



OECD Statistics Working Papers 2015/01

How Should One Measure Economic Insecurity?

Lars Osberg

<https://dx.doi.org/10.1787/5js4t78q9lq7-en>

Unclassified

STD/DOC(2015)1

Organisation de Coopération et de Développement Économiques
Organisation for Economic Co-operation and Development

05-Mar-2015

English - Or. English

STATISTICS DIRECTORATE

Cancels & replaces the same document of 03 March 2015

HOW SHOULD ONE MEASURE ECONOMIC INSECURITY?

WORKING PAPER No.59

Contact: Marco Mira D'Ercole, Statistics Directorate, +(33-1) 45 24 87 48; Marco.MIRA@oecd.org

JT03371665

Complete document available on OLIS in its original format

This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

STD/DOC(2015)1
Unclassified

English - Or. English

HOW SHOULD ONE MEASURE ECONOMIC INSECURITY?

Lars Osberg
McCulloch Professor of Economics
Dalhousie University, Halifax, Canada
Email: Lars.Osberg@dal.ca

OECD STATISTICS WORKING PAPER SERIES

The OECD Statistics Working Paper Series – managed by the OECD Statistics Directorate – is designed to make available in a timely fashion and to a wider readership selected studies prepared by OECD staff or by outside consultants working on OECD projects. The papers included are of a technical, methodological or statistical policy nature and relate to statistical work relevant to the Organisation. The Working Papers are generally available only in their original language – English or French – with a summary in the other.

OECD Working Papers should not be reported as representing the official views of the OECD or of its member countries. The opinions expressed and arguments employed are those of the author.

Working Papers describe preliminary results or research in progress by the author and are published to stimulate discussion on a broad range of issues on which the OECD works. Comments on Working Papers are welcomed, and may be sent to the Statistics Directorate, OECD, 2 rue André-Pascal, 75775 Paris Cedex 16, France.

The release of this working paper has been authorised by Martine Durand, OECD Chief Statistician and Director of the OECD Statistics Directorate.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

www.oecd.org/std/publicationsdocuments/workingpapers/

ACKNOWLEDGEMENTS

This paper was prepared during the author's sabbatical period spent at the OECD Statistics Directorate in 2014. Special thanks to Carlotta Balestra, who provided much of the data and tactful suggestions for improvements, and to Marco Mira d'Ercole, for many detailed comments on early drafts. Martine Durand, Herwig Immervoll and Alexander Hijzen also provided useful comments.

ABSTRACT

This paper suggests that individuals feel economically insecure when they perceive a significant downside economic risk – i.e. a hazard or danger – looming in their economic future, which they are unable to adequately insure against or avoid or ignore. After having noted that the costs of public policies to mitigate economic insecurity comprise significant shares of GDP in all OECD nations, the paper surveys critically the four main alternative methodologies for measuring economic insecurity, which are based on: i) large losses in household available disposable income; ii) the private wealth of the household adjusted for past wealth volatility; iii) the probability of downside household income volatility; and iv) the anticipated costs of specific named risks. It then discusses the optimal aggregation of hazards, the appropriate unit of analysis, the time frame for accounting, and the ideal criteria that a measure of economic insecurity should satisfy. The paper advocates the construction, using household level data, of sub-indices of the economic insecurities produced by the hazards identified in Clause 25 of the UN Universal Declaration of Human Rights (i.e. unemployment, illness, widowhood, disability and old age), and their aggregation to an over-all summary index of economic insecurity. It concludes by addressing what can be done with existing data and discussing possible measures if new surveys were implemented.

RÉSUMÉ

Les gens se sentent économiquement vulnérables lorsqu'ils pressentent qu'un risque important – autrement dit une menace ou un danger – de dégradation de la situation économique, contre lequel il ne sont pas en mesure de se prémunir et qu'ils ne peuvent éviter ou ignorer, pèsera sur leur avenir économique. Il y est fait observer que les coûts des politiques publiques destinées à atténuer l'incertitude économique représentent des proportions importantes du PIB de tous les pays de l'OCDE, sans exception. L'auteur de la note se livre ensuite à un examen critique des quatre principales méthodes distinctes de mesure de l'insécurité économique reposant sur : i) la baisse importante du revenu disponible des ménages ; ii) la valeur du patrimoine privé des ménages calculée en tenant compte des fluctuations passées de ce patrimoine ; iii) la probabilité d'aggravation de la volatilité du revenu des ménages et iv) les coûts anticipés de certains risques spécifiques désignés. Sont ensuite étudiés les modes d'agrégation optimale des risques, l'unité appropriée d'analyse, le cadre temporel de comptabilisation et les critères que devrait remplir un indicateur de l'insécurité économique. La note plaide en faveur de la construction – à l'aide de données recueillies au niveau des ménages – de sous-indicateurs des insécurités économiques induites par les risques recensés à l'article 25 de la Déclaration universelle des droits de l'homme des Nations Unies (à savoir le chômage, la maladie, le veuvage, l'invalidité et la vieillesse), ainsi que de leur regroupement au sein d'un indice synthétique global de l'insécurité économique. La note se conclut en évoquant ce qui peut être fait au moyen des données existantes et en examinant d'éventuelles mesures à utiliser dans l'éventualité où de nouvelles enquêtes seraient menées à bien.

TABLE OF CONTENTS

HOW SHOULD ONE MEASURE ECONOMIC INSECURITY?	2
OECD STATISTICS WORKING PAPER SERIES	3
ABSTRACT	5
1. Introduction	7
2. The costs of reducing economic insecurity.....	8
3. How is “economic insecurity” now measured?	10
3.1. Large income losses: the “Economic Security Index” of Jacob Hacker et al.....	11
3.2. The buffering role of private wealth: the D’Ambrosio et al. approach	12
3.3. Downside income volatility relative to trend: Rohde, Tang and Rao.....	13
3.4. A compound “macro” index: The IEWB Index of Economic Security of Osberg and Sharpe ..	14
4. Measurement choices and desirable principles.....	15
4.1. Dimensionality and the optimal aggregation of hazards	15
4.2. Unit of analysis.....	17
4.3. What time period should be used?.....	19
4.4. Desirable principles of measurement	20
5. Measuring named risk insecurity	21
5.1. Security in the event of unemployment	21
5.2. Security in the event of illness.....	23
5.3. Security in the event of disability	24
5.4. Security in the event of widowhood	25
5.5. Security in old age	27
6. Why not just ask people directly?	29
7. Conclusion.....	33
REFERENCES	43
ANNEX 1	48

Tables

Table 1. Net pension replacement rates from public and mandatory private schemes	28
Table A.1. Social government expenditures as a share of GDP, 2009	48

Figures

Figure 1. Social and other government expenditures as share of GDP, 2011	9
Figure 2. Labour market insecurity in OECD countries	22
Figure 3. On a 0 - 10 scale, how worried are you that income in old age will not be adequate to cover last years?	31
Figure A.1. Disability prevalence at working age is high in most OECD countries	49
Figure A.2. Income support for disability and sickness, late 2000s	50

Boxes

Box 1. Bismark's perspective on economic insecurity.....	7
Box 2. What concept of “wealth” is most relevant for economic insecurity?	13
Box 3. Examples of survey questions to measure subjective economic insecurity	32

1. Introduction

1. “Economic Insecurity” is a term with a very long history, and modern uses of the term going back to Bismark (Box 1). It also appears frequently in both popular journalism¹ and academic articles. As often as not, the phrase is used as if its meaning were so obvious that no explicit definition is necessary.² However, when the term “economic insecurity” is searched on the web using Google Scholar, the top five most popular academic articles with explicit definitions suggest it is³:

- “The risk of economic loss faced by workers and households as they encounter the unpredictable events of social life” (Western et al, 2012).
- “(The outcome) 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” (UNDESA, 2008).
- “The anxiety produced by a lack of economic safety, i.e. by an inability to obtain protection against subjectively significant potential economic losses” (Osberg, 1998).
- “The intersection between “perceived” and “actual” downside risk” (Jacobs, 2007).
- “An individual’s perception of the risk of economic misfortune” (Scheve and Slaughter, 2004).

2. Recently, the Stiglitz-Sen-Fitoussi report on the measurement of economic performance and social progress also noted, under the heading “Economic Insecurity”, that: “Uncertainty about the material conditions that may prevail in the future reflects the existence of a variety of risks, in particular associated with unemployment, illness, and old age. The realization of these risks has obvious negative consequences for the quality of life of the person affected” (Stiglitz et al. 2009, para 180).

3. A common theme in these definitions is that individuals feel economically insecure when they perceive a significant and unavoidable downside economic risk – i.e. a hazard or danger – looming in their future. This hazard is not certain but could materialise with a non-trivial likelihood and individuals are unable to adequately insure against or avoid or ignore it. These hazards clearly concern *future* states – which imply that current experiences and past events plausibly influence the estimation of future hazards, but are not in themselves the issue.⁴ As well, the emphasis on future *hazards*, i.e. downside risks, implies that concepts of volatility, uncertainty, prudence or risk aversion⁵ – which also include the probability of upside events – are quite different ideas from economic insecurity. An increased dispersion of future outcomes is not, in itself, equivalent to greater economic insecurity – giving somebody a lottery ticket would, for example, increase the uncertainty of their future income but would not make them more insecure.

Box 1. Bismark’s perspective on economic insecurity

“The real grievance of the worker is the *insecurity of his existence* ; he is not sure that he will always have work, he is not sure that he will always be healthy, and he foresees that he will one day be old and unfit to work. If he falls into poverty, even if only through a prolonged illness, he is then completely helpless, left to his own devices, and society does not currently recognize any real obligation towards him beyond the usual help for the poor, even if he has been working all the time ever so faithfully and diligently. The usual help for the poor, however, leaves a lot to be desired, especially in large cities, where it is very much worse than in the country.” (March 1884)

Source: Frederic B. M. Hollyday, *Bismark - Great Lives Observed*, Prentice-Hall (1970) p. 65

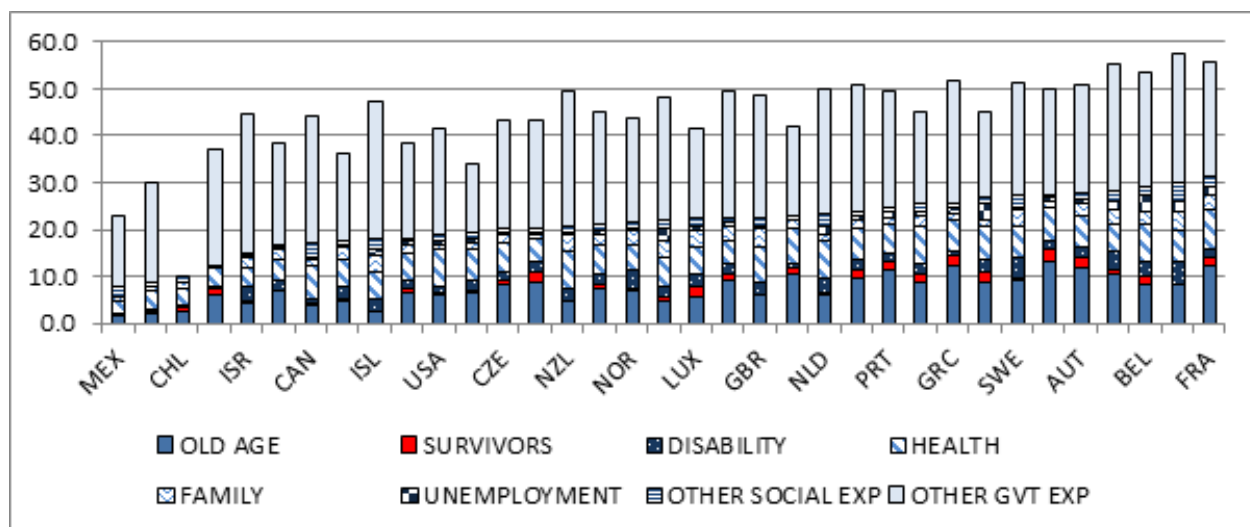
4. This paper takes these definitions as its starting point and asks how economic insecurity should be measured. Section 2 motivates the discussion by considering the costs associated with reducing economic insecurity which OECD nations now incur. Section 3 outlines measurement approaches proposed by the existing literature. Section 4 discusses the measurement choices that unavoidably sit behind any empirical index of economic insecurity and asks what criteria one would like an ideal measure to satisfy. Section 5 then outlines some concrete suggestions for feasible empirical measures for the various risks that, together, shape economic insecurity and Section 6 considers the possibility of using survey questions to assess people's sense of economic insecurity. Section 7 concludes with suggestions for further research.

