look when (as in the 1990s) the US unemployment rate was low compared to other nations.

The general methodological points to underline are that "security from unemployment" is a compound probability, which mingles the chances of the hazard (unemployment) and the probability of benefitting from insurance against that hazard. Assessment of trends depends on the relative weight ascribed to each component, which depends in turn on the specification of the costs of unemployment.

---

[19] We make the unemployment rate and the financial protection rate additive in weighted impacts, not multiplicative, which dampens the evolution of the risk to unemployment component over time. This also implicitly assumes no interdependence of the marginal impacts of changing unemployment or unemployment benefits.

Chart 1: Trends in Security from Unemployment, Selected OECD Countries, 1980-2010
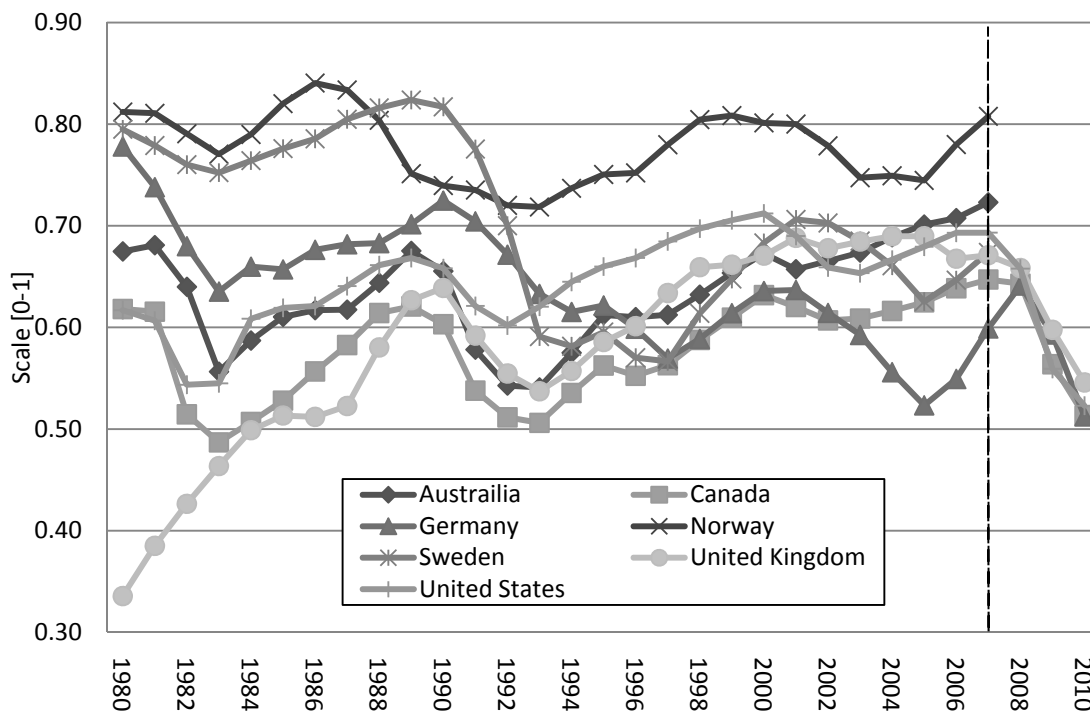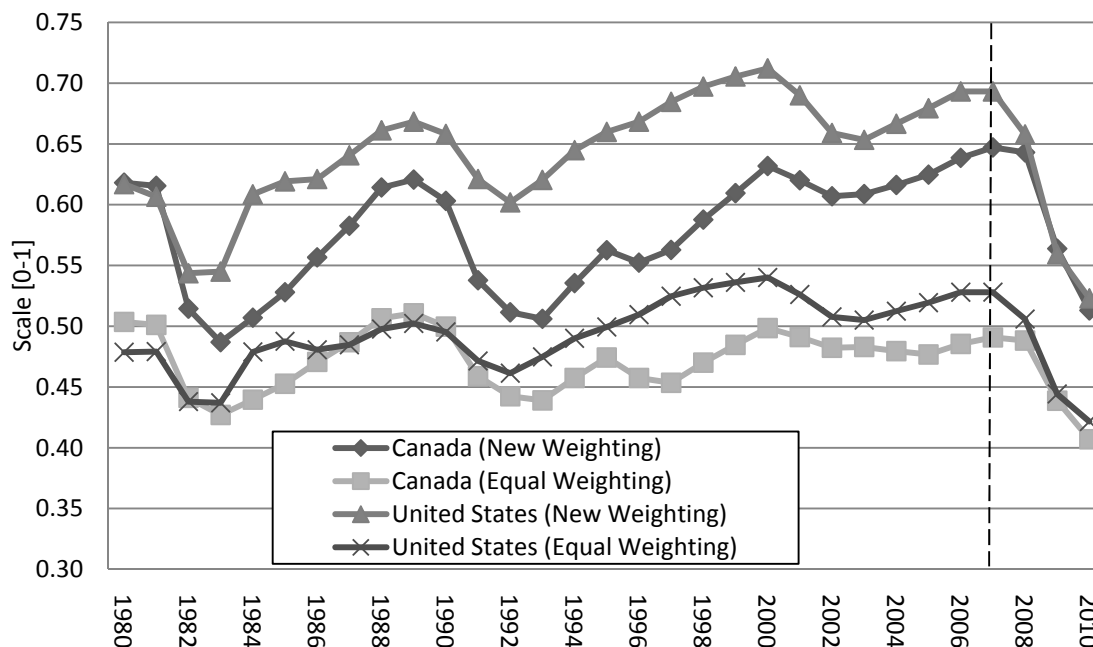

Chart 2: Sensitivity Analysis of Security from Unemployment, Canada and the United States, 1980-2010

Note: New weighting is 0.8 unemployment + 0.2 replacement rate.
The old weighting scheme assigned equal weight to the unemployment rate and the replacement rate.

b.   Security in the Event of Sickness

The focus of this component of the IEWB is the financial risk imposed by illness, which in international comparisons is dominated by the coverage of public health care. In all the affluent countries, except for the United States, publicly financed health insurance programs pay for medically necessary health care, but countries have different mixes of public and private services, with varying combinations of co-pay for services rendered[20].

Conceptually, one has 'security' if one can obtain protection from the adverse implications of an event that is ex ante uncertain – the voluntary choice of medically discretionary services is not an 'insecurity' issue.[21] Nevertheless, unless the income elasticity of medically discretionary health care expenditures and the health insurance reimbursement of such costs differs substantially across jurisdictions or over time, the error introduced by comparing the unreimbursed trend in total private health care expenditures is likely to be small[22].

Chart 3: Trends in Security from the Financial Cost of Illness, Selected OECD Countries, 1980-2007

---
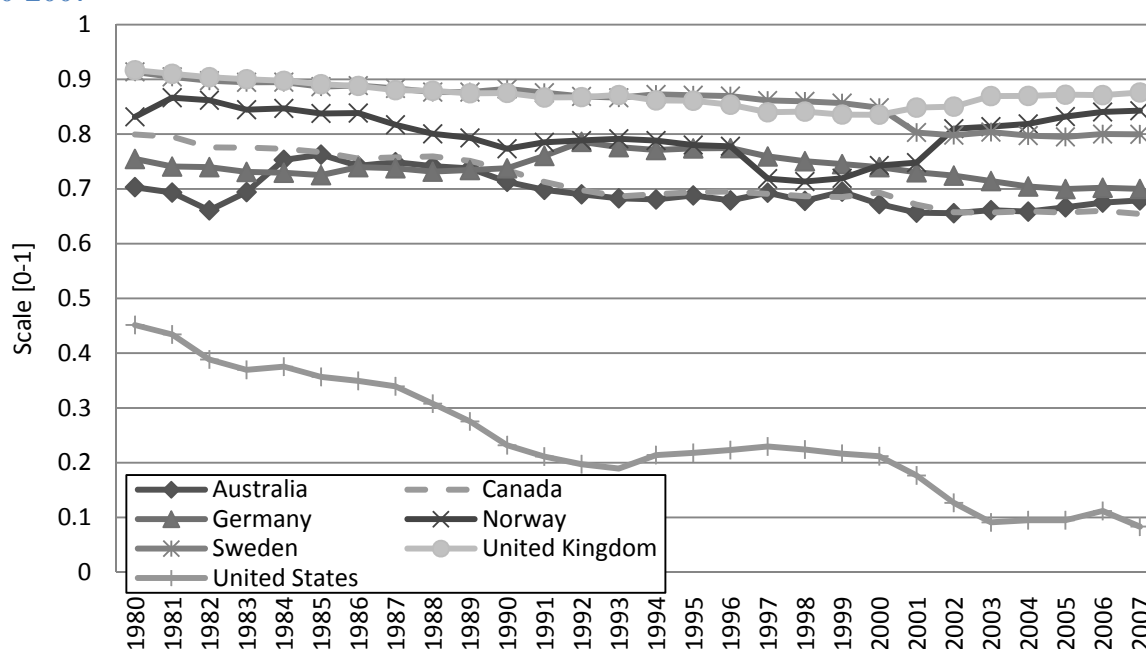
[20] E.g. in Canada, unlisted medical services (such as acupuncture), dental care and most drugs taken outside hospitals are not covered. These costs have been rising rapidly, which implies increased risk exposure.

[21] Choice induced change in the probability of adverse events does not lessen its medical necessity after the fact – e.g. fixing a broken leg is medically necessary, whether or not personal choices (e.g. going skiing) changed its probability.

[22] Osberg, 2009, Appendix 1 also discusses the risk of medical bankruptcy.

The IEWB uses the percentage of disposable household income spent by households on health care services that is not reimbursed by public or private health insurance as its indicator of the financial risk raised by illness. In 2007, this ranged from a low of 1.2 per cent in the United Kingdom to a high of 9.7 per cent in the United States, with Canada the next highest at 3.6 per cent. Chart 3 illustrates how Canada and these other five affluent OECD countries are clustered in a fairly narrow band. Chart 3 also illustrates the much lower level of, and larger deterioration in, security in the event of illness in the United States, relative to other countries.

c.   Security in the Event of Widowhood

Illness, unemployment or old age happen directly to individuals, but the hazard of "widowhood" arises because the underlying event (death) happens to somebody else – i.e. the husband with whom the widow had linked her fortunes by marriage. When the UN Universal Declaration of Human Rights was drafted in 1948, the implicit social context was the nuclear family in an industrial economy – specifically, the "male bread-winner model" of a single earner household with a non-employed spouse. At that time, the percentage of single parent families was relatively high partly as a result of the casualties of World War II, and "widowhood" was therefore the primary way in which women and children lost access to male earnings.