2. The costs of reducing economic insecurity

5. If we lived in a world of perfect information, zero transactions costs, complete markets and perfect competition in all markets, then fully rational, computationally sophisticated individuals could purchase actuarially fair private insurance against the costs of any possible adverse event in any future state of nature. In such a world, there would be no particular reason to expect any economic insecurity to exist, and hence no reason for any public policy to address it. Barr (1992, 2001) is among those who have argued that in the real world of uncertainty, substantial transactions costs, and imperfect and often asymmetric information, private insurance markets are often unavailable to individuals, who moreover face substantial problems of financial literacy, myopia, reference dependence, loss aversion and all the other impediments to "rational behaviour" surveyed by Kahneman (2011). Hence, since the mobility demanded by modern market economies has long ago undermined the risk-pooling norms of the extended family on which agrarian societies used to (often unsatisfactorily) depend, individuals have had to look for other mechanisms to provide economic security.

6. Public policies to reduce economic insecurity thus have a long history and a pedigree that spans the political spectrum. In establishing old age pensions in Germany and constructing the first stirrings of what came to be known as the "Welfare State", Bismarck's motivation in the 1880s was conservative – the maintenance of social order (in particular, the continued rule of the Kaiser). When, in the United Kingdom roughly sixty years later, the Beveridge Report of 1942 advocated substantial expansion of government's social security role, it was supported by all parties as a unifying wartime statement of national objectives (although implemented by the postwar Labour government).⁶ Governments of all political tendencies have also signed the United Nations' Universal Declaration of Human Rights of 1948, whose Article 22 states that "Everyone, as a member of society, has a right to social security", while Article 25 identifies "Security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control" as a basic human right.

7. Public spending to reduce economic insecurity has clearly become very big business in OECD nations.⁷ Figure 1 reports the percentage of GDP spent in 2011 by OECD governments to provide greater economic security against each of the hazards mentioned in the UN Universal Declaration.⁸ Most OECD countries spend between 20% and 30% of GDP in furthering these objectives – and in about half of these countries such spending adds up to a majority of public, non-debt related, expenditures.

Figure 1. Social and other government expenditures as share of GDP, 2011

Note: Data on unemployment public expenditures are not available for Mexico; data on total government expenditures are not available for Chile. Countries are ranked in ascending order of social government expenditures as share of GDP.

Source: OECD Social Expenditure Database (SOCX) and OECD National Accounts Statistics.

8. However, the costs of public policies to reduce economic insecurity are not limited to the explicit budgetary costs of the transfer and social insurance programs of the welfare state. Individuals and groups who face economic hazards can get income security in many ways and capitalist societies have developed a variety of instruments which can provide economic security to people. Labour market regulation, collective bargaining and welfare state transfer payments can all be seen as functionally equivalent substitute mechanisms (Bonoli, 2003).⁹ For example, rather than relying on unemployment insurance benefits when laid off, workers anxious about the possibility of layoff and lost earnings can vote for employment protection legislation or bargain collectively for strong contractual restrictions on employers. These alternative mechanisms for ensuring income security may have efficiency costs in impeding the ability of the labour market to allocate resources and may have equity costs in omitting some individuals (e.g. youth, the self-employed) from protection. However, these efficiency and equity costs are not explicitly and routinely monetized in the same way as the budgetary costs identified in Figure 1 – so they often remain invisible.

9. As well, risk adverse individuals make costly private decisions which are at least in part motivated by their desire for greater economic security. Barr (2001) argues that public social insurance programmes typically exist partly because private insurance is unavailable or very costly due to some combination of asymmetric information, co-variant risks and adverse selection. Nevertheless, when individuals are able to, and do, purchase private insurance, the administrative costs of such insurance should also be counted as part of the total social cost of reducing economic insecurity. As well, when individuals acquire precautionary savings as a buffer against the possibility of future income losses, those savings which are in excess of foreseeable life-cycle needs have a cost in terms of foregone utility.¹⁰ And the private cost which is hardest of all to estimate is the cost to societies of foregone opportunities – the lost benefits of choices not now made because the associated risk exposure is considered “too large”.

10. The total social cost of efforts to increase economic security thus includes public social security expenditures, plus the costs of policy-induced market distortions, plus the net private costs of insurance, excess savings and foregone opportunities. Differences in cultural values across countries imply that countries will differ somewhat in judgements about the optimal level of protection against economic

hazards and on the role that the public or the private sector should play in supplying it. Nevertheless, since the easy-to-observe budgetary costs reported in Figure 1 (and Appendix Table A1) are large in all OECD countries, the total social cost of reducing economic insecurity now incurred is surely even larger.¹¹

11. There are also large differences between OECD countries in the relative importance of public spending to reduce specific insecurities. Sweden and Italy have, for example, the same level of public social spending (27 % of GDP) but quite different patterns of spending – the percentage of GDP spent on old age benefits was substantially greater in Italy (13%) than in Sweden (9.4%) while family benefits were more than twice as high in Sweden (3.6%) than in Italy (1.5%). It is to be expected that differences in population needs (due, perhaps, to differing age structures), business cycle exposure and public preferences will produce differences in spending patterns in any given year. But it is also possible that the historical evolution of public policies in these countries has produced inefficiencies in the social mechanisms which now attempt to alleviate economic insecurity, in the sense that it might be possible to produce more economic security at the same total social cost or the same overall security at a lower cost. However, in order to examine whether that is true, a necessary first step is to be able to measure economic insecurity.

12. This paper discusses the measurement of economic insecurity in OECD nations.¹² In that context, where most households depend primarily on labour income for their economic well-being, the prevalence and nature of downside risks to labour earnings are especially crucial. Venn (2011) used panel surveys to examine earnings volatility within OECD nations. In a more recent paper, Guvenen, Karahan, Ozkan and Song (2015) have used the millions of observations contained in US Social Security records to analyse the earnings volatility of American men – and since both papers do distinguish downward income shocks from upward shocks, parts of both are relevant to the issue of economic insecurity. An important conclusion from Venn’s analysis is that when individuals experience a 20% or more decline in earnings, OECD nations differ significantly in the buffering impacts that taxes and transfers provide for the adverse consequences (such as being unable to pay bills) of earnings shocks for household well-being.

13. With millions of individual work histories from 1978-2010, Guvenen et al. (2015) have been able to provide an exact characterization of the distribution of shocks to male earnings, by stage of the life cycle and at each point in the distribution of earnings. They unambiguously reject the assumption of log-normality of income shocks which has been prevalent in the earnings dynamics literature, concluding that “earnings shocks display strong negative skewness (what can be viewed as individual disaster shocks) and extremely high kurtosis... most individuals experience very small earnings shocks, few experience middling shocks, and a small but non-negligible number experience extremely large shocks” (p. 44) An important implication of the fact that the “tail risk” from large negative shocks is much larger in the real world than what a lognormal distribution would have predicted is that risk-averse individuals would be willing to pay much more for income insurance than standard models have implied (their example calculations are an amplification of 450%).¹³ The conclusions of Guvenen et al. about the shape of the distribution of downside earnings risks (if supported by similar data from other OECD nations) thus provide additional evidence for the importance of economic insecurity.

3. How is “economic insecurity” now measured?

14. Currently available measures of economic insecurity differ in terms of which data are considered most important – e.g. income, wealth or some combination of income and wealth. They differ also in their judgments about aggregation, in two senses – (1) aggregation across hazards, i.e. whether the impact of specific hazards should be assessed separately or whether an over-all index calculated; and (2) aggregation across households, i.e. whether economic insecurity should be measured first at the level of the individual household and then added up over households to national totals, or should be estimated using aggregate national data. This section reviews the four most influential measures now available in the literature.

3.1. *Large income losses: the “Economic Security Index” of Jacob Hacker et al.*

15. The “Economic Security Index” (ESI) proposed by Jacob Hacker and his colleagues (2010, 2011, 2012) is a “micro-based” index of aggregate economic security in the United States. Its underlying conception of economic security is: “the degree to which individuals are protected against hardship-causing economic losses”. The emphasis of this approach is on the frequency of large (i.e. greater than 25%) net income declines that people experience, net of whatever level of income protection may be available to them and whatever else happened in their life.¹⁴ The ESI approach does not attempt to measure the “protections” available to individuals, nor does it measure directly either the financial shocks that individuals experience or the social protection mechanisms of the welfare state (such as eligibility for unemployment insurance benefits, or the replacement rate for lost earnings provided by unemployment insurance benefits) nor the protections individuals may benefit from privately (such as private insurance or support from family or friends). As well, Hacker et al. do not distinguish, at the individual level, between large involuntary declines in income (e.g. due to layoff) and voluntary declines (e.g. because of choices to go back to school or other voluntary withdrawals from the labour force).¹⁵

16. For Hacker et al., subjective “anxiety” about future hazards is not the focus of measurement – they explicitly reject the use of public opinion data regarding perceptions of experiences. Instead, they use longitudinal micro-data – from the U.S. Survey of Income and Program Participation (PSID) to calculate “the share of individuals who experience at least a 25 percent decline in their inflation-adjusted ‘available household income’ from one year to the next (except when entering retirement)”. The ESI then adds the additional requirement that people experiencing “substantial income fall should also lack an adequate financial safety net to replace this lost income until it returns to its original level” (Hacker et al., 2012:8). Since their emphasis is on insecurity trends in the United States, where uninsured medical expenses have been a leading cause of household bankruptcies, they also deduct the amount of medical out-of-pocket spending from after tax income in order to get their measure of “available disposable income”.¹⁶ [Since their objective is to calculate an over-all index of insecurity, they do not attempt to model the insecurities specific to health care costs.] Because the wealth which can be accessed to replace lost income provides a sense of security which buffers the impact of income shocks, Hacker et al. also exclude from the “insecure” population anyone with sufficient liquid financial wealth to cope with a large (>25%) shock to available disposable income.¹⁷

17. Household holdings of private wealth therefore play a buffer stock protection role in this framework. However, the protective role of the state through social assistance or social insurance (e.g. unemployment insurance or worker’s compensation or public pensions) is not separately measured. Variations in transfer income are not distinguished from variations in earned income.

18. The 25% criterion which distinguishes losses large enough to cause insecurity from “small” declines that can be ignored is recognized by the authors to be somewhat arbitrary, in much the same way as any specific poverty line criterion can be seen as arbitrary. As already noted, Venn (2011) used 20% as her criterion for a “large” shock. The important issue in both instances is robustness – whether alternative plausible thresholds give approximately the same results. Hacker et al. assure readers that the 25% criterion is consistent with polling data on self-perceptions of hardship, and that trends in the ESI are qualitatively similar with alternative thresholds, while Venn (2011:16) shows that the rankings of countries based on the incidence of earnings volatility using alternative thresholds are highly correlated.¹⁸

19. Conceptually, the ESI thus has three major components: i) losses in equivalent after tax income¹⁹; ii) the subtraction of medical out-of-pocket spending from available income; and iii) a check to see if wealth holdings are sufficient to maintain consumption, for those with a decline of more than 25% in available disposable equivalent income. Because the focus of the ESI is on net declines in general purchasing power, Hacker et al. do not distinguish between variations in earnings or transfer payments or

other different types of income. They therefore aggregate earnings, transfers and other sources of income. Both the time frame and the accounting period are a single calendar year. Measurement of economic insecurity, according to Hacker et al., is about how many people, in a particular year, experienced a negative shock to available net income that was too large to cope with easily, given their current wealth stock.

3.2. *The buffering role of private wealth: the D'Ambrosio et al. approach*

20. D'Ambrosio and her collaborators (e.g. Bossert and D'Ambrosio, 2009 and 2013; D'Ambrosio and Rohde, 2012) define economic insecurity as “the anxiety produced by the potential exposure to adverse events and by the anticipation of the difficulty in recovering from them”. Their central question therefore is “what is it that can make a person feel less anxious about the future?” “Wealth” is their answer.

21. D'Ambrosio and her co-authors suggest that wealth represents a buffer stock that can be turned to in the case of any adverse event. Because their focus is on the factors causing or reducing anxiety, they argue that each individual's present economic insecurity depends on their current wealth level and on past changes in their wealth stock. For D'Ambrosio and her collaborators, the accounting period is annual but economic insecurity at any point in time is driven by events over a number of past years. They argue that economic anxieties depend only partly on current wealth because, for any given amount of wealth at a point in time, an individual will feel more secure if they have been able to keep their wealth intact throughout their past life. (Their emphasis on the anxiety-inducing nature of past wealth fluctuations thus contrasts strongly with the literature on asset-based poverty, which only looks at current wealth holdings.)

22. Because past declines in wealth are thought of as due to adverse shocks, and not due to voluntary planned dissaving (e.g. the spending of savings in retirement), D'Ambrosio et al. also hypothesize that greater fluctuations in private wealth in the past will mean that individuals will feel more insecure about their future, whatever the amount of wealth they have at a given moment. In D'Ambrosio and Rohde (2012) the proposed measure of insecurity therefore is a weighted sum of current wealth and past losses and gains in wealth, where past declines are more heavily weighted than past increases (loss aversion is the rationale) and where events farther in the past get less weight than more recent events.

23. Conceptually, Bossert and D'Ambrosio (2013:3) argue that “wealth” should be “defined in a comprehensive manner – wealth is assumed to encompass everything that may help an individual in coping with adverse events. The wealth of an individual includes, for instance, claims on governments, family, friends etc. Sen (1976) refers to these claims as entitlements – “consumption bundles available to an agent given her rights and opportunities”. However, although financial assets can be spent for any purpose, informal protective “entitlements” are typically not legally enforceable and may be conditional on “good behaviour” – issues which are not addressed by D'Ambrosio. Individuals observably do get help from friends and relatives when they are in adversity: however, the essence of help and “charity” is its voluntary nature – friends and relatives can also refuse.

24. Because entitlements to benefits under the social insurance or social assistance programs of the welfare state are typically codified in national legislation, they can be summarized in national indices such as those which the OECD now calculates for pension entitlements or unemployment insurance systems. Such summary indices can then be included in a “macro” measure of economic security. However, informal social entitlements are much more hypothetical – the strength (or weakness) of such potential claims can only be observed when adverse events play out. Hence, in practice, D'Ambrosio and Rohde (2012) use the net marketable private assets of households – i.e. the sum of financial assets (including homeowner's equity) less total liabilities – as their measure of wealth.

Box 2. What concept of “wealth” is most relevant for economic insecurity?

The concept of “wealth” has found many alternative definitions in empirical economic research. For example, in addition to including in wealth the value of marketable financial and real assets minus liabilities, Wolff (1991) provided an early discussion of whether and how to count the discounted present value of employer pensions or social security benefits as part of household wealth. Both the Hacker and the D’Ambrosio perspectives include only private stocks of marketable individual wealth in their empirical measures of economic insecurity, and share the implicit assumption that the present value of pension entitlements, both public and private, should not be part of the calculation of measures of economic insecurity. Implicitly, by only counting privately held assets, both Hacker and D’Ambrosio also concur in pushing the role of the welfare state out of the centre of the “economic insecurity” stage.

Where the Hacker and D’Ambrosio perspectives diverge is in their treatment of housing wealth (which is the main marketable private asset held by most households in OECD countries). Because Hacker et al. see insecurity as arising from an inability to maintain consumption in the event of a large income shock, they exclude housing wealth as a plausible source of security. The illiquid nature of housing equity may be the reason – “hard to sell when you need cash right now” might be a way of rationalizing their perspective. Because the market value of net home equity is not considered as part of wealth, an implication of the Hacker approach is that renters and owners are implicitly assumed to be equally exposed to income shocks. By contrast, D’Ambrosio and her collaborators do include the value of home equity in their measure of household wealth, because it is seen as providing a sense of security equivalent to other wealth – i.e. in proportion to net home equity; this implies that rising house prices produce increased security and that falling prices cause greater insecurity.

In practice, the market value of owner occupied housing can be quite volatile – a notable recent example is the increase in US house prices from 2000 to 2007, and the subsequent collapse. Middle class US households have easy access to mortgage financing, and many were highly leveraged – Wolff (2012) estimates that as a result “between 2007 and 2010, median wealth plunged by a staggering 47 percent”. If housing equity is excluded from measurement of economic insecurity (as Hacker et al. advocate), neither the increase in US middle class net worth prior to 2008 nor the collapse in their net worth after 2008 enter the calculation. From the perspective of D’Ambrosio et al., however, an estimate of the level of economic insecurity in the US in the 2000 to 2007 period should reflect the rising house values of that period – and estimates of economic insecurity for each year from 2008 to 2011 should reflect, with greater weight, the net home equity losses of the latter period. Because they differ in how they conceive housing wealth, cyclical volatility in housing prices does not influence trends in economic insecurity in Hacker’s calculations, but does drive middle class insecurity in D’Ambrosio’s world view.

3.3. *Downside income volatility relative to trend: Rohde, Tang and Rao*

25. Rohde, Tang and Rao (2014 – henceforth RTR) start by noting that: “the term (economic insecurity) is used broadly to refer to a state of stress or anxiety concerning one’s financial future”. RTR emphasize that this concept is inherently “forward looking” but share with D’Ambrosio the perspective that there is no option but to use “backward-looking” data on individuals’ past experiences in building a micro-based index – they emphasize that one does so in order to estimate individuals’ perceptions of the future. Like her, they emphasize the importance of past volatility – but it is the volatility of income rather than wealth.²⁰

26. A number of countries have panel data on household incomes which indicate that household i has income stream $x_i = (x_{i1}; x_{i2}; \dots x_{iT})$ over T time periods, usually annual. The question RTR address is how to construct from such data an insecurity index I_i for each household, and then how to aggregate such an index over all households. RTR are conscious that indices of dispersion in past incomes (such as the coefficient of variation, or the Theil or Gini indices) pay no attention to the sequence of income changes. A volatile income stream [e.g. 10, 25, 15, 30, 20] has the same coefficient of variation (or Gini or Theil index) as a steadily increasing sequence [e.g. (10, 15, 20, 25, 30)], which might correspond to a predictable career progression] or a steadily decreasing sequence [e.g. (30, 25, 20, 15, 10)]. Thus, to measure “economic insecurity”, it is essential to distinguish between volatile and predictable variations of income over time.

27. To meet this goal, RTR use panel data to estimate a time series regression of the form $x_{it} = a + \beta t + e_{it}$ for each household and consider the volatility that arises when incomes fall relative to the household's overall trend ($e_{it} < 0$). This approach implies that a downward deviation from a descending trend is equivalent to a downward deviation of the same size from an ascending trend – which Guvenen et al. (2015:21) suggest is a poor fit to real data.. Like Hacker and D'Ambrosio, they do not distinguish between market and transfer income.

28. There are numerous studies of short-term volatility of incomes, sometimes referred to as transitory variation, which start by drawing a distinction between “permanent” income [$E(y)$] and the realization y_T of a mean zero random shock [observed income in any period is $y = E(y) + y_T$].²¹ This income volatility/instability literature emphasizes trends in the variance of y_T . RTR are quite clear in distinguishing themselves from this literature – they are only interested in negative income shocks.

3.4. *A compound “macro” index: The IEWB Index of Economic Security of Osberg and Sharpe*

29. Although their verbal definition of economic insecurity is general, subjective and forward-looking (Osberg, 1998), the Osberg and Sharpe (2002, 2005, 2009, 2012) measurement strategy is focused on four specific economic hazards, i.e. unemployment, sickness, widowhood and old age. Osberg and Sharpe assume that changes in the subjective anxiety about a lack of economic security are proportionate to changes in objective risk, and that a national level index of such changes can be evaluated using macro data for the year in question.²² Because their index of economic security is one of the four components of the Index of Economic Well-Being (IEWB), they refer to it as “The IEWB Index of Economic Security” (Osberg and Sharpe, 2012).

30. Like the IEWB itself, the IEWB Index of Economic Security is a compound index. The IEWB perspective is that public policy cannot mitigate or offset all possible economic hazards (and should not attempt to try²³) and that informing public policy debates is the purpose of social index construction. In the IEWB, the specific contingencies (“security in the event of unemployment, sickness, disability, widowhood and old age”) are identified, because those are the hazards specifically mentioned in Article 25 of the 1948 Universal Declaration of Human Rights (and reiterated in numerous other human rights covenants since then).²⁴ These hazards are measured by:

- The probability of unemployment and the size of financial loss it can produce, as indicated by the unemployment rate and the average proportion of earnings that are replaced by unemployment benefits (The OECD's measure of “labour market insecurity” is essentially identical (2014, pp. 94-103).
- The financial risk imposed by illness, which in international comparisons is dominated by the coverage of public health care. This is estimated by the percentage of disposable household income spent by households on health care services that is not reimbursed by public or private health insurance.
- The risk of becoming poor due to family breakup – i.e. the probability of divorce times the poverty rate among single female parent families, times the average poverty gap ratio among single female parent families).²⁵
- The poverty intensity (= poverty rate * average poverty gap ratio) experienced by households headed by a person 65 and over.

31. These components are all measured at the national level, weighted by the relative population size directly affected and then aggregated to an overall index of economic security. The resulting aggregate

index is therefore “macro” in nature. The employment security component, for example, measures the aggregate risk of unemployment and the coverage which unemployment insurance offers, on average, to offset the risk of that hazard – i.e. it does not add up micro-data on the unemployment experience of individuals. The financial risk associated with illness is similarly modelled as proportional to aggregate medical out of pocket spending unreimbursed by insurance. Since this total spending is not distributed among households, the role which private wealth could play as an individual’s buffer is ignored.

32. Although these four hazards are specifically named in the UN Universal Declaration of Human Rights, they are subtly different in nature. Unemployment and ill health are adverse events which directly cause economic losses (i.e. loss of earnings and health care costs). However, “widowhood” or “old age” are states of life which are economically hazardous in the probabilistic sense of causing an increased likelihood of deprivation. Hence, the calculation of these components of the IEWB index emphasizes the probability, and depth, of poverty associated with these states.²⁶

4. Measurement choices and desirable principles

33. Since, as argued in Section 2, mitigating economic insecurity is now a very costly activity in all OECD countries, accurate measurement of it is important. But what are the crucial choices in defining a measure of economic insecurity? What criteria should guide these choices? Sections 4.1 to 4.3 discuss three unavoidable choices that have to be made in the construction of indices of economic insecurity, while Section 4.4 addresses the additional criteria that an ideal measure should satisfy.

4.1. Dimensionality and the optimal aggregation of hazards

34. If economic insecurity derives from anxiety about future hazards, should an index of economic insecurity identify specific hazards or use one variable to summarize insecurity in toto? If specific hazards are identified, which should they be, how many should there be, and how should they be aggregated?

35. In the current literature, the Hacker, D’Ambrosio and RTR approaches all use a single variable (respectively, large losses in household available disposable income; the private wealth of the household adjusted for past wealth volatility; and the probability of downside household income volatility) to summarize the impacts of all types of hazards. The IEWB approach identifies four general hazards, computes indices of each and then aggregates these sub-indices (weighted by size of population affected) to a national total.