Since 1948, the two-earner family has become the social norm in affluent countries, and divorce and separation have become the primary origins of single parent families. However, it is still often true that many women and children are "one man away from poverty." The prevalence of poverty among single parent families is much higher than in the general population, and family break-up is a hugely important determinant of entry into poverty. [23] We model the risk of becoming poor because of family breakup in an 'expected value' sense – i.e. we multiply (the probability of divorce) * (the poverty rate among single female parent families) * (the average poverty gap ratio among single female parent families).[24] The product of these last two variables is proportional to the intensity of poverty. Poverty is defined in relative terms as the proportion of households below one half median equivalent income.

The divorce rate per thousand was 2.2 in Canada in 2007, the same as Sweden and not so different from Germany or Norway (2.3), but less than Australia (2.6), the United Kingdom (2.8) and the United States (4.2). The United States was also an outlier in the poverty gap for single parent families at 42.7 per cent, compared to a range for other nations from 18.8 per cent in the

---

[23] Although divorce and separation can have large emotional impacts and substantial transactions costs (e.g. in legal bills) and although the termination of abusive or dysfunctional relationships can have social benefits, we do not attempt to model these issues. Our focus is a more limited financial one.

[24] This procedure effectively ignores single male parents. In Canada, males comprise only about 17 per cent of the single parent population, and have substantially smaller increases in poverty probability following separation.

United Kingdom to 32.3 per cent in Germany. Canada (43.4 per cent) and the United States (43.7 per cent) were quite similar in the rate of poverty for single female headed households with children – well above Germany (34.9 per cent), the United Kingdom (30.5 per cent) or Australia (31.6 per cent) and very different from Norway and Sweden, where the poverty rate was 13.3 per cent and 9.7 per cent respectively.

Hence, the United States is an outlier on all dimensions, while other countries were sometimes relatively high, and sometimes relatively low, on particular dimensions. As a result, except for the United States, Chart 4 shows the product of these influences to be clustered in a fairly narrow band. Empirically, the moral is that similar aggregate levels of risk and insecurity can be the result of offsetting differences in component hazards – but an outlier on all components is sure to be an outlier in the aggregate.

Chart 4: Trends in Security from Single Parent Poverty, Selected OECD Countries, 1980-2007
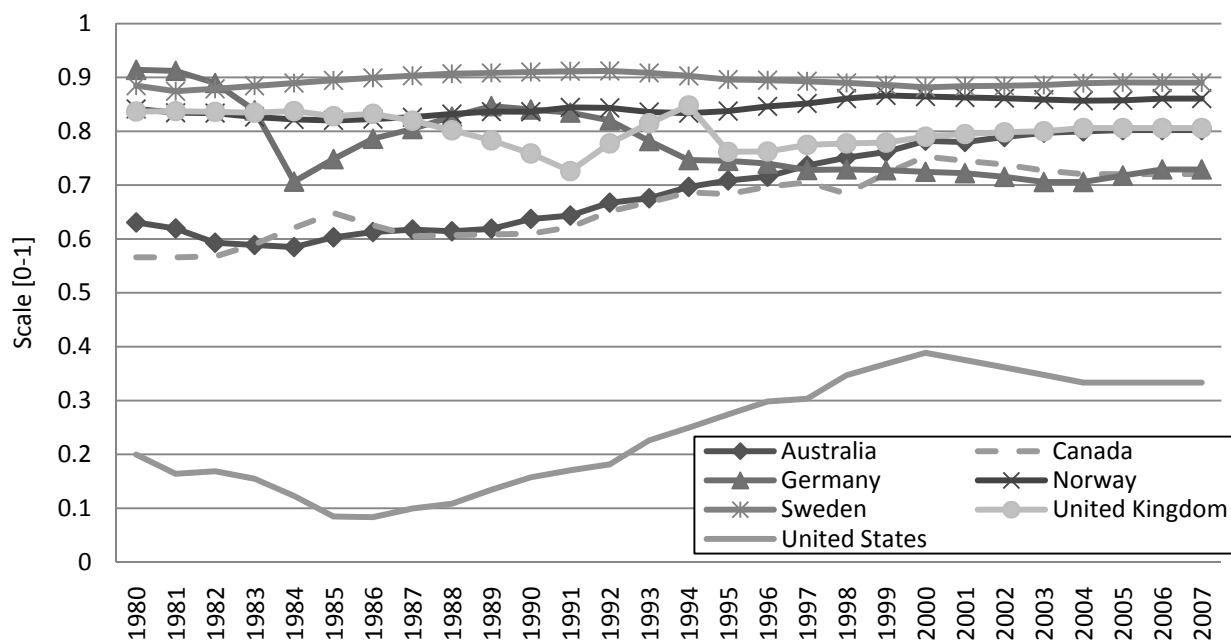
d. Security in the Event of Old Age

In the IEWB perspective, feelings of insecurity about old age are driven by fears of a worst case outcome, and the likelihood of that worst case outcome. Hence, the fourth component of the economic security domain is the risk of poverty in old age, which is proxied by the

poverty intensity (= poverty rate * average poverty gap ratio) experienced by households headed by a person 65 and over. In this perspective, the IEWB is much closer to Beveridge and the vulnerability literature than to Bismark.

Chart 5 indicates fluctuations over time in poverty intensity among senior citizens – e.g. in Germany or Norway – which sometimes seem to follow a "saw-tooth' type of pattern. A characteristic feature of the income distribution of the elderly in affluent countries is a "spike" in the incomes of the elderly at the minimum income base defined by the structure of the country's old age security system, which is often quite close to the 'one half median income' poverty line. Since many of the elderly, in all countries, do not have significant private pensions or income from capital, they must depend entirely on public pensions, so their incomes from pension entitlements are often much the same, because they are determined by the same formula for the minimum income base defined by pension legislation. When the resulting spike in the income distribution is close to the poverty line, and the formula is imperfectly adjusted for annual inflation, but revised periodically, 'saw-tooth' fluctuations over time in the poverty rate among the elderly are the result[25].

e.   Security in the event of disability or other loss of livelihood in circumstances beyond one's control

"Disability" is a term that covers a number of specific hazards, for which some insurance coverage is available in affluent nations – but the non-availability of comparable international data has thus far prevented comparative measurement. When we entirely omit consideration of this dimension of (in)security we are implicitly setting its weight to zero. This is not satisfactory, but we do not yet have a better alternative.

---

[25] As well, since our data for this variable are drawn from the Luxembourg Income Study, which has periodic observations from each country, we have been forced to interpolate between data points and accept data (e.g. from Germany in 1983 and 1984) which are drawn from different original surveys – and both these compromises may introduce error.

Chart 5: Trends in Security from Poverty in Old Age, Selected OECD Countries, 1980-2007
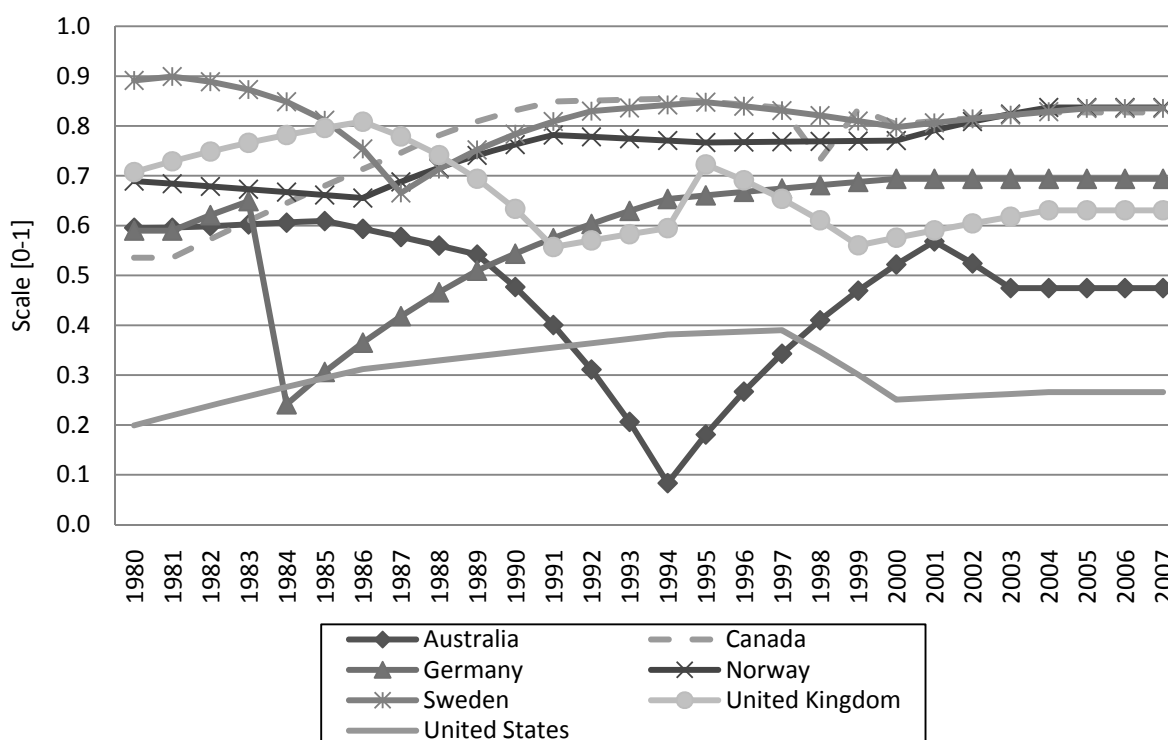

f.   Aggregation of the Components of Economic Security into Overall Economic Security Domain Index

To aggregate the scaled values of the four components of the economic security domain into an overall scaled index we must choose weights for each risk. Equal weighting would implicitly assume that all the named risks are of equal importance, although the number of people facing each type of risk is not equal. It is more ethically defensible to weight each risk by the relative size of the populations deemed to be subject to it.