36. It could also be argued that more hazards should be specifically identified. Most people would probably consider having a job, buying food, or making financial decisions to be ‘economic’ activities. So, should indices of “job insecurity”, “food insecurity” and “financial insecurity” be separately calculated as components of economic insecurity? In the human rights literature, housing has also been seen as a primary good²⁷ and historically, some countries have had a judicially enforceable ‘right to housing’. Should security of housing – ‘always having a roof over your head’ – therefore also be explicitly recognized when measuring economic insecurity? If so, how many other specific hazards should be separately identified?

37. Although there are large literatures associated with specific hazards, these have typically been quite distinct sub-areas of study – each topic has been analysed in isolation. Narrowness of focus has sometimes facilitated measurement and public communication – but it also sometimes has significant costs. For example, the large literature on job insecurity addresses the implications of a very specific hazard – whether a person’s current worker/firm job match is likely to be terminated by the employer. Job insecurity is important for well-being – as the OECD (2014) has noted: “When workers are asked to state their preferences with respect to different aspects of work... the results rank job security consistently as the

most important item in almost all countries for which data are available” (p. 96). Because the hazard involved is quite specific, very direct survey questions have been used for measurement purposes. In Laszlo et al. (2010), for example, respondents in 16 European countries were asked to what extent they agreed with the statement ‘My job security is poor’. Those responding “strongly agree” and “agree” were regarded as experiencing high job insecurity.²⁸ In the job insecurity literature, the respondent’s current main job provides a clear, unique referent. Context is not addressed, i.e. no attempt is made to measure whether or not unemployment insurance benefits partially offset the financial cost of job loss, whether increased earnings from other family members can maintain household consumption or whether replacement jobs are easily available. This focus on the current job and inattention to context and mitigating circumstances keeps the measurement problem relatively simple.

38. ‘Employment insecurity’ refers to the more general hazard of wanting, but not being able to get, any paid job. Arguably more relevant for well-being, this concept recognizes the reality that, in project driven industries such as consulting or construction or live music or film, workers typically have a series of employer/employee matches and no particular job lasts very long. However, when labour demand is strong, individuals may get a degree of employment security if they can move quickly from one gig to the next. Likewise, in a macro-economy with low unemployment, even casual workers with little security in any given job may get steady work, albeit from a sequence of employers. Both examples illustrate the importance of macro-economic context for the micro-measurement of insecurity. Although both ‘job insecurity’ and ‘employment insecurity’ consider the availability of continuing employment, ‘job insecurity’ focusses narrowly on the current worker/firm match, while the availability of other jobs is crucial to ‘employment insecurity’. Even so, ‘employment insecurity’ is still an incomplete concept, because it omits consideration of what happens in the event of non-employment, e.g. whether unemployment benefits are available, and at what rate.

39. Similar difficulties arise in defining and measuring ‘food insecurity’²⁹, while the term ‘financial insecurity (which is potentially very broad) has been commonly restricted to the context of retirement and/or old age.’³⁰ In general, although the appropriate policy response to a specific hazard may sometimes be equally specific (e.g. the ‘housing first’ approach to homelessness), context is very often crucial. Hence, the ‘optimal aggregation’ of hazards – i.e. the degree to which hazards should be considered separately as isolated events or grouped together and considered in their wider context – is very much a judgement call. The trade-off is between identifying so many distinct hazards that general trends and interconnections between issues cannot be discerned or aggregating so much that measurement provides no guidance to policy priorities.

40. As noted in Section 3, the Hacker, D’Ambrosio and RTR approaches are in agreement that a measure of economic insecurity should define a single summative variable – they just disagree about which one. The IEWB approach, on the other hand, constructs the overall insecurity index by adding up sub-indices of the insecurities implied by key types of specific hazards. The choice between these two methodologies depends partly on whether anxiety about future economic hazards is seen as a diffuse and general characteristic of individuals, or whether individuals are seen as becoming anxious about their futures by worrying about specific hazards.³¹ As well, for measurement purposes an important implication of using an indicator variable like wealth or income is that it does not distinguish between the impacts of the choices individuals have made and the constraints they have faced. Interpreting changes in aggregate wealth or total income as indicating economic insecurity depends on maintaining the assumption that changes over time are always due to unanticipated changes in the constraints people face, rather than to any voluntary choices.

41. The perspective advocated in this paper is that it is preferable to identify a limited number of sub-indices of specific kinds of hazards,³² because the purpose of any social index (such as a measure of economic insecurity) is to assist in collective decision-making.³³ From this perspective, a major

disadvantage of one-dimensional measures is that they provide no hint as to where social problems may actually be. When, for example, measures only provide information that economic insecurity has gone up or down, they provide no hint to policy makers of where to look for new policies. When all data on economic insecurity are aggregated directly into a single summative index, any potential for indication of the relative priority of particular policy areas is lost.

42. However, it is also desirable to avoid overwhelming public debates by listing so many sub-indices of possible insecurity that everyone loses track. Because humans are limited in their ability to comprehend a great many variables simultaneously, a very large dashboard of sub-indices of economic insecurity can easily overwhelm readers with complexity. ‘Optimal aggregation’ of hazards implies identifying a cognitively manageable number. Because an index which attempted to incorporate explicitly all possible events whose occurrence might lead to future economic losses would become incomprehensible, slimming down the list of identifiable hazards of life for the purposes of index construction is inescapable.

4.1.1. Anchored in policy-relevant hazards

43. One straightforward criterion for index inclusion is quantitative importance. Although uncertainty about any future hazard will decrease the well-being of a risk-averse individual, some hazards are relatively small in impact and/or affect only a small part of the population.

44. More importantly, all societies make judgements about the kinds of risks considered relevant for social policy. For example, social insurance against the unemployment losses of steel mill workers is typically seen quite differently from public compensation of trading losses for hedge fund managers. If the objective of measurement is to assist in the policy process, it is not particularly useful to construct a measure of the total utility loss from all possible misfortunes, since some hazards (e.g. losing money at the race-track or in the commodity futures market) are not generally seen legitimate objects of public policy.

45. Which hazards should be counted as mattering for public policy? Any list constructed by an individual researcher or research group can at best claim to be that person or group’s informed opinion. By contrast, the articulation and adoption of human rights covenants such as the UN’s Universal Declaration of Human Rights (1948) are the result of a political process which (at least in democracies) can claim general societal support, and can therefore claim procedural legitimacy for their societal choices.³⁴ This paper, like Osberg and Sharpe (2002, 2005, 2009), therefore argues that these rights – specifically, the “right to security in the event of unemployment, sickness, disability, widowhood, old age” (Article 25) – should be the starting point for measurement of economic insecurity.³⁵

4.2. Unit of analysis

46. As noted in Section 3, the Hacker, D’Ambrosio and RTR approaches to the measurement of economic insecurity all start from a measure of the insecurity of individual households in a cross-sectional sample of the population and then sum across all households to get an aggregate index at the national level. The IEWB methodology, by contrast, has used macro-data at the national level, and cannot disaggregate to measures of the economic insecurity of particular individual households, or groups of households. What unit of analysis should be adopted for the measurement of economic insecurity?

47. Although the well-being of individual persons is the focus of welfare economics, the Hacker, D’Ambrosio and RTR approaches all assume that income is pooled for consumption purposes within households and make no attempt to distinguish between the economic insecurities of different household members. The neglect of intra-household inequality at any point in time, and of the fact that over time individuals move through a sequence of households, has long been known to be unsatisfactory for the

study of economic inequality or poverty, and for much the same reasons it is also problematic for the study of economic insecurity.

48. Nevertheless, it is clear that norms of mutual assistance within extended families have historically been crucial risk pooling mechanisms, and remain important today. Within nuclear families, labour economists – from Killingsworth (1983) to Venn (2011) – have long recognized the interdependency of spousal labour supply within families and the insurance role for family income of added workers in the event of primary earner unemployment. There is therefore some justification for ignoring intra-household inequalities in risk exposure. Furthermore, there is no practical alternative with available data, since estimating the flow of resources within households is extremely difficult. Hence, this paper advocates taking the household as the recipient unit.

49. Estimating the level of insecurity for each household enables researchers to compare the incidence and depth of economic insecurity across different groups in society, and to evaluate the distribution of insecurity. When social decisions depend on both the average and the distribution of impacts³⁶, it is not enough just to know whether a given policy will cause a change in the national level of insecurity; distributional measures are also needed, and this requires household level data.

50. Household-level and aggregate estimates are linked by the fact that an unbiased predictor, for all households, of any specific hazard will sum up over all households to the observed population frequency of that specific hazard. Probabilities are about observed frequencies in specific populations. As economic insecurity is about the probability and costs of adverse events, both the frequency and the costs of these adverse events for specific population groups should be measured. But because the same individual can belong simultaneously to several different categories (e.g. be both female and aged 45-54), policy analysts often want to look at data using a variety of categories. Hence, economic insecurity should ideally be estimated at the level of individual households using micro-data, so that it could later be aggregated by any desired characteristic into a consistent national total. In this way, both national and distributional trends and policy implications can be discussed.

4.2.1. Pitfalls of aggregation and causality in interpreting household insecurity

51. In advocating the aggregation of household level measures to national totals, one must be aware that contagion and externality effects are plausible aspects of economic insecurity, which might considerably complicate aggregation. Contagion effects operate directly across individuals – as in the greater difficulty one might feel in not worrying about a hazard (e.g. unemployment) when more of one's neighbours are worrying about it. Externality effects operate through behavioural outcomes – as in the case of an unemployed person's diminished chances of getting a job when more other people are also becoming unemployed and looking for jobs. Both factors imply that each individual's economic insecurity may depend on that of others, and that aggregate insecurity may not be a simple linear additive sum of all individuals' insecurities. A priority for future research therefore is to assess the sensitivity of aggregate economic insecurity to contagion and externality effects.

52. A second cautionary note concerns the interpretation assigned to cross-sectional differences in household insecurity. At any point in time, in any given society, resource endowments, past history, social institutions and public policy combine to establish the rules of the economic game for individuals³⁷, and thereby produce an average level of exposure to downside risk. Although governments set the policy environment, individuals (who have varying levels of personal anxieties) can, within a given context, avoid, mitigate or increase their personal exposure to economic hazards. For example, knowing the unemployment rate and the benefit/wage replacement rate determined by the provisions of unemployment insurance, individuals can decide whether to incur a risk (e.g. by accepting a job with greater risk of future

layoff) or whether to get more self-insurance against risk (e.g. by deciding how much to save privately in order to build a larger buffer of private savings).

53. In setting public policy, governments may believe that observed outcomes partly reflect individual choices, but whether or not that is true, they must still decide how much of the cost of hazards (such as unemployment or illness) the public sector should share, on average, with individuals, through programs like unemployment insurance or public health insurance. For public policy, the bottom line is the net aggregate level of economic insecurity, averaging over individual differences in personal preferences.³⁸

54. However, in assessing the causal interpretation of differences between households, individual differences in preferences may be crucial. For example, in the D'Ambrosio approach discussed in Section 3.2, the level of wealth (adjusted for past fluctuations in wealth) is taken as the indicator of economic insecurity, although it is also possible that those individuals who are more anxious about the future save more, while those who are relatively less anxious increase their exposure to shocks by choosing to go into debt. These individual decisions are made conditional on the general level of social protection, but they also imply that a cross-sectional comparison of individuals at a point in time may reveal that the more anxious have more private wealth, even if, *for any given person*, greater wealth would reduce economic insecurity. In general, although measures of individuals' economic insecurity can be correlated in cross-sectional micro-data with other characteristics of the same individuals, the assessment of whether "insecurity causes X", "X causes insecurity" or "Y causes both X and insecurity" is not obvious. Sometimes, 'natural experiments', such as a major change in social policy, are captured in the data.³⁹ But the more general case is that issues of endogeneity and possible reverse causality at the individual level have to be considered seriously, and that econometric assessment of the implications of individual insecurity for other individual outcomes has to distinguish clearly between correlation and causation.⁴⁰

4.3. What time period should be used?

55. In reality, time is continuous, but any index of economic security must specify the accounting period within which flows are cumulated and negative shocks to individuals are calculated. Although in principle a hazard (such as an adverse income shock) could be accounted for within daily, weekly, monthly, annual or longer periods of time, in practice an annual accounting period is the convention used by all the analyses of "economic insecurity" reviewed above in Section 3. This implies consistency with the annual income period used for most data collection and for analyses of poverty or the distribution of income or national output trends, and therefore is the accounting period advocated in this paper.

56. Nevertheless, there are disadvantages to an annual accounting framework. To start with, it implies understating the impact of events which can overlap year end-points and ignoring the impact of short, within-year deprivations.⁴¹ Implicitly, specifying a particular time period for the measurement of a flow presumes that, within that period, timing can be ignored.⁴² For example, in calculating an individual's annual income for the calendar year 2014, it is presumed that whether cash actually arrived on 3 January or on 30 December does not matter, despite the fact that families with no cash and no access to credit can get very cold and very hungry in much less than a week. For income and consumption purposes, specifying a time period means making the assumption that capital markets are perfect within periods— an assumption that has important measurement consequences. [For example, Ruggles (1991) used PSID data for the United States, (which recorded monthly income flows) to show that the incidence of monthly income poverty in a year was about three times greater than the incidence of annual income poverty.] Within-year poverty dynamics disappear when analysts use annual income data, but short-period losses (especially if combined with lack of credit access) may be highly relevant for individuals' economic insecurity. Long duration events (like a spell of unemployment or illness) may also appear to be shorter, and thus less of a shock to well-being, if they overlap the end of an annual accounting period and are divided between two adjacent years.

57. Typically, the data available to researchers are annual, which implies that within period expectations can be partly driven by prior within period events (e.g. “economic insecurity” about unemployment for most of the year can be heavily influenced by being unemployed in the January to March period, even if the respondent was employed for the remaining nine months of the year). Hence, using annual data it is sensible to use ‘current’ personal experience of hazards (e.g. a person’s experience of unemployment) as a predictor of insecurity. For example, using annual data from Chile and Mexico, Yevenes, Espinosa and Friedman (2014) conclude that the most significant variable in determining subjective economic insecurity is current (i.e. same year) exposure to adverse events, which produces great anxiety and concern about, and the inability to recover from, these bad events.

58. Finally, although researchers can observe what did actually happen in a given year, direct measures of the expectations of individual households are quite rare. Economic insecurity arises from anxieties about the future but typically researchers have to infer those expectations about the future from observable data on current actual events, recognizing that doing so entails always using a subset of the information potentially available to individuals. (For example, individuals’ anxieties about future unemployment always occur in a context where there is an actual current observable unemployment rate *and* numerous conflicting forecasts, in the business press and elsewhere, about future unemployment rates).⁴³ As a practical matter, there is little feasible alternative to using observed events as predictive of expected events – and given that most of the population do not in fact read the forecasts of economic and political pundits, this may not be all that far off how most people actually form their expectations.

4.4. *Desirable principles of measurement*

59. Measuring economic insecurity requires choices about the optimal dimensionality of hazards, the appropriate unit of analysis and the time framework for accounting. In making these and other choices, it is useful to keep some specific criteria in mind.

4.4.1. *Axiomatic ethical defensibility*

60. In the literature on aggregate indices of poverty and inequality, there is wide agreement on a standard list of ethical axioms⁴⁴ which a defensible aggregate index of poverty or inequality should possess. In “adding up” the insecurities of individual households into an aggregate index of insecurity, one cannot simply rely on the axioms of the inequality and poverty literatures, since some make no sense in the insecurity context.⁴⁵ Monotonicity, however, remains important.

61. In the context of economic insecurity, the Monotonicity Axiom would mean: “A reduction in one person’s security, holding other people’s security constant, must increase the aggregate index of economic insecurity”. The practical implication of this axiom is that it rules out indices which solely depend on the incidence of insecurity and are insensitive to severity – for example, an index of the insecurities caused by unemployment should not just reflect the unemployment rate, but should also embody some measure of the severity of the loss caused by unemployment. As Stiglitz, Sen and Fitoussi put it, “a comprehensive measure of economic insecurity would ideally account for both the frequency of each risk and its consequences”.

4.4.2. *Counting the benefits of insurance*

62. Both private insurance and public social programs can offset significant parts of the financial risks of adverse events. Since it is the *net* cost of a hazard that matters for insecurity, the offsetting impacts of such insurance should be counted and, to the extent possible, separately reported, so that the underlying hazard, and the extent of existing insurance against it, can be assessed. However, since the discretionary

nature of charity also means that it is not equivalent to legally enforceable claims, informal entitlements should not be included in a measure of economic insecurity.⁴⁶

4.4.3. Communicable in public debates

63. If the purpose of social index construction is to assist the democratic debate on collective decisions, then it has to be actually used in such debates, which implies that it must be possible for it to be widely understood. Communicability is enhanced if indices have a common philosophy and “grammar” – such as, for example, thinking of downside risk as the expected value of loss, which can be decomposed into the probability of incurring a loss multiplied by the average severity of the loss, if incurred.⁴⁷

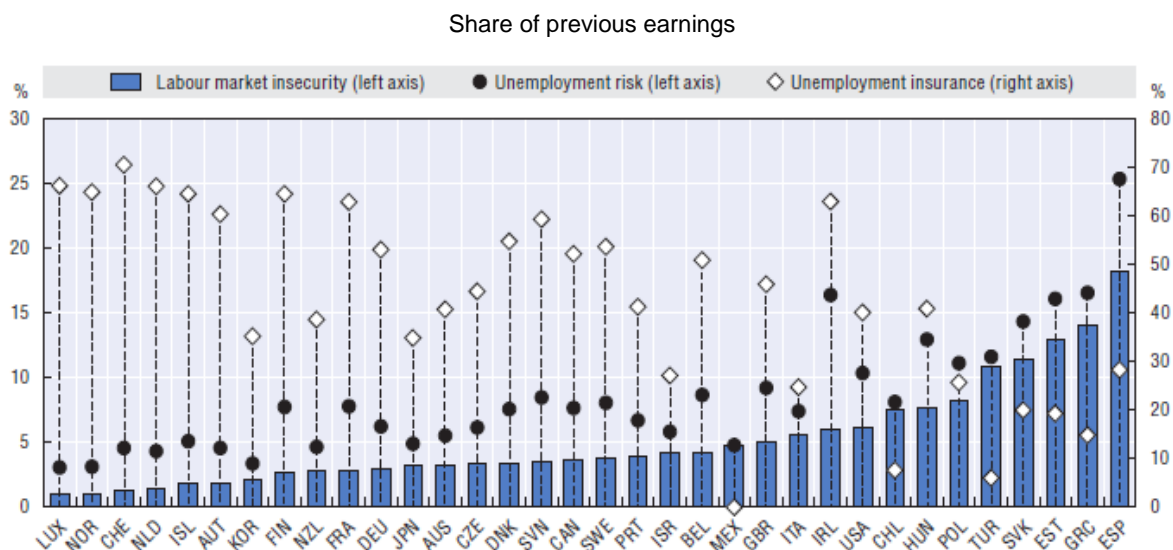
5. Measuring named risk insecurity

64. This paper advocates the construction, using household level data, of indices of the economic insecurities produced by the hazards identified in Clause 25 of the UN Universal Declaration of Human Rights (i.e. unemployment, illness, widowhood, disability and old age), and the aggregation of these indices to an over-all measure of economic insecurity. Section 6 will discuss possible measures if new data surveys are implemented – this section addresses what can be done with existing data.

5.1. Security in the event of unemployment

65. The UN Universal Declaration of Human Rights of 1948 was drafted and adopted by industrialised nations, whose citizens overwhelmingly depend on money earnings from formal employment in the labour market. Although unemployment insurance systems might mitigate the hazard of being unable to exchange labour time for commodities, for most people, at that time, involuntary unemployment of the primary earner and loss of household livelihood were synonymous. However, although worrying about “where is the next meal coming from?” remains a crucial concern today whenever paid work is scarce, the context of unemployment has changed considerably.⁴⁸

Figure 2. Labour market insecurity in OECD countries



Note: 'Unemployment risk; is the probability of becoming unemployed times the expected duration of unemployment, which may be interpreted as the average earnings loss associated with unemployment as a share of previous earnings. 'Unemployment insurance' is the effective net individual replacement rate of unemployment and social assistance benefits in terms of previous earnings. 'Labour market insecurity' is measured as the unemployment risk times one minus unemployment insurance; it may be interpreted as the uninsured average expected earnings loss associated with unemployment as a share of previous earnings. For further details, see the web annex of Chapter 3 on www.oecd.org/employment/outlook.

Source: OECD (2014)

66. Figure 2 (from the 2014 edition of the OECD *Employment Outlook*) shows a wide dispersion across the OECD in the exposure of individual workers to the risk of unemployment and in the effective net replacement rate of individual earnings embodied in unemployment insurance programs. Like the earlier similar calculations of Osberg and Sharpe (2002, 2005, 2009, 2012) of "security from unemployment", this measure is calculated from national level averages of the hazard of unemployment and replacement rates of earnings *for individuals*.

67. Distinguishing between "loss of livelihood" for an individual and "loss of livelihood" for a family would be unnecessary if all families had just one wage-earner and all earners lived in families. But social reality is characterised by a diversity of household types. Although the multiple earner household is now the norm in OECD countries, a significant minority of single earner families remains, while a growing social problem in some countries is the emergence of workless households in which nobody is employed. Moreover, the number of dependents within households varies appreciably across countries. Hence, measuring the insecurity for households caused by unemployment requires consideration of household composition.

68. Berloff and Modena (2014) have argued that the consequences of unemployment risk may be quite different according to the number of household members who depend on the income of the person who has become unemployed. Their results suggest that: i) the overall level of insecurity associated with similar unemployment and unemployment insurance replacement rates increases if all the individuals in the households potentially affected are considered; and ii) the use of net rather than gross incomes and of micro-level data changes quite significantly the relative position of countries in terms of the economic insecurity due to unemployment.

69. In calculating the “insurance premium” that corresponds to the expected loss of equivalent household consumption implied by the probability of being unemployed (of either adult earner or of both) Berloff and Modena use the OECD Tax-Benefit model⁴⁹, emphasizing the importance of considering the ‘net’ financial impacts of unemployment rather than the ‘gross’ impacts, since countries differ in the tax and other benefit provisions applicable to the unemployed in different family circumstances. Similarly, since countries differ greatly in the unemployment benefits available at different durations of unemployment, and since the frequency distribution of durations varies over time and across countries, they stress the importance of computing the benefits applicable to each person’s experienced duration of unemployment, weighted by currently observed durations of unemployment spells. As they note (2014): “the interpretation of the measure based on the insurance approach is quite simple: the percentage of the gross average wage that would be required from each earner in order to insure the aggregate expected loss of the country, under a zero expected-profits condition”. This clarity of interpretation is highly advantageous – hence, the Berloff/Modena equalised insurance premium methodology is recommended.⁵⁰

5.2. *Security in the event of illness*

70. Illness can impose costs on households in the form of: i) health care costs borne by the household; ii) loss of earnings; iii) longer term implications of any unmet medical needs; and iv) pain and suffering while ill. In practice, health care expenditures and loss of earnings can be estimated, but the cost equivalent of unmet medical needs and of pain and suffering cannot be satisfactorily addressed with existing data.