It is assumed that the population of working age (i.e.15 to 64 years) either is, or could be, employed and is thus affected directly by the risk of unemployment. For illness, it is assumed that 100 per cent of the population is at risk. For the risk of single parent poverty, it is assumed that all married women and their children who are under 18 are at risk. On the presumption that individuals only really start to worry about poverty in old age as their retirement years start to near, it is assumed that the population 45-64 are most at risk. The component specific weights are generated by adding up all the proportions of the population subject to the four risks and then standardizing to unity by dividing each proportion of the population affected by the risk by that

total[26]. For example, in Canada in 2007, the weights for the four components of economic security were 0.146 for security from single-parent poverty; 0.117 for security from poverty in old age; 0.438 for security from the financial risk of illness; and 0.298 for security from unemployment.

Chart 6: Trends in the Index of Economic Security, Selected OECD Countries, 1980-2007
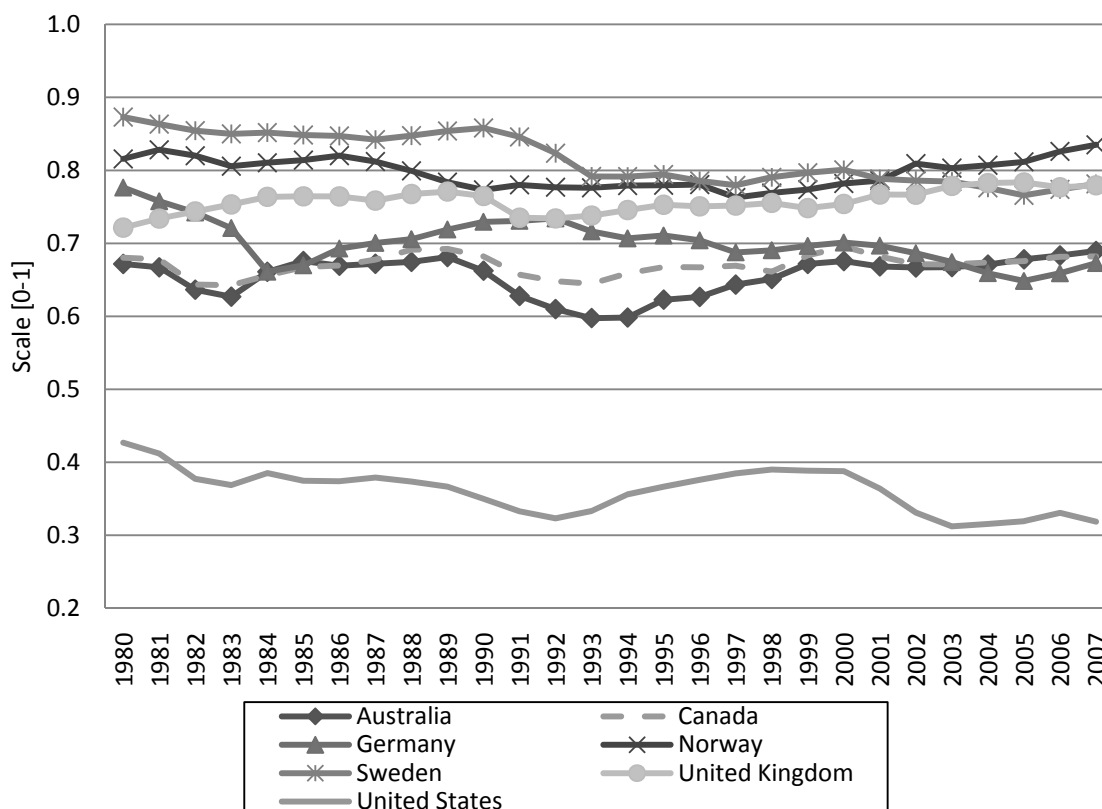
Because the demographic structure of each country differs, and shifts over time, the proportion of the population affected by the different risks, and hence the weights, vary by country and over time. The contribution of each component is the product of its scaled value and weight.

Chart 6 presents the summary Index of Economic Security for all seven countries. The immediately obvious lesson is the much lower level, and downward trend, of economic security in the United States – well before the advent of the current recession. The United States is not

---

[26] In the Canadian case in 2007, adding up to 228 = 68 per cent of the total population of working age + 100 per cent for illness + 33 per cent married women plus children + 27 per cent aged 45 to 64.

particularly an outlier in security from the costs of unemployment, but in all the other three dimensions of economic security it falls well short of the comparator nations. Largely because our new weighting for unemployment benefits in the costs of unemployment de-emphasizes the replacement rate of UI/EI benefits and ignores entirely the decline in UI/EI coverage in Canada, the IEWB Index of Economic Security shows essentially no change for Canadians. Norwegians and Australians also had very small changes. In the United Kingdom there has been an improvement and in Germany and Sweden a deterioration in economic security – but in both level of economic security and in trends over time, the United States stands out clearly.

3.   Measuring Economic Insecurity in a poor country – the example of Tanzania

Poor countries typically do not have long time series of reliable micro-data statistics of the type which Section 2 has relied on – but most of humanity lives in such places. If comparisons are central to the interpretation of measurement, and if discussions of economic insecurity across jurisdictions or over time rely on comparable measurements, is it possible to meaningfully compare the economic insecurity of the world's population – i.e. including those who live in poor countries?

This section will use Tanzania as a case study of the possibility of calculation of a meaningful index of economic insecurity for people who live in a very different context than that of Section 2. The emphasis is on using available data of a type which might plausibly be available for other countries. International data bases (e.g. from the World Health Organization, the FAO and the World Bank) are used in conjunction with the 2007 Household Budget Survey of the Tanzania's National Bureau of Statistics – henceforth HBS2007).[27]

It is not likely that anyone who has actually worked with survey administration or micro-data analysis in poor countries will minimize the associated difficulties – but it is also useful to keep a historical perspective. It is not all that long ago that the analysis of Section 2 would have been impossible even within affluent countries. The availability of internationally comparable socio-economic micro-data of any type is a relatively recent phenomenon – the first real example being the Luxembourg Income Study data base, which contained a very limited set of data when it started in 1983. Section 2 relied on the most recent LIS data and it relied also on time series of social policy data from the OECD which has only been available, in more rudimentary form, since the 1990s. In many ways, the availability of high quality data in poor countries has changed even more rapidly – as evidenced by the availability of HBS2007 and other data bases in Tanzania and by internationally comparable data bases including less developed countries (such as the World Development Indicators). Data constraints now limit this section to international

---

[27]HBS2007 randomly sampled 10,466 households. Expenditures, and other data, were recorded for 28 days.

comparisons of the *level* of the IEWB index of economic security, but better data is continually becoming available, and one can hope that further work will be able to expand on the limited comparisons of this paper.

The central issue in the 'vulnerability' literature is individuals' risk of poverty, and in Section 2, the risk of poverty was explicitly part of two of the four calculations of 'economic security' (i.e. security in the event of old age and 'widowhood'). One must therefore ask what measure of individual poverty should be used – given the vast difference in living standards between Tanzania and the countries discussed in Section 2, and given also the present purpose of poverty measurement.

In this paper, poverty is being measured because people are sometimes anxious about their future chances of poverty and because we want a measure of 'insecurity' that reflects those personal anxieties. In section 2, the criterion of poverty used was explicitly relative – the poverty line was set at one half the median equivalent income of individuals in each country. This methodology was adopted on the grounds that local norms of poverty are in practice determined by the standard of living seen as 'normal' in a society at a point in time – and that median income is a reasonable approximation[28] of prevailing consumption norms. Within the set of countries similar to those examined in Section 2, the 'relative' criterion of one half the median equivalent income is commonly used in the literature on poverty comparisons because of its conceptual consistency across countries and its concordance with generally accepted local norms of poverty within countries.

Advocates of an 'absolute' poverty line methodology argue that the poverty line should be set at the cost of the bundle of commodities necessary for subsistence. When an absolute standard of poverty (such as $2 per day per person, measured in PPP terms) is used to measure poverty in all nations, the implicit audience is the dispassionate global observer who would set this as an objective criterion of deprivation for all humans. The purpose of measurement, in this context, is to assess social needs, and to serve as a focus for global anti-poverty policy initiatives (as expressed, for example, in the Millenium Development Goals). This can sometimes be very useful.

However, the purpose of poverty measurement in this paper is different. This paper wants to measure 'insecurity' about the future – i.e. individuals' own subjective perceptions of 'vulnerability'[29]. Hence, it is the subjective anxieties of local people which matter, and it is local norms of deprivation which are relevant to those anxieties. In practice, local measures of poverty in Tanzania bracket a "one half the median" poverty line. In 2007, Tanzania's National Bureau

---

[28] For an extended discussion see Osberg (2007).

[29] Recall that insecurity was defined as "the anxiety produced by a lack of economic safety – i.e. by an inability to obtain protection against subjectively significant potential economic losses" while vulnerability was the "*threat* of poverty and destitution; the danger that a socially unacceptable level of wellbeing may materialise."

of Statistics (henceforth NBS) used a criterion of 2200 calories per adult equivalent per day to establish the "food poverty line" at 10,219 Tshs per adult equivalent per month in mainland Tanzania (assuming a food bundle similar to that of the poorer half of the population and no other expenditures)[30]. In public discourse, the 'food poverty line' is often discussed, but the more commonly used 'headline number' is the "Basic Needs" poverty rate[31]. In both the 2001 and 2007 Household Budget Surveys, NBS set the 'Basic Needs' poverty line 37% higher than the food poverty line – at 13,998 Tshs per adult equivalent per month in 2007[32] . HBS2007 data indicate that median total expenditure per equivalent adult in 2007 was 23,790 Tshs monthly, half of which is 11,895 Tshs.

Hence, in the Tanzanian case the "one half of median per equivalent adult" relative poverty line methodology would, in practice, set the poverty line at somewhat less than the average of the "food poverty line" and "Basic Needs poverty line" of the NBS. All three are clearly <u>very</u> severe criteria of poverty, by international norms – but when individual Tanzanians worry about the uncertainties surrounding their future lives, it is <u>local</u> norms of consumption that drive their subjective anxieties. This paper therefore uses the 'one half median equivalent expenditure' criterion for poverty because its methodology is conceptually comparable across nations and because it is, lying mid way between locally calculated poverty lines in Tanzania, relevant for present purposes.

In calculating the Human Development Index or the Index of Economic Well Being or other compound indices with components that cannot be measured in comparable units, the standard methodology adopted is to use "Linear Scaling", in which each observation's value is expressed as a proportion of the observed range of values. That methodology is used here, as it was in Section 2[33].