5.2.1. *Unreimbursed health care costs*

71. International comparisons of the health care costs borne by households are dominated by the coverage of public and private insurance for health care costs. In all affluent countries, publicly financed health insurance and legally mandated private health insurance programs pay for most medically necessary health care – but with different mixes of public and private service provision, and with varying combinations of co-pay⁵¹ for services rendered.⁵² Consumer expenditure surveys in most countries produce household micro-data which report expenditures by households on health care services that are not reimbursed by public or private health insurance. As an indicator of the financial risk raised by illness, the impact of Medical Out Of Pocket (MOOP) spending on household finances should be expressed as a percentage of disposable household income (as in current versions of the IEWB). The impact of MOOP health care costs on well-being depends on households’ ability to pay, which depends in part on how many household members have to share a given income. But even if illness strikes a household, food and shelter must be paid for, even before medicines, so a better measure of health care cost risk would express MOOP costs as a percentage of household discretionary income (i.e. money income minus income and payroll taxes and minus household costs for food and shelter).⁵³

72. Estimation of the economic insecurity faced by individual households due to illness should rely on micro-data from surveys of consumer expenditure to calculate the conditional expectation of unreimbursed MOOP expenditure as a percentage of household income after tax and after the costs of food and housing, for households with given personal and situational characteristics.⁵⁴ Averaging these costs across households would then give the aggregate index of economic insecurity about health care costs.⁵⁵

5.2.2. *Loss of earnings due to sickness/ill health*

73. The earnings loss due to sickness for each household h is the difference in household earnings when household members are healthy (Y_h) and when they are sick (Y_s), added up over the duration (T periods) of the illness spell to an aggregate loss (L_h^*) for the household in question – i.e. $L_h^* = \sum_T (Y_h -$

Y_t).⁵⁶ However, annual data are too coarse to catch many illness spells, which are often measured in weeks or months of impact. Since many households in OECD countries report savings insufficient to maintain consumption for very long and may have poor access to credit, illness spells as short as a month can be a serious concern. Unfortunately, in annual data, the sequencing of short periods of good and bad health, of the earnings levels while in each spell and of the duration of sickness spells are typically not observed – only aggregate totals are reported. As already noted, most available micro-data surveys present their data using an annual accounting period⁵⁷, which implies that earnings while ill and while well within a year cannot be distinguished, and that measured illness spells are truncated at the beginning and end of the year.

74. A second-best alternative in estimating risk of loss of earnings due to ill health is to use available annual earnings data to estimate the percentage difference in household earnings and in transfer payments, including any sick pay (conditional on household characteristics) between households containing individuals who report work absences due to ill health and those that do not. The expected value of this earnings loss, as a percentage of household income after tax and after the costs of food and housing, is a measure of the hazard, and any change in transfer payments is a measure of offsetting social insurance spending. The net impact [i.e. $\Delta(\text{earnings})$ less $\Delta(\text{transfers})$] should then be added to the conditional expectation of unreimbursed MOOP expenditure, as a percentage of household income after tax and after the costs of food and housing, to give an estimate of risk exposure to health care costs and earnings loss for households with given personal and other characteristics.⁵⁸ Because annual data only captures part of the duration of the illness spells which overlap either the beginning or the end of calendar years, this estimate will understate the magnitude of risk of income loss due to illness. More complicated methods to avoid truncation bias are available, but it is not clear that the data can support them – and complexity carries its own costs. However, having some estimate of income loss due to illness, even if it is an under-estimate, is preferable to having none and implicitly putting this penalty to zero.

5.3. *Security in the event of disability*

75. An essential distinction between lower earnings caused by ‘sickness’ and lower earnings caused by ‘disability’ is duration – individuals recover from illness, but when an incapacity is permanent, it becomes a ‘disability’. As well, whether a personal characteristic is a “disability” is very heavily dependent on social context (e.g. the implications of using a wheelchair depend heavily on infrastructure accessibility). However, whether people develop a disability during adult life, or begin life with a disability, costs are borne by the household to which these individuals belong. As with illness or unemployment, those costs at the individual household level aggregate to societal costs, and are partly shared socially, in the sense that disability benefits, transfers and services for disabled people are available in most OECD countries, and are financed by the entire population. In principle, in estimating the security that households have from the hazard of incurring costs caused by the disability of household members, it would be desirable to use methodologies similar to those outlined for health care costs and to aggregate the values of such protections.

76. In practice, a consistent, comparable cross-country definition of ‘disability’ is needed in order to estimate a measure of the underlying hazard, and it is much more difficult to find cross-nationally comparable data on disability than to find comparable data on unemployment or illness. In part, this is because disability has been a low priority for statistical harmonization. Enabling better macro-economic policy co-ordination has been an important motivation for the fact that unemployment data in OECD countries are now available from labour force surveys which, over many years, have been largely harmonized through the use of a similar “job search” and “availability” requirements in order for respondents to be considered “unemployed”. Health care expenditure estimates come from consumer expenditure surveys. In both cases, fairly clear units of measurement are possible that are interpersonally comparable, and relatively independent of context (weeks of job search without employment and

unreimbursed expenditures on health care, respectively).⁵⁹ By contrast, measurement of “disability” has been much less unambiguously standardized

77. A recent UK report started with the observation that: “One of the major challenges facing the Disability Rights Commission (DRC) from the outset was the existence of multiple definitions of disability – in research circles, among disability activists, and among the wider public. Different definitions of disability were used by various big national surveys, giving different overall figures for the numbers of “disabled people” in Great Britain.” (DRC, 2010:1) The report complained particularly that, although the most widespread public conception of disability might be a person in a wheelchair, psychological, mental and emotional disabilities (which are extremely context dependent and hard to measure) are hugely important and growing. The data problem for international comparisons is even worse. Palmer and Harley (2011) have contrasted the different emphases and implications of the medical and social models of disability, while the OECD report *Sickness, Disability and Work: Breaking the Barriers* concluded with considerable understatement that: “Identifying disability is not straightforward. No one of the above disability definitions and measures is “superior” to the others” (2010).

78. Annex Figure A.1. reports the prevalence of self-reported disability in OECD countries, according to the differing definitions of disability used in different national surveys of self-assessed disability. One can see that self-reported disability incidence, which mingles self-efficacy and context, differs widely – to a degree that is likely to reflect differences in the measurement concept as much as differences in the underlying prevalence. Administrative records of disability benefits programs mingle the prevalence of the hazard of disability with the benefits that are received in the event of disability. The percentage of all people who receive disability benefits is equal to the percentage of people who are disabled (a measure of the hazard) multiplied by the fraction of the disabled who get benefits (an indicator of adequacy of insurance against the hazard) – which implies that a low hazard/low insurance country can look similar to a high hazard/high insurance country.⁶⁰ As well, there is some suspicion that disability expenditures may be influenced, in some countries, by the use of disability programs as substitutes for long term unemployment benefits for workers nearing retirement age. Figure A.2. shows large differences in the percentages of the population receiving disability benefits in OECD nations.

79. In this context, therefore, it is much harder to propose good measures of “security in the event of disability” than it is to measure security in the event of unemployment or illness. The issue to assess is whether a poor measure is better than none at all. If difficulties of measurement prevent the use of any measure at all of security from disability, the issue of security in the event of disability drops out of discussion. In practical terms, not measuring a hazard is implicitly equivalent to setting it to zero, everywhere – which is surely a very bad estimate.

5.4. Security in the event of widowhood⁶¹

80. 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. to the husband or wife with whom the widow had linked his/her fortunes by marriage. In all countries, most people live in families⁶² and although market income is received by individuals, it is pooled within families to support the consumption of all household members. Hence, the economic well-being of family members depends on both the risk of interruption of individual income flows (e.g. from loss of livelihood of a household member – see above) and on the risk of shocks to the composition of the household. The gendered dimension of this risk arises from the fact that men typically have higher individual earnings than women, but women usually retain responsibility for the care of children, even if male earnings are no longer available to the family.⁶³ 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 – security against the risk of loss of well-being for women and children due to household dissolution.

81. At that time, the social context in signatory nations was the nuclear family with a single earner. Partly as a result of the casualties of World War II, widowhood was the primary way in which women and children lost access to male earnings to become single parent families. Since then, divorce and separation, rather than widowhood, have become the primary origins of single parent families, although male mortality also remains important in some countries as a cause of loss of male earnings (e.g. in the United States, with a divorce rate of 3.7 and male mortality of 2.98⁶⁴). Although the two-earner family has today become the norm in affluent countries, female earnings alone are often not enough to keep family income above the poverty line, so many women and children are still “one man away from poverty.” The prevalence of poverty among single parent families is much higher than in the general population, and the loss to the household of male earnings remains a hugely important determinant of transitions into poverty.⁶⁵

82. If “widowhood” is interpreted broadly to encompass all events that lead women and children to lose access to male earnings (e.g. divorce, separation or the death of the husband) then the economic insecurity which ‘widowhood’ produces can be thought of in terms of the old question: “what will happen to me and the children if we are left on our own?”. Some people who think about the possibility of losing (due to widowhood or divorce) a significant part of their current family’s standard of living may plausibly expect that, even after such a loss, they would not be poor.⁶⁶ Others can realistically expect to slip below the poverty line if the earnings of their partner are no longer available. If economic insecurity is modelled from the “Beveridge” perspective that insecurity is produced by the hazard of poverty, only the anxieties of the latter group are relevant. However, from a “Bismarkian” perspective, the relevant hazard is the chance of a significant change of standard of living, so both should be counted.

83. From a “Beveridge” perspective, one would model “widowhood” insecurity, for a mother in a household of given characteristics, as the “expected value” of the risk of becoming poor because of family breakup – i.e. as equal to (the probability of divorce or separation plus the probability of adult male mortality, for a household with similar characteristics) times (the probability of poverty for a similar single female headed household) times (the average poverty gap ratio among similar single female headed households).⁶⁷ The product of these last two variables is proportional to the intensity of poverty.

84. In order to estimate the probability and possible consequences of the “widowhood” hazard at the individual household level, panel data micro-data can be used to provide estimates for households of different characteristics. However, panel micro-data are not always available within countries and panels may be of short duration. An advantage of using the Beveridge “hazard of poverty” approach is the availability of diverse sources of long run data at a population level. For many countries and many years, data on the divorce rate, the probability of male mortality, the poverty rate among single female parent families and the average poverty gap ratio among single female parent families can be located and combined into an aggregate measure.

85. Alternatively, the “Bismark” perspective argues that economic insecurity refers to worries about the chances of substantial decline in social position. The previously discussed measures of economic insecurity in the event of unemployment and ill-health have adopted this perspective, which would imply using the probability and depth of a large loss (e.g. greater than 25%) in equivalent after tax available income as the criterion variable, rather than the probability and depth of poverty. The “expected value” of the risk of large income loss because of family breakup would then be equal to (the probability of divorce or separation plus the probability of adult male mortality, for a household with similar characteristics) times (the probability of large loss for a similar single female headed household) times (the average depth of loss among similar single female headed households with large losses).

86. Security in the event of widowhood could also be “modernised” by interpreting it in terms of the loss of either parent – i.e. by modelling all transitions to single parent status, including transitions both to single parent father and single parent mother households. However, since male single parents are a small, and relatively advantaged, percentage of single parents, this paper advocates keeping an explicit gender dimension to the insecurity discussion.

5.5. *Security in old age*

87. Economic insecurity in the event of loss of livelihood or ill health refers to anxiety about the consequences of an adverse event, which has some probability of occurring and (usually) a limited duration. Economic security in old age, on the other hand, refers to people’s expectations of their standard of living during a predictable stage of life. It does not concern, like unemployment or ill health, a state that people would prefer to avoid and attempt to exit as soon as possible. Rather, since the only available alternative to growing older is death, old age is a state that people hope to enter and remain in, for as long as possible. While rational maximization of lifetime utility would theoretically imply that individuals save enough privately during their working years to finance their retirement spending, this is rarely observed in the real world. Even in affluent nations with well-developed financial markets, a minority of households enter their retirement years with enough private saving to pay for much of their consumption for very long.⁶⁸ In all OECD countries, the state therefore provides some sort of public pension system to maintain consumption in old age.

88. There are significant differences across countries in how much income security in old age is provided to the middle class by the public pensions system, compared to the percentage of working life income replaced for low income citizens. Some national pension policies reflect the “Bismark” perspective that public pensions should maintain living standards in retirement for most people – i.e. for the middle class, as well as the less well-off. By contrast, the “Beveridge” viewpoint is that the role of the state should be limited to preventing destitution among the elderly. Table 1 compares the replacement rates that workers with a working life history of employment at 50%, 100% and 150% of average earnings can expect to receive from public and mandatory private pensions. In the OECD as a whole, and particularly in the EU27, the public pension system provides significant income security to those with higher working life wages, but among English-speaking countries the Beveridge perspective has clearly been more influential – replacement rates are often quite low for workers with above average earnings.