---

[30] At current exchange rates (1,330 Tshs per dollar) in 2009, 10,219 Tshs is about $7.68 US. However, the PPP conversion factor in 2007 for private consumption was 521 Tshs per dollar (LCU per international $: WDI variable PA.NUS.PRVT.PP), which implies that the Food Poverty Line was equivalent to $19.59 monthly, and the Basic Needs Poverty Line was $26.84 monthly.

[31] See, for example, Poverty and Human Development Report 2007, 2009; In 2007, the 'food poverty line' Head Count rate of poverty was 0.164 while half median total expenditure implies the poverty rate was 0.235, compared to 0.333 if the 'Basic Needs' poverty line is used.

[32] See HBS2007; AppendixA The expenditure concept used by the NBS (expadeqx) excludes medical care, education and rent (because this is quite different from the income/expenditure concepts used by other nations, it is not emphasized here). Its median in HBS2007 is 21,752 Tshs per adult equivalent, implying "one half median expenditure per equivalent adult" would set the poverty line at 10,876 Tshs per month – further below the 'basic needs' poverty line but still somewhat above the 'food poverty line'. These are all very severe criteria of deprivation. Mboghoina and Osberg (2010a,b) have argued that the NBS food poverty line embodies questionable assumptions on equivalence scales and neglects the impact of physical activity on required caloric intake.

[33] In Linear Scaling, where r_{max} is the highest risk jurisdiction and r_{min} is the lowest, a specific *risk* (r_i) is translated into an index of *security* by calculating $I_i = (1.05*r_{max} - r_i) / [1.1* (r_{max} – r_{min})]$. This procedure essentially asks, for a given observed range, where a country sits compared to the worst observed outcome. In this section, 10%, is added to the observed range to allow for possible change at the extremes.

a) Unemployment and the Risk of Loss of Livelihood

In 1948, when the UN's Universal Declaration of Human Rights was drafted and adopted, its signatories were overwhelmingly industrialised nations. In such countries, the vast majority of the population depend on earnings from formal employment in the labour market to enable household consumption and rely on unemployment insurance systems for mitigation of the risk of being unable to exchange their labour time for commodities when paid employment is unavailable. The reason for writing "security in the event of unemployment" as a basic human right in Article 25 was the fact that in the context of industrialized countries, for most people, involuntary unemployment and loss of livelihood were synonymous.

What might be a reasonable index of the risk of loss of livelihood in a global context in 2010 – i.e. including both industrialized nations and countries like Tanzania?

In Tanzania, 89.6% of people over age 15 were economically active in 2006. There is no social welfare or unemployment insurance system to support the jobless. Most people survive either by farming their own plots or by working in the large informal sector of petty trading and self-employment. Hence, the NBS argues that the standard international definition of unemployment as "without work and looking for work" is inappropriate to local circumstances. The NBS adds those with marginal attachment to employment and those available for work to get an estimate of 11% unemployment. Three quarters of the employed (75.1%) worked in agriculture (67.2% worked on their own farm while 7.9% were unpaid family helpers). The non-agricultural sector was split between informal and household employment (13.2%) and paid jobs with government, parastatal and other private employers (11.6%).[34] Growth and urbanization are changing the relative proportions of these sectors, but all are likely to remain important for the foreseeable future – as they are in much of developing world. This suggests that a plausible index of risk of loss of livelihood in the Tanzanian context might be a population weighted average of the risks of loss of livelihood associated with agricultural and non-agricultural employment.

If the objective is to measure insecurity as a component of economic well-being, then one should phrase the issue as constructing an "Index of Livelihood Security".

Index of Livelihood Security = $P_E * I_E + P_A * I_A$

> = (% of employed population in non-agricultural employment) * (Index of Security from Unemployment)

---

[34] See United Republic of Tanzania, 2007: Pages 7, 19, 30, 36, 38, 56;

+ (% of employed population in agriculture) * (Index of Agricultural Livelihood Security)

Section 2a of this paper reported calculations of the first component – an Index of Security from Unemployment. In affluent nations, generalizing its implications to the entire population of working age can be defended as a reasonable approximation since agricultural employment is a very small percentage of the population. This is not reasonable in Tanzania.

Lines 1 and 2 of Table 1 report the unemployment rates and unemployment benefit replacement rates[35] for 2007 which were used to calculate the Index of Security from Unemployment in Section 2 – as well as the unemployment rate (11%) and replacement rate (zero) for Tanzania. Line 3 uses Linear Scaling to calculate the Index of Security from Unemployment for this expanded set of countries.

Table 1
Security from Loss of Livelihood

	Tanzania	USA	Canada	UK	Australia	Germany	Sweden	Norway
1 - Unemployment rate 2006/7	11.0	4.6	6.0	5.3	4.4	8.7	6.2	2.5
2 - Replacement rate 2006/7	0	13.5	11.7	12.3	22.1	24.2	23.8	33.6
3 - Index of Security from Unemployment	0.05	0.67	0.54	0.61	0.74	0.38	0.59	0.96
4 - Percent agricultural employment	75.1	1.4	2.3	1.4	3.3	2.2	2.2	2.2
5 - Variance 1961-2007 of FAO Food Production Index*	96.1	65.2	87.0	99.3	91.9	52.8	51.6	33.2
6 - Index of Agricultural Variability*	0.09	0.51	0.21	0.05	0.15	0.68	0.70	0.95
7 - Index of Livelihood Security**	0.079	0.666	0.533	0.600	0.717	0.385	0.595	0.956

*gross value per capita food index 1999-2001 base - variance 1961-2007
http://faostat.fao.org/site/612/DesktopDefault.aspx?PageID=612#ancor
** Line 7 = Line 6*Line 4 + Line 3*(1-Line 4)
ILFS Tanzania +Key Indicators of the Labor Market (KILM) data base - ILO + Norway estimate

---

[35] See footnote 17 above.

Line 4 shows the very different percentages of the workforce who are directly affected by variability in the agricultural sector. As a 'reduced form' estimate of the riskiness of agriculture[36], Line 5 calculates the variance over time (1961 to 2007) of the gross per capita Food Production Index of the FAO, which is the basis of Line 6, the sub-index of Agricultural Variability. Line 7 reports the population weighted average of Lines 3 and 6. For the affluent countries whose agricultural labour force is around 2% of the total, adding consideration of agricultural variability clearly makes little difference – but for Tanzania, it is central.

b.   Security in the Event of Sickness

Tanzania's health care system combines profit and non-profit private facilities and an overburdened public network of dispensaries and hospitals, within which the non-elderly must often pay for services and pharmaceuticals. Health care costs are a significant worry to Tanzanians. When asked their "main problem" during the past year, 16.7% of respondents to REPOA's "Views of the People Survey" in 2007 said "sickness", 11.4% mentioned "shortage of drinking water" and 11.2% said "cost of medical treatment" [37].

As Line 1 of Table 2 documents, the differences in health care spending between Tanzania and affluent countries are even more dramatic than the differential in GDP per capita – the US to Tanzania ratio in health expenditures is 93:1 and the Germany/Tanzania ratio is 50:1, dwarfing the comparable GDP per capita ratios in Line 5. Line 10 of Table 2 reports life expectancy at birth, as just one example of the many statistics that could be used to make the point that health care is inadequate in Tanzania.

However, the focus of this paper is on the financial risks which health care costs impose on households, and the economic insecurity that this implies – not on the morbidity and premature mortality produced by health care inadequacies[38]. Lines 2 and 3 of Table 2 are included to show the variation across countries in the percentage of health care costs that are

---

[36] The variance is a measure influenced by extremes of both good and bad, but insecurity of agricultural livelihood is about the bottom tail of the distribution of crop outcomes. Appendix B discusses briefly the importance of drought in determining crop failure in Tanzania, and the possibility of measurement of such risks.

[37] REPOA's "Views of the People Survey" of 2007 (VoP2007) randomly selected a primary respondent from among adults over age 25 within 4,987 sampled households. This methodology implies direct questioning of women, as well as men. Calculations by author.

[38] The Human Development Index (an equally weighted sum of indices of Life Expectancy, Education and ln(GDP per capita)) is based on the premise that greater well-being depends on living a longer and better informed life, as well as on more access to economic goods and services. It has, therefore, a larger conception of human well-being than purely "economic". "Economic Security" is being measured here as one domain of the Index of Economic Well Being, whose focus is quite consciously narrowly economic. Osberg and Sharpe (2005) argue that the IEWB is a better measure than GDP per capita of the access to economic goods and services component of the HDI.

borne by the private sector and the percentage of those costs that are not reimbursed by private insurance, respectively. Line 4 puts those two elements together and compares the risk exposure of households to a given level of health care spending (i.e. Out of pocket costs as a percentage of the total spent) and line 6 expresses it as a fraction of GDP per capita.

Out of pocket spending as a percentage of GDP per capita is conceptually similar to the index of health care cost risk used in the IEWB, and the relative magnitudes of that measure of risk, across the seven affluent nations of Table 1, align with the ranking of those nations in Chart 3 of Section 2. It is notable that the ratio of out of pocket medical spending to GDP per capita in Tanzania is similar to that of the US – the most health care cost insecure of affluent nations – although at <u>very</u> much lower levels of health care expenditure.

However, in rich countries there is much more discretionary income available to be spent on health care, if necessary. The IEWB has used out of pocket health care costs as an indicator of health care cost risk, and Section 2 expressed it as a percentage of disposable household income[39], because the impact of health care costs on well-being depends on ability to pay. But what we would really like to measure is out of pocket costs as a percentage of household discretionary income, since even if illness strikes a household, food must be found, even before medicines. In the rich countries considered in Section 2, spending on food is a small enough share of total household consumption that its neglect can perhaps be justified. But for poor countries ability to pay is really better measured by income net of food expenditures than by total income, so direct comparison of the share of out of pocket health care costs in total income arguably distorts the impact of health care cost risk.

In the Tanzanian HBS 2007 micro-data, food expenditures were 63.7% of total household expenditure of all types for the median Tanzanian household. Given the large share of the typical family budget that must be spent on food, a better measure of the micro-impact of health care costs is as a percentage of non-food expenditure – in which case the mean is 9.25%.[40] However, this calculation is only possible if one has access to the micro-data. If one is to make comparisons across nations and over time, the availability of similarly measured data is crucial. Fortunately, the FAO, as part of its mandate to monitor world food security, maintains a comparative database of the share of food consumption expenditure in total household

---

[39] This variable is not available in the World Development Indicators data set – hence the use of GDP per capita.
[40] In the Tanzanian HBS 2007 micro-data, the medical care spending of Tanzanian households was on average 2.4% of total spending, with a range from 1.45% at the median to 5.9% at the 90th percentile of spending. Expressed as a fraction of non-food spending, the median share was 4.7% and the 90th percentile was 19.6% as percentage of non-food spending (HBS2007 Variable nfdxme – non-food expenditure excluding medical and education). Author's calculations using HBS2007 see 23/2/10 – average across individuals –i.e. Population weighted

expenditure (line 7 of Table 2).[41] This is used to calculate out of pocket health care costs as a percentage of GDP per capita after adjustment for food expenditure share (line 8).

Table 2
Security from Health Care Costs - 2006

	Tanzania	USA	Canada	UK	Australia	Germany	Sweden	Norway
1 - Per Capita total health spending*	72	6719	3673	2815	3119	3465	3162	4519
2 - Private Expenditures as % total	42.2	54.2	29.6	12.7	32.3	23.1	18.3	16.4
3 - Out of Pocket expenditure as % private expenditure on health	80	26.6	49	69.5	56.4	57.1	91.1	95.2
4 - Out of pocket as % total spent	33.8	14.4	14.5	8.8	18.2	13.2	16.7	15.6
5 - GDP per capita PPP US current $	1108	44016	36761	35130	33196	32841	34443	52173
6 - Out of pocket as % GDP per capita	2.2	2.2	1.4	0.7	1.7	1.4	1.5	1.4
7 - Food as % household spending	0.65	0.14	0.18	0.23	0.20	0.19	0.17	0.17
8 - Out of pocket health costs as % income after food spending	6.3	2.6	1.8	0.9	2.1	1.7	1.9	1.6
9 - Index of Security from cost of Illness	0.039	0.677	0.809	0.952	0.747	0.819	0.794	0.832
10 - Life Expectancy at Birth	55.9	78	80.6	79.3	81.3	79.7	80.9	80.4

Sources: (1-4)World Health Statistics 2009 - http://www.who.int/whosis/whostat/EN_WHS09_Table7.pdf
(5) (9)World Development Indicators Online - 2006 data;variables NY.GDP.PCAP.PP.CD; SP.DYN.LE00.IN
(7)FAO Food Security Statistics http://www.fao.org/economic/ess/food-security-statistics/en/
* PPP $ 2006
Row 6 = row(4)*row(1)/(row(6)); Row(8) = row(6)/(1- row(7))

---

[41] http://www.fao.org/economic/ess/food-security-statistics/en/

c.   Security in the event of "Widowhood"

Security in the event of "Widowhood" is the most clearly gendered component of the IEWB. In all countries, most people live in families but income from capital or labour earnings is received by individuals, and pooled within households for consumption purposes. Hence, the economic well-being of most people depends both on the risk of interruption of individual income flows (e.g. from loss of livelihood – see (a) above) and on the risk of shocks to the composition of the family unit. The gendered dimension of this risk arises from the fact that males typically have higher individual earnings than females, but women usually retain responsibility for the care of children, even if male earnings are no longer available to the family. When the Universal Declaration of Human Rights included 'security in the event of widowhood' as a basic human right in 1948, it recognized a right that was especially relevant for women.

If 'security in the event of widowhood' is seen more generally as being about the risk of poverty due of loss of male earnings, Section 2 argued that in affluent nations, the main source of that risk has changed over the last 60 years from widowhood to divorce.[42]. HBS2007 micro-data indicate that 22.2 % of Tanzanian households with a head under 60 were female-headed in 2007. Of those, about three in ten (29.2%) were headed by widows and slightly fewer (27.3%) by separated or divorced women[43]. The risk of divorce/separation is clearly important in the Tanzanian context[44], but the risk of widowhood dominates (as one might expect when over all life-expectancy is as low as it is).

In Table 3, the annualized risk of adult male mortality (Line 2) is added to the probability of divorce (Line 1) to produce the annual hazard of loss of male earnings due to either death or divorce (Line 3). One lesson of Table 3 is the non-negligible continuing importance of male mortality in the hazard of loss of male earnings, even in affluent nations – in concentrating solely on divorce, the calculations of Section 2 may have prematurely ignored the level, and the international variation, in traditional widowhood.

Following the methodology of Section 2, Line 6 of Table 3 calculates the risk of single parent poverty as the product of the Poverty Rate (Line 4), the average poverty gap (Line 5) of female headed households with children under 18 and the annual hazard of loss of male earnings (Line 3). To calculate an

---

[42] The text above continues the tradition, arguably implicit in the UN Universal Declaration, of interpreting the risk of widowhood within the implicit framework of the nuclear family. Even in affluent countries, many people can probably personally remember examples of voluntary sharing within the extended family in hard times – even if they may also remember such sharing as acts of generosity, not as due to as-of-right expectations. Because our objective is to measure economic security, enforceable access to resources is the crucial issue, hence the focus here on the nuclear family. In Tanzania social norms of sharing within the extended family are certainly far stronger than in, for example, Canada – but relatives are also often poor and sharing norms are not rights and cannot be legally enforced. Tanzania is not a country governed by sharia law, in which the teachings of the Koran on the duty of men to care for their brother's widows and orphaned nieces and nephews might have legal force.

[43] The remaining 43.5% were 16.7% never married, 23.8% married and 2.8% living together. The Tanzanian divorce data is based on survey self-reports, not the administrative data used in some other countries.

[44] Table 3 reports for Tanzania the probability of divorce and no remarriage within 5 years, calculated for 5 year intervals ages 24 to 44 using HBS2007, annualized and averaged.

index of security, rather than a risk of poverty, Line 7 uses Linear Scaling to report the relative level of security from the compound hazard.

It is not surprising that Tanzania's very high male mortality rate, combined with a fairly high divorce rate, mean a high risk of loss of male earnings – but those earnings are often very low to begin with, so the poverty rate among husband/wife families is high in any event. As well, the HBS2007 does not enable us to distinguish extended family households which have expanded to accommodate widows and their children. Hence, the observed difference in poverty rate associated with a woman being married and living in a male-headed household or being the widowed head of household is relatively small (about 3 percentage points). By contrast, in rich countries male earnings make much more of a difference to the probability and depth of female poverty.

Table 3
Security in the Event of Widowhood

	Tanzania	USA	Canada	UK	Australia	Germany	Sweden	Norway
1: Annual Divorce Rate per 1,000*	5.70	4.19	2.18	2.80	2.57	2.32	2.24	2.27
2: Annual Adult Male Mortality per 1,000**	16.09	3.27	2.07	2.29	1.90	2.49	1.80	2.00
3: Annual Hazard (Divorce + Widowhood)	21.79	7.46	4.25	5.09	4.47	4.81	4.04	4.27
4: Poverty rate (%) for single women with children under 18	25.8	43.7	43.4	30.5	31.6	34.9	9.7	13.3
5: Poverty Gap	29.6	42.7	28.9	18.8	20.4	32.3	22.9	29.2
6: Risk of Single Parent Poverty	16.66	13.92	5.33	2.92	2.88	5.42	0.90	1.66
7: Index of Security from Widowhood	0.05	0.20	0.70	0.84	0.84	0.69	0.95	0.91

*2007 data from www.csls.ca + author's calculations from HBS2007
**Probability of dying between 15 and 60 per 1000 population annualized; 2006 WHO data from http://data.un.org

Line 3 = Line 1 + (Line 2); Line 6 = (Line 3)*(Line 4)*(Line5)/1000

d.   Security in the Event of Old Age

The HBS2007 micro-data indicate that only 6.1% of Tanzanians were over 60 in 2007 and that the median age of the population was 19. Because Tanzania is a relatively young society, old age security does not have the salience as a policy issue that it has in the other countries discussed here. "Old Age" begins earlier – the commonly accepted criterion is 60 years of age – but in a country with no system of general old age security or public pension, in which only about 4.4% of those over 60 can rely on pension income, "retirement" is not a normally expected stage of life. In 2007, the labour force participation rate of Tanzanians over age 65 was 68.2%.[45] Only about a fifth of the elderly live by themselves or just with their spouse – approximately 60.3% of those over 60 live in extended family settings with other adults aged 25 to 59, and another 18.8% live with children or young adults in 'skip-generation' extended families.[46]

Because so many of the elderly live with, and work like, younger Tanzanians, there is not much difference between the official estimates of poverty among the elderly and among younger cohorts. Using the 'one half of median' concept for the poverty line, the poverty rate is 23.5% for both groups[47]. Table 4 calculates the 'Index of Security in the Event of Old Age' in the same way as it was done for these other seven countries in Section 2.