89. These differences in public policy choices partially reflect different judgements about whether, while working, households are primarily concerned about their likelihood of poverty in their old age or about being able to maintain their accustomed standard of living. Conceptually, both issues revolve around the probability and depth of potential shortfalls from a criterion of income adequacy – the “poverty line” is defined by each society’s norms of deprivation while ‘retirement income adequacy’ is defined by each individual’s past working life earnings level. It is plausible that people care about both. If so, a social index of “security in old age” should have two components: i) security from poverty in old age; and ii) security of living standards in old age. These two components will, presumably, receive different degrees of emphasis from supporters of Bismark and Beveridge – but some importance should be assigned to both.

Table 1. Net pension replacement rates from public and mandatory private schemes

Percentage replacement of individual earnings for persons at 50%, 100% and 150% of average individual earnings

	Public			Total mandatory		
	0.5	1.0	1.5	0.5	1.0	1.5
Australia	57.7	17.5	0.9	100.5	67.7	54.3
Canada	71.5	50.6	35.2	71.5	50.6	35.2
United Kingdom	61.7	38.0	27.2	61.7	38.0	27.2
United States	56.2	44.8	40.4	56.2	44.8	40.4
OECD34	65.7	48.7	42.6	79.4	64.1	58.3
EU27	68.6	56.6	50.7	80.0	69.1	64.3
France	75.9	71.4	60.9	75.9	71.4	60.9
Germany	55.9	55.3	54.4	55.9	55.3	54.4

Source: OECD pension models, OECD (2013), Table 4.10 Pensions at a Glance 2013: Retirement-Income Systems in OECD and G20 Countries

5.5.1. *Security from poverty in Old Age*

90. In practice, how should the hazard of “poverty in old age” be measured? Every aspect of the concept is open to question – not least the issue of when “old age” begins. Nevertheless, some measurement choices are fairly standard (if somewhat arbitrary) – such as the convention that one suddenly becomes elderly on the 65th birthday. Since both the incidence and depth of income shortfalls are important, a useful summary statistic for countries is the “normalized poverty gap” of the elderly – i.e. the poverty rate of the over 65 population multiplied by the average percentage poverty gap of the elderly poor. The corresponding household level measure is the individual household’s poverty gap ratio.⁶⁹

91. When this measure is calculated at a point in time, it measures the realized poverty outcomes of the current elderly population. At a population level, its interpretation as an index of economic insecurity among those currently of working age relies on the presumption that individuals see the life situation of older cohorts as a predictor of what they themselves can expect when they are older. At an individual level, the insecurity about old age poverty now experienced by non-elderly households can be modelled as the expected value of the poverty gap in old age of somebody with similar household characteristics⁷⁰. A practical advantage of this approach is the widespread availability of household level data on income and poverty, in many countries and for many years.⁷¹

5.5.2. *Security of living standards in Old Age*

92. Although there is debate in the literature on how best to estimate the retirement income necessary to maintain the living standards of working life, it is remarkable how frequently that debate converges around a 70% replacement rate of retirement income to earnings while employed as being sufficient to maintain living standards in retirement.⁷² Since this concept of income adequacy is explicitly linked to individual earnings while employed, it is typically defined on an individual basis (as in Table 1, above). For each worker the issue of maintaining living standards in old age is seen as whether, and by how much, annual individual income while retired will fall short of 70% of typical annual individual earnings while employed. Since both the incidence and the depth of income shortfall are important, the ‘normalized adequacy gap’ can be calculated as the rate of income shortfall multiplied by the average percentage shortfall, in a way analogous to the normalized poverty gap already discussed.⁷³

93. Table 1 presented average replacement rates in retirement from the OECD's *Pensions at a Glance 2013*. Similar calculations are available for 42 countries. Many assumptions are necessary to forecast the pension benefits under current pension rules that an individual worker can expect to receive decades in the future.⁷⁴ Over time, one could hope that the OECD pension model could incorporate more realistic operating assumptions and that the models could be run using the actual distribution of wages in each country, instead of just three ideal types of earnings levels. Nevertheless, the current calculations, if applied to each worker, provide a starting point for estimating the security of income flows for individuals in old age.

94. Since two earner households and divorce/remarriage are quite common within OECD nations, estimating each elderly household's security of living standards in retirement requires, in addition, some modelling of the splitting and recombination of individual pension entitlements upon divorce and/or remarriage, as well as an estimate of the correlation of such entitlements. Behavioural micro-simulation models can do this, but it is not simple to translate an estimate of individual income security in old age into an estimate of the security of household living standards.⁷⁵ Because this sort of modelling capacity has many other potential products which policy makers can use, it would seem important for OECD governments to invest in such models over time. If they do so, estimates of the security of household living standards for the population as a whole could become available in future years to replace the currently available measures of individual earnings replacement for ideal type workers. But for now, individual earnings replacement rates are all that is available.

95. In general, should economic security be thought of in terms of avoiding tail events (i.e. poverty) or avoiding large proportionate losses (i.e. maintaining accustomed living standards)? Measurement decisions should probably pay attention to how the issue has been framed in the public policy context. Since the debate between the "Beveridge" and "Bismark" perspectives on social policy has been especially crucial to the differing national designs of retirement income systems, this paper has suggested that measurement of the level of economic insecurity in old age should present data that is useful for debates framed in both policy perspectives. Since debates on public health care design have been quite different, revolving much more around the percentage co-pay of health care costs than about the impact of unreimbursed health care expenditures on poverty or accustomed living standards, in the context of the economic insecurity that is due to ill health it seems more reasonable to emphasize the expected burden of health care costs as a proportion of disposable income. Most national unemployment benefits systems⁷⁶ are based on proportionate replacement of lost earnings, so this paper sees an actuarial, "expected proportionate value of loss" framework as appropriate to measurement in that context as well. However, since the public policies which address the economic insecurities arising from the probability of divorce/widowhood are diverse, it may be useful to policy debates to have measures of economic insecurity arising from both the chances of poverty and of large proportionate losses – so this paper has advocated constructing both types of measures.

6. Why not just ask people directly?

96. If economic insecurity means being anxious about one's economic future, why not just ask people directly if they are anxious? Why not then use those self-reports to measure economic insecurity? Within the economics profession in general, and within the OECD in particular, there has been a huge surge of interest in the use of subjective self-reports of well-being. What sort of survey evidence would be needed to construct reliable indices of economic insecurity?

97. In the survey evidence on subjective well-being, questions about how respondents would rank their satisfaction with their lives (on a 0 to 10 point scale) are asking people to assess their life to date, and thus are inherently backward looking questions about the past. Questions about how happy or how sad respondents feel now are questions which assess affect and emotional state in the immediate present.

However, questions about anxiety are about the future – they assess the forward-looking component of well-being.

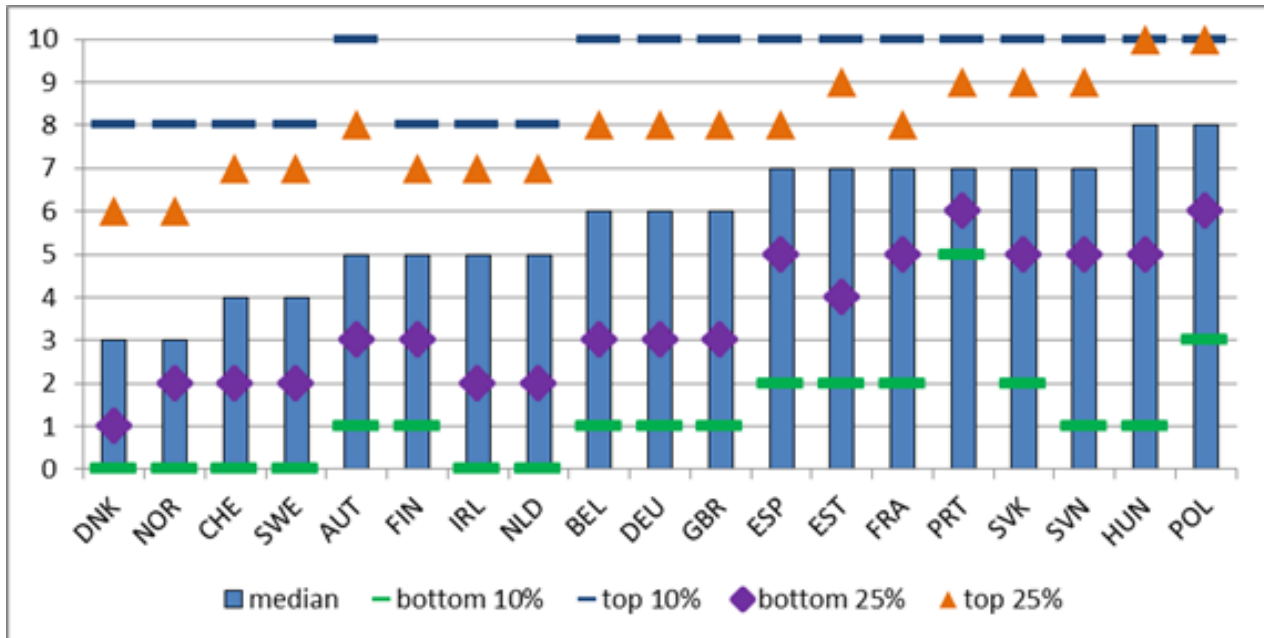
98. Currently available surveys have sometimes asked broad questions about anxiety. For example, the Gallup World Poll from 2005 to 2013 asked for Yes/No responses to the question of whether the respondent “Felt worried yesterday”. The 2012 European Quality of Life Survey (EQLS) asked respondents to use a 5-point scale to assess whether they would agree with the statement “I have felt particularly tense” and “I am optimistic about the future.” The European Social Survey (ESS) in 2006 and 2012 asked if respondents: “Felt anxious, how often in the past week”.⁷⁷ In general, however, there are only a few questions on “anxiety”, “worry” or “insecurity” in the 12 international survey data sets we have been able to examine.

99. Asking whether somebody “felt worried yesterday” or posing questions about general anxiety level has the problem that individual responses are sensitive to transient events (like terrorist attacks) and to the respondent’s immediate personal life issues (like any current crises or life events of their teenage children). Even in English, being “worried” or “anxious” or “insecure” are terms with somewhat different connotations, and it is not obvious which should be used as a general category for measuring economic insecurity. When these concepts are framed in general terms, their translation into different languages is likely to be at least as problematic as translation of “happiness” or “well-being” has been found to be. General questions can also prompt general cultural stereotypes and role identities (as in “a real man is not an anxious wimp”) which may make it hard to distinguish between culturally conditioned responses and real differences in circumstances. Most importantly, the answers to general questions about anxiety offer no pointers to what people are worried about, hence they are not particularly useful for policy purposes. Further research on the inherent noisiness and susceptibility to cultural and linguistic bias of data on generalized anxiety would be useful.

100. One alternative to general-purpose questions about anxiety and insecurity is to ask questions that probe respondents on their views about specific hazards whose occurrence would increase their economic insecurity. A case in point is that of old-age. Although old age is not a hazard in itself, it is a foreseeable period in life in which people are highly exposed to the risk that they will not be able to provide for their own economic needs – and old age pensions were historically the first type of widespread public programme to reduce economic insecurity. Limited comparative evidence about people’s expectations on their economic conditions after retirement exists for European countries. As Figure 2 indicates, there are significant differences between countries in median expectations about security in old age, and there is a wide dispersion in anxiety levels within national populations. In Denmark, Norway, Switzerland and Sweden, most of the population are hardly worried at all about their income in old age, but in Hungary and Poland 25% of respondents scored themselves 10/10 on the anxiety scale and 50% ranked themselves 8/10 or more.

Figure 3. On a 0 - 10 scale, how worried are you that income in old age will not be adequate to cover last years?