Table 4
Security in the event of Old Age

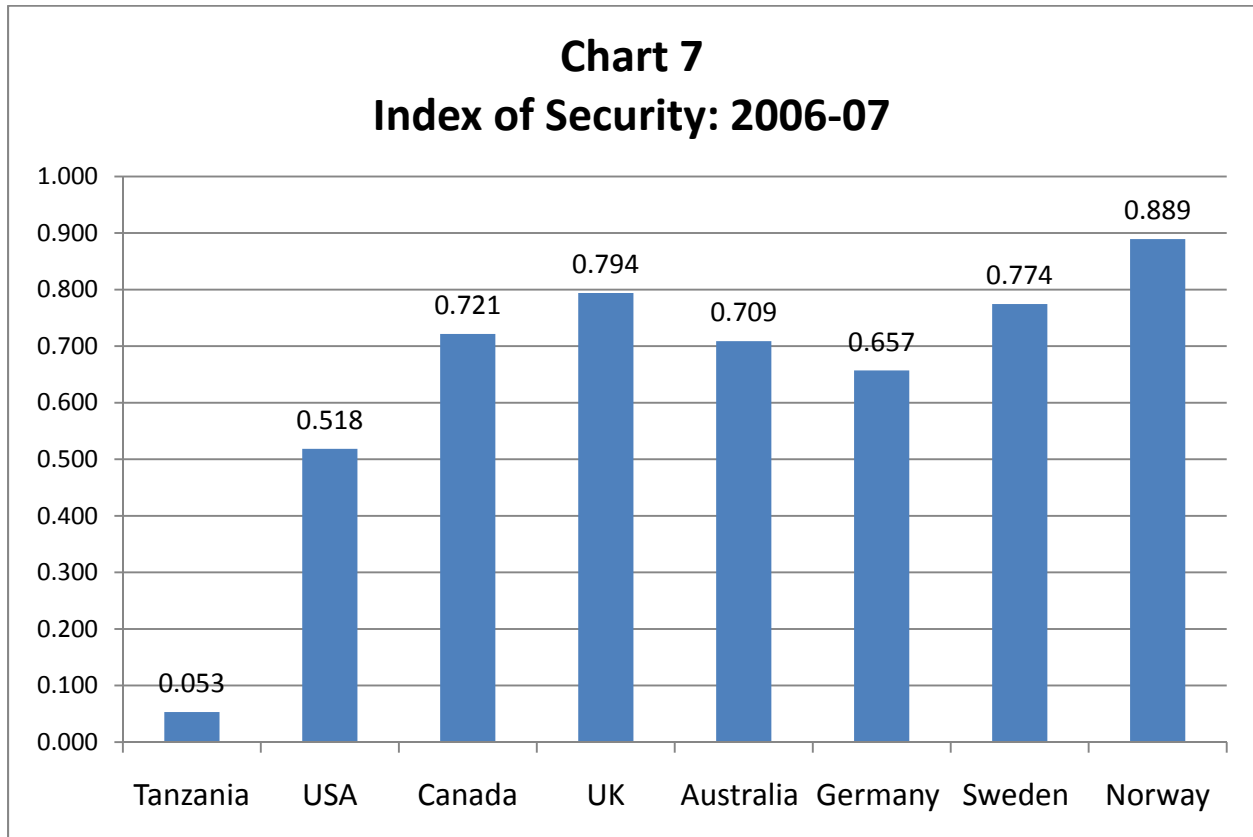|	Tanzania	USA	Canada	UK	Australia	Germany	Sweden	Norway
Poverty Rate of Elderly	23.5	24.6	6.3	16.3	22.3	10.4	6.6	8.5
Poverty Gap of Elderly	28.8	29.0	15.9	19.3	21.8	23.6	13.8	10.5
Normalized Poverty Gap	6.77	7.13	1.00	3.15	4.86	2.45	0.91	0.89
Index of Security in Old Age	0.060	0.006	0.900	0.587	0.337	0.688	0.913	0.915

---

[45] See Mboghoina and Osberg (2010a:Table 3, 10); Integrated Labour Force Survey (2007:19)
[46] Mboghoina and Osberg (2010a:Table 1, p. 3)
[47] For present purposes, the expenditure concept, equivalence scale and equal sharing assumption used by the NBS is also used here, with the poverty line set at 11,895 Tshs per month. Mboghoina and Osberg (2010b) emphasize the importance, especially for elderly women, of these assumptions, and question them in detail.

e.	An Index of Economic Security

Chart 7 puts the pieces together, weighting the four sub-indices of economic security by the relevant proportionate share of population as discussed in Section 2(f) – see Appendix C for the calculations.

Chart 7
Index of Security: 2006-07

Country	Index
Tanzania	0.053
USA	0.518
Canada	0.721
UK	0.794
Australia	0.709
Germany	0.657
Sweden	0.774
Norway	0.889

4.   Discussion and Conclusions

Economic insecurity affects well-being both directly and indirectly. Using panel micro-data, Smith et al (2009:15) have been able to show that "economic insecurity is an important cause of weight gain" for US males between 1988 and 2000. Motivated in part by the observation that the upward trend in US obesity and its sharply higher level compared to other affluent nations matches the differentials in economic security presented in Section 2, Offer et al (2010) have used the Osberg/Sharpe Index of Economic Security to argue that:

> "Economic insecurity and 'market-liberal' welfare regime are the two strongest determinants of the level of obesity. The gap between the survey with the lowest level of security and the one with the highest level is 26 percentage points of obesity prevalence. Of this, economic insecurity would explain about 12 percentage points, and market liberalism another 5, i.e. together about two thirds."

Over-eating may be a feasible (if dysfunctional) individual response to economic insecurity in high income countries where food is abundant, but low incomes mean that this option is not as readily available to most people in poor countries. Das et al (2009: 44) instead argue that micro-data from Indonesia, India and Tonga "provide strong evidence that while income and poverty are not strong predictors of mental health status, shocks that affect the economic or demographic nature of the household may have significant influences on mental health." For both the rich and the poor nations of this world, insecurity has both direct and indirect impacts on well-being – but the pathways of impact depend heavily on economic context.

Section 1 of this paper began with a discussion of the literatures in economics on 'insecurity' and on 'vulnerability'. It argued that their differing roots in the human rights and utility maximization perspectives underlies the former's emphasis on the anxieties of all citizens about the hazards of uninsurable economic dangers and the latter's concern with the probability of poverty. Section 2 presented a summary of recent trends in economic security in a sample of affluent nations to illustrate the methodology of calculation of an index of economic security. Section 3 then used the example of Tanzania to ask what changes are needed to make such measures relevant to the very different context of poor nations.

This paper argues that economic insecurity and vulnerability are very similar in their core concern with fears of the uninsured hazards of an uncertain future – something which is conceptually distinct from (although correlated with) current poverty. Somebody (e.g. a pensioner) who knows their future income with certainty is not 'insecure' about that future income. If their known future income is miserably low, then they will be certain of their level of

future poverty. However, a poor pensioner at least knows that the future will not be worse than the present, so they can plan their future, and they are better off than people who are both currently poor *and* anxious about losing the little they now have.

In affluent countries, private insurance and capital markets are well developed and the welfare state provides a set of transfers and services that shield citizens from many hazards – but in poor nations these mechanisms of risk mitigation are typically much less available. When measuring economic security in countries with very different income levels and very different structures of economic activity, what measures are both relevant to the differing contexts of individuals and comparable across jurisdictions? How can economic insecurity in poor countries be measured in a way that does not just reflect the poverty of those countries?

Up to now, measurements of 'vulnerability' have focussed on micro studies of specific sub-populations in less-developed countries. A benefit of the special purpose surveys used has been the possibility of nuanced discussion of behavioural response to vulnerability. A cost of the small and non-representative samples used has been the impossibility of generalization to the national level and of international comparisons or analysis of trends. Measurement of 'insecurity' has, by contrast, largely neglected behavioural response. While the "economic insecurity" literature has emphasized international comparability, it has been largely limited to developed countries – thereby omitting most of the world's population, and the most economically insecure of the world's citizens.

The suggestion of this paper is that measurement of the adverse outcomes that cause economic insecurity, i.e. fears about the economic future, should reflect their subjective nature as relative to local norms – but that the Human Rights discourse offers a guide to which type of hazards are universal. [48] For example, all humans have good reason to think occasionally about what will happen to them when they are old and frail – and Article 25 of the Universal Declaration of Human Rights explicitly recognizes "security in the event of old age" as a basic human right. But when the future that the elderly can anticipate reflects a relatively high rate and depth of poverty, it is local standards of deprivation which determine if people have good reason

---

[48] Because the vast majority of elderly Tanzanians have to work as long as they can, the 'working age population' for which the risk of 'loss of livelihood' was calculated in sub-section (a) above included all Tanzanians over the age of 15 (unlike the 16 - 64 limitation for other countries).   Local standards are also crucial to analyzing security in old age. Anxieties about poverty in one's old age in Tanzania do not, for example, include worries that one will not be able to afford to drive a car (only 2.76% of Tanzanian households owned a car in 2007). However, it is a relevant worry for Americans, who live in a automobile dependent culture, in which many daily activities (such as shopping) depend on owning this asset. Although the elderly in the USA have much more material wealth, and more leisure time, than elderly Tanzanians, Table 4 indicates a lower value of the Index of Security in Old Age for the USA than for Tanzania.

to be more anxious about their future. As Table 4 indicates, the hazard of poverty[49] in old age is not just a matter of the level of GDP per capita.

The core message of this paper is that it is possible to measure economic insecurity in a comparable way across countries – including both very poor countries and the most affluent. Among the eight countries examined in this paper, economic security is least in the poorest country (Tanzania) and greatest in the nation with highest GDP per capita (Norway), but in between there is a very imperfect correlation. Economic security is therefore a dimension of economic well-being that deserves to be analyzed in its own right – and one which can be measured in a conceptually comparable way.

---

[49] Note that if an 'absolute' criterion of poverty to be adopted (e.g. the $1.25 per day or $2.00 per day criterion), Tanzania would score even more poorly in Table 3 and Table 4 than it now does.

References:

Alkire, Sabina and Maria Emma Santos. 2010. *Multidimensional Poverty Index: 2010 Data*. Oxford Poverty and Human Development Initiative. Available at: www.ophi.org.uk/policy/multidimensional-poverty-index/.

Richard Anderson and Charles Gascon (2008) *Offshoring, Economic Insecurity and the Demand for Social Insurance* Working Paper 2008-003A Federal Reserve Bank of St Louis, January 2008

Avner Offer, Rachel Pechey and Stanley Ulijaszek (2010) *Obesity: The Welfare Regime Hypothesis* British Academy Review, issue 15 (March 2010). pages 31 to 33

Walter Bossert and Conchita D'Ambrosio (2009) "*Measuring Economic Insecurity*" mimeo March 15, 2009

Deborah Bryceson (1990) *Food Insecurity and the Social Division of Labour* MacMillan Press, Basingstoke

Sewin Chan and Ann Huff Stevens (1999*) Employment and Retirement Following a Late-Career Job Loss* The American Economic Review, Vol. 89, No. 2, Papers and Proceedings of the One Hundred Eleventh Annual Meeting of the American Economic Association (May, 1999), pp. 211-216

Luc Christiaensen and Kalanidhi Subbarao (2005). "*Towards an Understanding of Household Vulnerability in Rural Kenya,*" Journal of African Economies, Oxford University Press, vol. 14(4), pages 520-558, December.

Luc Christiaensen, Vivian Hoffmann and Alexander Sarris (2007) *Gauging the Welfare Effects of Shocks in Rural Tanzania* Policy Research Working Paper 4406 The World Bank, Africa Region, Africa Technical Families Division, November 2007

Jishnu Das, Quy-Toan Do, Jed Friedman, and David McKenzie (2009): "Mental Health Patterns and consequences: Results from Survey Data in Five Developing Countries," *World Bank Economic Review*, 23(1), 31-55.

Stefan Dercon, (1996) *Risk, Crop Choice and Savings: Evidence from Tanzania* Economic Development and Cultural Change 1996 Pp 485-513

Stefan Dercon, (2002) *Income Risk, Coping Strategies and Safety Nets* World Bank Research Observer Vol. 17 No 2 Pp 141-166 March 2002

Stefan Dercon (2005a) *Vulnerability: a micro perspective* Paper first presented at the ABCDE for Europe World Bank conference in Amsterdam, May 2005.

Stefan Dercon, (2005b). "*Risk, Poverty and Vulnerability in Africa*," <u>Journal of African Economies</u>, Oxford University Press, vol. 14(4), pages 483-488, December.

Stephen Devereux and Simon Maxwell (2001) (ed) *Food Security in Sub-Saharan Africa* University of Natal Press, Institute of Development Studies, 2001

Di Tella, Rafael, Robert MacCulloch and Andrew Oswald (2003) "*The MacroEconomics of Happiness*" <u>The Review of Economics and Statistics</u> November 2003, vol. 85, no. 4, pp. 809-827.

Jeff Dominitz and Charles F. Manski (1997) *Perceptions of Economic Insecurity: Evidence From the Survey of Economic Expectations* <u>The Public Opinion Quarterly</u>, Vol. 61, No. 2 (Summer, 1997), pp. 261-287

Gisele Gamanou and Jonathan Morduch, 2002. "*Measuring Vulnerability to Poverty*," <u>Working Papers</u> UNU-WIDER Research Paper , World Institute for Development Economic Research (UNU-WIDER).

Paul Glewwe and Gillette Hall, 1998. "*Are some groups more vulnerable to macroeconomic shocks than others? Hypothesis tests based on panel data from Peru,*" <u>Journal of Development Economics</u>, Elsevier, vol. 56(1), pages 181-206, June.

Francis Green, Alan Felstead and Brendan Burchell (2000) *Job Insecurity and the Difficulty of Regaining Employment* Oxford Bulletin of Economics and Statistics Volume 62, Special Issue (2000) Pages 855 - 883

Basudeb Guha-Khasnobis, Shabd Acharya and Benjamin Davis (ed) (2007) *Food Insecurity, Vulnerability and Human Rights Failure,* Palgrave-MacMillan in association with United Nations University – World Institute for Development Economics Research

Patrick Guillaumont (2008) *An Economic Vulnerability Index: Its Design and Use for International Development Policy* United Nations University – World Institute for Development Economics Research Research Paper No. 2008/99 November 2008

ILO (2008) *Can low-income countries afford basic social security?* Social security policy briefings; Paper 3 International Labour Office, Social Security Department – Geneva: ILO, 2008

Marie Jahoda (1979) "The Psychological Meanings of Unemployment" *New Society* September 6, 1979. Pp. 422-425

Peter Lambert (1989) *The Distribution and Redistribution of Income: A Mathematical Analysis* Basil Blackwell, Cambridge and Oxford, 1989

Isabela Mares (2004) *Economic Insecurity and Social Policy Expansion: Evidence from Interwar Europe* <u>International Organization</u> 58, Fall 2004, pp. 745-774

Simon Maxwell (2001) *The Evolution of Thinking about Food Security* Chapter 1 (Pages 13 to 31) in Stephen Devereux and Simon Maxwell (2001) (ed) <u>Food Security in Sub-Saharan Africa</u> University of Natal Press, Institute of Development Studies, 2001

Thadeus Mboghoina and Lars Osberg (2010a) *Social Protection of the Elderly in Tanzania: Current Realities and Future Implications* Research on Poverty Alleviation (REPOA), PO Box 33223, Dar es Salaam, Tanzania

Thadeus Mboghoina and Lars Osberg (2010) *The Hunger of Old Women: How sensitive are poverty measures?* Research on Poverty Alleviation (REPOA), PO Box 33223, Dar es Salaam, Tanzania

Neil McCulloch, & Calandrino, Michele, 2003. *"Vulnerability and Chronic Poverty in Rural Sichuan,"* <u>World Development</u>, Elsevier, vol. 31(3), pages 611-628, March.

Hyman Minsky and Charles Whalen (1997) *Economic Insecurity and the institutional prerequisites for successful capitalism* <u>Journal of Post Keynesian Economics</u> Winter, 1996-97 Vol 19 No 2 155

Andy Norton, Tim Conway and Mick Foster (2001) *Social Protection Concepts and Approaches: Implications for Policy and Practice in International Development* Working Paper 143 Centre for Aid and Public Expenditure, February 2001, Overseas Development Institute

WIM NAUDÉ, AMELIA U. SANTOS-PAULINO and MARK MCGILLIVRAY (2008) *Vulnerability in Developing Countries* Research Brief No 2, 2008 WIDER, United Nations University, Helsinki, 2008

Lars Osberg (1988) "*The 'Disappearance' of Involuntary Unemployment*" <u>Journal of Economic Issues</u>, Sept. 1988. Vol. 22, No. 3, pp. 707-728.

Lars Osberg (1998) *"Economic Insecurity,"* SPRC Discussion Paper No. 88, Social Policy Research Centre, University of New South Wales, Sydney, Australia, October 1998.

Lars Osberg (2007) *"The Evolution of Poverty Measurement - with special reference to Canada,"* Workshop on Low Income, Poverty and Deprivation – Statistics Canada, February 12, 2007 – Ottawa. – available at http://myweb.dal.ca/osberg/

Lars Osberg and Andrew Sharpe (2002) "*An Index of Economic Well-Being for Selected OECD Countries*" <u>The Review of Income and Wealth,</u> Series 48, Number 3, September 2002 Pp. 291-316

Lars Osberg and Andrew Sharpe (2005) *"How should we measure the 'Economic' Aspects of Well-Being?"* <u>The Review of Income and Wealth</u> Series 51, Number 2, June 2005 Pp. 311-336

Lars Osberg and Andrew Sharpe (2009) "*New Perspectives on the Economic Security Component of the Index of Economic Well-Being"* Canadian Economics Association 43rd Annual Conference – Toronto May 31, 2009

Osberg, Lars, and Andrew Sharpe (2009) *"New Estimates of the Index of Economic Well-being for Selected OECD Countries, 1980-2007,"* Centre for the Study of Living Standards Reearch Report 2009-11. http://www.csls.ca/reports/csls2009-11.pdf.

Lars Osberg and Kuan Xu (2005) *"How Should We Measure Poverty in a Changing World? Methodological Issues and Chinese Case Study"* Review of Development Economics*, 12(2), 419–441, 2008

Lant Pritchett, Asep Suryahadi and Sudarno Sumarto, 2000. *"Quantifying Vulnerability to Poverty - A Proposed Measure, with Application to Indonesia,"* Development Economics Working Papers 83, East Asian Bureau of Economic Research.

John Rawls (1982) "Social Unity and Primary Goods" Pages 159 to 185 in *Utilitarianism and Beyond* edited by Amartya Sen and Bernard Williams, Cambridge University Press, Cambridge, 1982

Franklin Delano Roosevelt (1936) *A Rendezvous With Destiny* Speech before the 1936 Democratic National Convention Philadelphia, Pennsylvania June 27, 1936
   http://www2.austincc.edu/lpatrick/his2341/fdr36acceptancespeech.htm

Christopher J. Ruhm (1991) *Are Workers Permanently Scarred by Job Displacements?* The American Economic Review*, Vol. 81, No. 1 (Mar., 1991), pp. 319-324

Scheve, Kenneth F., and Matthew J. Slaughter (2002) "Economic Insecurity and the Globalization of Production," National Bureau of Economic Research Working Paper No. 9339.

Amartya Sen (1999) *Development as Freedom,* A. A. Knopf, New York, 1999

Andrew Sharpe and Julia Salzman (2003)*"Methodological Choices Encountered in the Construction of Composite Indicators,"* paper presented to the annual meeting of the Canadian Economics Association, Carleton University, Ottawa, Ontario, May.

Trenton G. Smith, Christiana Stoddard, and Michael G. Barnes (2009) "Why the Poor Get Fat: Weight Gain and Economic Insecurity," *Forum for Health Economics & Policy*: Vol. 12: Iss. 2 (Obesity), Article 5. http://www.bepress.com/fhep/12/2/5

United Nations Department of Economic and Social Affairs (2008), "*World Economic and Social Survey 2008. Overcoming Economic Insecurity,*" downloaded from
http://www.un.org/esa/policy/wess/.

United Republic of Tanzania (2007a) *Analytical Report for Integrated Labour Force Survey (ILFS) 2006* National Bureau of Statistics, November 2007 Dar es Salaam

United Republic of Tanzania (2007b) *Poverty and Human Development Report 2007* Research and Analysis Working Group, MKUKUTA Monitoring System, Ministry of Planning Economy and Development, December 2007, Dar es Salaam, Tanzania

United Republic of Tanzania (2008) *Household Budget Survey 2007* National Bureau of Statistics, Dar es Salaam, Tanzania

United Republic of Tanzania (2009) *Poverty and Human Development Report 2009* Research and Analysis Working Group, MKUKUTA Monitoring System, Ministry of Planning Economy and Development, December 2009, Dar es Salaam, Tanzania

 Jef Van Langendonck, (2007) *The Right to Social Security* (ed) Intersentia Press, Social Europe Series Volume 12, Antwerp and Oxford, 450 pages, 2007

James Verdin and Robert Klaver (2002) *Grid-cell-based crop water accounting for the famine early warning system* HYDROLOGICAL PROCESSES Volume **16**, 1617–1630 (2002)

James Verdin, Chris Funk, Gabriel Senay and Richard Choularton (2005) *Climate science and famine early warning Philosophical Transactions of the Royal Society Biological Sciences* 2005 **360**, 2155-2168

Patrick Webb and Andrew Thorne-Lyman (2007) *Entitlement Failure from a Food Quality Perspective: The Life and Death Role of Vitamins and Minerals in Humanitarian Crises* Chapter 10 (Pages 243-265 in Basudeb Guha-Khasnobis, Shabd Acharya and Benjamin Davis (ed) (2007) *Food Insecurity, Vulnerability and Human Rights Failure,* Palgrave-MacMillan in association with United Nations University – World Institute for Development Economics Research

Marc Wuyts (2006) *Developing Social Protection in Tanzania within a Context of Generalised Insecurity* Special Paper Number 06.19, RESEARCH ON POVERTY ALLEVIATION, Dar es Salaam, Tanzania

Appendix A
Other related concepts (not used in this paper, but should be mentioned)

"Social Protection" is a term which blurs the distinction between between economic insecurity and vulnerability and is often used as a generic label for the public policy response to both. For Norton, Conway and Foster (2001:1), "social protection is taken to refer to: 'the public actions taken in response to levels of vulnerability, risk and deprivation which are deemed socially unacceptable within a given polity or society.' They go on to argue explicitly that: "Social protection thus deals with both the absolute deprivation and vulnerabilities of the poorest, and also with the need of the currently non-poor for security in the face of shocks and life-cycle events." Wuyts (2006:6) is even broader in approach: "Social protection, therefore, is not just a question of finding a technical fix to the problem of vulnerability in society, but instead involves the creation, sustenance and expansion of political and social institutions through which mechanisms of redistribution and social insurance are negotiated and articulated." As might be expected, the breadth of the 'social protection' perspective means that both human rights and social welfare are appealed to.

In their 2008 report "*Can low-income countries afford basic social security*" the ILO discusses the relationship between 'social protection' and 'social security':

"In the literature and public debate on social issues, the term "social security" which widely used for decades, is often understood as the set of transfers that originate from formal sector employment. "Social protection" is considered to be a wider concept. (2008:1)"

Within the set of 'social security' programmes[50] that are such a large part of the 'welfare state', a further distinction is often drawn between 'social insurance' and 'social assistance'. Social insurance (e.g. workers compensation, unemployment insurance, public old age pensions) provides benefits, usually earnings related, to all eligible beneficiaries who experience a specific loss, or who meet specified non-income criteria. The aim is to provide security by redistributing between events or contingencies – for both poor and non-poor individuals. Eligibility for "Social assistance" programmes, on the other hand, is determined by assessment of family need.

Although the emphasis of 'vulnerability' discourse on preventing poverty might seem to fit nicely with the policy focus of 'social assistance' programmes and ideas of 'social insurance' might seem to match up similarly with "economic insecurity", this paper does not emphasize these connections. In affluent countries, although all citizens may be somewhat exposed to the hazards relevant for social insurance programmes (like work place injury or spells of unemployment), the odds are typically much worse for low-wage workers – hence such

---

[50] The 2008 ILO report in fact goes on to use the terms "social security" and "social protection" interchangeably. Van Langendonck (2007) also uses the term 'social security' in a very broad sense.

programmes play an important anti-poverty, as well as risk-reduction, role. Social policy planners therefore need to pay close attention to the interactions between social insurance and social assistance programmes and insisting on the insurance/assistance distinction is not very useful, in practice. In the countries where the vulnerability literature is typically focussed (like Ethiopia or Tanzania), there is no 'social assistance' to speak of, and 'social insurance' programmes touch only a tiny fraction[51] of the population – which more or less implies the irrelevance of the distinction between them.

"Food Security" has been the subject of high profile international summit conferences (most recently, in 1996 and 2009) and is often a major focus of agricultural and trade policy within nations[52]. Maxwell (2001:15) notes that the term has at least 32 distinct definitions in the published literature. He argues that over time the focus of that literature has shifted somewhat from a concern with aggregate food production to greater emphasis on the household poverty that determines individual access to available food. However, Webb and Thorne-Lyman (2007) emphasize that income is not enough – food quantity is not sufficient for the vitamin and micro-nutrient intake necessary for health. Guha-Khasnobis et al (2007) have drawn explicit links between food security and both vulnerability and the human rights discourse.

Appendix B

Drought is the main risk factor in loss of livelihood for Tanzanian peasant farmers since only about 0.2 million of 5.1 million hectares farmed are irrigated. Tanzania (2008a). Risk exposure varies with type of agriculture – e.g. pastoralist herders are particularly vulnerable to small rainfall changes on already marginal terrain. Crop choices (e.g. cassava) can help mitigate risk and other risks (like crop disease or pests) also matter, but the main event is rainfall. To model the risk exposure of Tanzanians to drought, one needs to know the probability distribution of the chance that a peasant farmer will have significant crop losses due to inadequate rainfall. Complicating issues are:

- Local – level variability in precipitation determines the actual rainfall risk exposure of individuals. Tanzania is a large country with a number of distinct climactic zones. Both floods and droughts can produce local crop losses. Geographically based national average precipitation figures may be misleading guides to the aggregate risk exposure of individuals because regions vary greatly in population density.

---

[51] In Tanzania, for example, only 4.4% of the elderly were able to depend on pension income in 2007 – see Mboghoina and Osberg (2010)

[52] Historically, "Food Security" has been, and remains, a particularly important issue for agricultural policy in Tanzania – see, for example, Bryceson (1990)

- Rainfall risk exposure depends partly on cropping patterns. Both rainfall timing and total amounts matter. Terrain and soil type help determine runoff and the retention of water available for agriculture.

- Global Climate Change is expected to raise average temperatures, increase year to year precipitation variability, impact the mean level of rainfall unevenly (increasing in some areas while decreasing in others) and increase the frequency of extreme weather events. All these trends will affect climate risk exposure.

Tanzania is one of the four poor nations for which the FAO, as part of its effort to model the impact of climate change on agriculture, has done detailed analysis of local level rainfall variability and drought over the 1961-2002 period[53]. Local conditions are analyzed from satellite imagery and local weather stations and evaluated on a pixel by pixel basis (in Tanzania, this implies monthly resolution at approximately 0.5 degrees spatially). The FAO then constructs a "Water Satisfaction Index" which summarizes up to a specific growth stage the degree to which cumulative water requirements have been met for the locally relevant reference crop (for Tanzania, maize). The modelling considers rainfall timing by crop growth stages, the impact of wind and heat on evapo-transpiration from cropped areas and the impact of terrain and soil type on soil retention of water.

Motivated by a desire to model emerging famines reliably, NASA has used a similar methodology. Verdin et al (2005) describe their technique as follows:

" Satellite RFE have been especially useful as input to a geospatial crop water balance model that evaluates the availability of moisture to a crop relative to its needs over the course of the growing season. Frere & Popov (1986) originally developed the water requirement satisfaction index (WRSI) for calculation with rainfall station data. It has been adapted to use on a geospatial basis to facilitate wide area monitoring (Verdin & Klaver 2002; Senay & Verdin 2003). The WRSI varies from 0 to 100, and is the ratio of actual crop evapotranspiration to theamount that would occur with a full water supply. This quantity has been shown to be a good indicator of yield reduction due to water limitation (Doorenbos & Kassam 1986).

The geospatial implementation of the WRSI, in effect, treats each grid cell as if it were a station location. To do so requires gridded estimates of soil water holding capacity (WHC) and daily potential evapotranspiration (PET). The FAO digital soil map of the world is used to assign a value of WHC to each cell. Reference crop PET is calculated according to the Penman–Monteith equation (Shuttleworth 1992) using 18 analysis fields from the NOAA global data assimilation system (Kanamitsu 1989) for air temperature, atmospheric pressure at the surface, wind, relative humidity and radiation. Published crop coefficients (FAO 1998) are used to

---

[53] The others are Burkina Faso, Cambodia and Nepal - see Climate Impact on Agriculture, Environment, Climate Change and BioEnergy Division, Food and Agriculture Organization
http://www.fao.org/nr/climpag/nri/index_en.asp

modify PET to simulate the demand for water of a staple crop of interest. The daily crop water balance calculation includes a regularly updated estimate of available soil moisture. The maps that are forthcoming from these geospatial calculations reveal zones of poor crop performance due to dry spells or drought, as corroborated by field reports. Furthermore, maize yield estimates based on WRSI (calculated with RFE) were found to agree (rZ0.8) with official reports in a test with 1996/1997 data for Zimbabwe (Verdin & Klaver 2002)."

Unfortunately, past estimates of WRSI have been discarded by NASA, which implies that the risk of variability cannot be assessed. Furthermore, estimates are currently presented for geographic areas, without weighting for population density. For these reasons, this index has not been used in the current paper.

Appendix C
Population Weights and Index Calculation - 2007

	Tanzania	USA	Canada	UK	Australia	Germany	Sweden	Norway
Working Age as % Total Population*	56.1	64.8	68.0	63.3	66.4	66.0	64.2	64.7
Sickness	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Women & Kids at Risk widowhood	51.3	39.3	33.4	34.6	36.9	29.1	33.9	36.4
45-64 as % population	12.6	25.2	26.7	24.9	24.7	26.4	26.1	25.4
sum	220.0	229.3	228.1	222.8	228.0	221.5	224.2	226.5
proportionate weights								
Working Age Population**	0.255	0.283	0.298	0.284	0.291	0.298	0.286	0.286
Index of Livelihood Security	*0.079*	*0.666*	*0.533*	*0.600*	*0.717*	*0.385*	*0.595*	*0.956*
Sickness	0.454	0.436	0.438	0.449	0.439	0.451	0.446	0.442
Index Security from Cost of Illness	*0.039*	*0.677*	*0.809*	*0.952*	*0.747*	*0.819*	*0.794*	*0.832*
Women & Kids at Risk widowhood	0.233	0.171	0.146	0.155	0.162	0.131	0.151	0.161
Index of Security from Widowhood	*0.050*	*0.200*	*0.700*	*0.840*	*0.840*	*0.690*	*0.950*	*0.910*
45-64 as % population	0.057	0.110	0.117	0.112	0.108	0.119	0.116	0.112
Index of Security in Old Age	*0.060*	*0.006*	*0.900*	*0.587*	*0.337*	*0.688*	*0.913*	*0.915*
Index of Security***	0.053	0.518	0.721	0.794	0.709	0.657	0.774	0.889

Notes:

*Tanzania - working age population = 15+ as % total population; nearing old age = 40 - 59

**Proportionate Weights calculated as fraction of total - e.g. for Tanzania, total weights = 220,
so proportionate weight for working age = 56.1/220 = 0.255

***Index = sum of sub-indices, proportionately weighted - e.g. 0.053 = 0.255*0.079+0.454*0.039+0.233*0.05+0.057*0.06