0 Not worried at all, 10 Extremely worried. Only respondents aged between 45 and 64.



Source: European Social Survey, 2006

101. This ESS 2006 question asks respondents to rate the intensity of a specific anxiety⁷⁸ – a methodological strategy which has the advantage that as a practical question with a specific referent, it is less susceptible to translation ambiguity and less affected by cultural biases and socially appropriate responses than general questions are likely to be. However, respondents may not interpret the “1 to 10 Point Ladder” in the same way for a specific hazard and there is no clear way of comparing “1 to 10” scales across different types of hazards. Hence, an alternative possible metric for the intensity of specific anxieties is frequency of worry.

102. Such a measurement approach could also be extended to other types of hazards, as suggested in Box 3.

Box 3. Examples of survey questions to measure subjective economic insecurity

Using subjective responses to track specific anxieties suggests that one could ask respondents:

1. How often do you worry about being poor in your old age?

Response categories might be:

- 1] never
- 2] hardly ever (once a year or less);
- 3] rarely (once every few months);
- 4] sometimes (almost every month);
- 5] frequently (probably once every two weeks or so);
- 6] all the time (most days).

2. How often do you worry about not having enough income in your old age?

[Same response categories as above]

3. How often do you worry about the financial costs of unemployment?

[Same response categories as above]

4. How often do you worry about the financial costs of sickness?

[Same response categories as above]

5. How often do you worry about the financial costs of disability?

[Same response categories as above]

6. How often do you worry about having enough income if your partner were to leave or die?

[The same questions could be asked to women with partners]

103. Using frequency of worry provides a natural unit of measurement that is comparable across both people and types of risks (no comparable metric is available for happiness or life satisfaction). Providing explicit definitions of the intervals corresponding to verbal terms (e.g. hardly ever = “once a year or less”) would also help to increase the chances that verbal categories are interpreted in approximately the same way by all respondents – pre-testing can help establish if these particular intervals are the ones that make most sense. And when the question is asked in a fairly concrete way, it should be less susceptible to cultural bias or translation issues. Obviously, substantial field testing of wording and response categories would be needed. Pre-testing can also help to establish the relationship between the insecurity of individual respondents and the insecurity of households.⁷⁹

104. These types of data do not now exist. If its collection were started (e.g. in EU-SILC), it would take several years before there was enough of a time series for trends to be assessed. However, even short-runs of such data could be used to assess how closely the “objective” assessments of economic insecurity of the type described in Section 4 match with self-assessments at the individual level, and in analysing the correlates / determinants of subjective insecurity. If a general question on anxiety were also asked at the same time, one could assess how much of interpersonal variation in over-all anxiety levels is explained by worries about specific economic hazards. One could also aggregate naturally across types of worries to the total number of occasions each respondent has worried about these economic hazards in a year.

7. Conclusion

105. This paper has argued that economic insecurity is an important determinant of individual well-being and that mitigating the extent of economic insecurity is now expensive in all OECD nations. Improving the delivery of economic security is, therefore, a socially important issue.

106. Nevertheless, the measurement of economic insecurity remains “work in progress”. This paper has argued that with existing objective data on the consequences of unemployment, sickness, widowhood and old age, it would be possible to improve significantly the measurement of economic insecurity. Further, the development of survey evidence assessing people’s subjective anxieties with respect to different types of hazards can improve measurement even more. An important research agenda thus lies ahead.

NOTES

-
- 1 For example, Clark and Taylor (2014); Elliott (2014).
- 2 For example, Minsky and Whalen (1996) and Leggett (1964) remain web-popular and discuss large topics – respectively, the importance of economic insecurity for the structural survival of capitalism and the formation of class consciousness. Neither article provides an explicit definition of economic insecurity, although the context indicates that unemployment is probably what they mean.
- 3 In some cases, e.g. Catalano (1991), the “definition” provided is in the form of specific issues (such as job loss) rather than by the articulation of conceptual equivalents.
- 4 Individuals may well mourn past losses or regret past decisions – but unless that changes their estimation of future events or their anxiety about the future, insecurity is unaffected.
- 5 The literature on risk aversion, prudence and uncertainty is immense. Recent relevant contributions include Eeckhoudt et al, 2009 and Liu and Meyer, 2012.
- 6 Van Langendonck (2007) surveys 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 United States (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.]
- 7 Public programs which are framed around a particular hazard inevitably also affect issues correlated with that hazards – e.g. since, as Guvenen et al (2015) and many others have noted, the probability of negative earnings shocks is higher for lower lifetime income workers, unemployment insurance is ex ante lifetime income redistributive. Unemployment insurance also often redistributes between regions of a country. Hence, the motivations of governments in implementing such programs are also mixed.
- 8 Appendix Table A1 reports the corresponding numbers. Note that Table A1 and Figure 1 do not include debt servicing charge as part of government expenditure.
- 9 Bonoli defines economic security as: “the degree to which individuals are protected against the risk of finding themselves without an income or with an income that is not sufficient to guarantee them a dignified standard of living” (2003:1009). More formally he sees it as the probability of not being poor and emphasizes that he refers only to money income flows, not including in-kind services like health care or education.
- 10 If Dynan’s (1993:1105) conclusion (“the data suggest that precautionary saving is an unimportant part of consumer behavior”) is correct, this cost may be quite small.
- 11 Of course, incurring these costs in no way implies that OECD nations have attained the “socially optimal” level of economic insecurity. Given that [1] reducing economic insecurity has costs, [2] that complete insurance against future losses would create incentive and moral hazard problems, and [3] that public

-
- preferences for security probably differ across countries, the socially optimal level of economic insecurity is: i) highly unlikely to be zero; and ii) probably differs across nations. Nevertheless, within any given country, an important question for public policy is how to obtain most efficiently the socially desired average level of economic security.
- 12 Osberg and Sharpe (2014) have argued that economic insecurity is now greatest in the poor nations which lack the widespread private and public insurance mechanisms available in rich countries and which are still exposed to hazards, such as famines, which affluent societies have long forgotten.
- 13 See Guvenen et al (2015, page 43). As well, earnings shocks change over the life cycle, vary hugely with the earnings levels of individuals and are quite asymmetric.
- 14 Suppose, for example, that an individual experiencing unemployment had prior year earnings of Y ; in the year when unemployment occurred, he or she had earnings of Y_u and received unemployment benefits of B . Hacker et al. measure the decline in net income ($= Y - (Y_u + B)$) and consider a person insecure if $(Y - (Y_u + B))/Y > 0.25$, which means that only the total of Y_u and B matters. The approach suggested in Section 5 is based on the idea that the hazard of unemployment produced a market income loss of $(Y - Y_u)$, and that the degree of protection of individuals should be decomposed into the probability of loss (i.e. Prob (unemployment)) and the expected share of market income loss that is replaced by unemployment benefits, i.e. $E[B/(Y - Y_u)]$.
- 15 Because it is based on the criterion of a 25% annual income loss, long duration events which stretch over the year-end mean that the ESI's annual accounting period arguably implies understatement of the incidence of economic insecurity. To see this, imagine two individuals (Bob and Jim), who both have the same constant monthly rate of pay and who both experience the loss of 5 months of income during the calendar years 2011 to 2013. If Bob loses his income from 1 July 2012 until 30 November 2012, his 2012 income is 5/12 lower than his 2011 income, and his 2013 income is back to the 2011 level: the ESI counts Bob as experiencing a significant (greater than 25%) income loss during 2012. By contrast, if Jim loses his income from 15 October 2012 until 15 March 2013, his 2012 income is only 21% ($= 2.5/12$) below his 2011 income and his 2013 income is the same as his 2012 income: in this case, Jim does not get counted as experiencing a year-to-year income loss of more than 25% – but his only difference from Bob is in the timing of the job and income loss. The same issue arises for any hazard that lasts for some time (such as medical out-of-pocket spending or earnings losses associated with an ailment which spreads over a year-end). The problem of annual accounting period end-points may not affect the annual rate of change in economic insecurity very much, but estimates of levels of insecurity will be under-estimated to a degree which varies over time and across groups, depending on the frequency distribution and seasonality of durations.
- 16 Debt servicing costs for households with negative net worth are deducted as well. If health care reform in the United States is successful, presumably the health care cost element in the calculation of the ESI will diminish in importance over time.
- 17 “Liquid financial wealth” is defined as all wealth holdings besides the primary home, personal vehicles, and earmarked retirement savings. “Sufficient” is defined as equal to, or greater than, the cumulative loss for the median individual with their socio-demographic characteristics who also experienced such a loss. In principle, one might worry that the frequency of insecurity might be sensitive to this definition of ‘sufficiency’, but since few US households have more than minimal liquid financial wealth, in practice this probably does not matter much.
- 18 Similarly, Hacker et al. (2010) state that excluding families experiencing losses in equivalent income stemming from changes in family size does not affect the level or trend of the ESI.
- 19 A birth or marriage or other demographic change which increases household size will, if money income remains constant, cause the equivalent income of all household members to fall. Conversely, if household size declines, implying fewer people have to share a given income, equivalent income will rise. The ESI uses the Citro and Michael (1995) preferred equivalence scale. For a family with A adults and K children,

-
- the number of equivalent adults is $(A + PK)^\alpha$ where $P = 0.7$ and α is either 0.65 or 0.75. This implies that one additional child or adult household member, with no income of their own, would decrease equivalent income by a bit less than 25%.
- 20 They are careful to note: “Reflecting this limited scope, we refer to our results as measurements of “income volatility” or “income insecurity” rather than “economic insecurity”.”
- 21 Sologon and O'Donoghue (2014), footnote 2, gives an idea of the scope of the literature, almost all of which relies on the log-normality of transitory shocks which Guvenen et al (2015) reject.
- 22 Green et al (2000) 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.
- 23 For example, speculators may worry about the possibility of a collapsing stock market or a decline in commodity prices. In the Bossert and d'Ambrosio approach, the reasons for past changes in wealth are irrelevant, so changes in wealth caused by speculation do show up.
- 24 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 medical care and necessary social services the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control”. See also Article 11(1) of the International Covenant on Economic, Social and Cultural Rights. In the IEWB, lack of data has prevented measuring the insecurity due to the hazard of disability and the deprivation of primary commodities (“food, clothing, housing_and medical care and necessary social services”).
- 25 Osberg and Sharpe (2014) note that there is significant cross-national variation in adult male mortality even among affluent nations, implying that calculations of this hazard – i.e. widowhood – should also be included in future.
- 26 Arguably, the IEWB, by focussing on the percentage of loss as a measure of cost adopts a Bismarckian perspective for the hazards of unemployment and illness, while the emphasis on the probability of poverty in widowhood or old age is more consistent with a Beveridge perspective.
- 27 See, for example, Article 25 of the UN Universal Declaration of Human Rights.
- 28 The question used by Burgard et al, (2009) was even more specific: “How likely is it that during the next couple of years you will involuntarily lose your main job? – not at all likely, not too likely, somewhat likely, or very likely?” Like much of the literature, Laszlo et al. (2010) examine the impacts of job insecurity on individual health and job performance, concluding that, in line with the meta-analysis of Sverke, Hellgren and Näswall (2002), “job insecurity has detrimental consequences for employees' job attitudes, organizational attitudes, health, and, to some extent, their behavioural relationship with the organization”.
- 29 The category “food” aggregates over all nutrients, and adequate nutrition requires both sufficient caloric intake and other necessary proteins and minerals. Maxwell (2001) noted that “food security” has at least 32 distinct definitions in the published literature, which is more than “job security”.
- 30 Regrettably, this is often done without any accompanying explicit definition; see, for example, Gustman et al. (2010); or Poterba et al. (2011).
- 31 Economic anxiety may generalize – e.g. individuals who are told that their factory might soon close may worry first about future unemployment, before starting also to worry about their health insurance and their

-
- pension benefits. A single event may have multiple adverse impacts and may also heighten subjective awareness of, and sensitivity to, risks.
- 32 Although the voluntary or involuntary nature of, for example, unemployment or unreimbursed medical expenses is sometimes contested, it is more plausible to see these as specific constraints rather than to assume that no income or wealth changes arise from choices.
- 33 Some measurement activities by governments (e.g. rainfall measurement) can help some individuals (e.g. farmers) in decision-making about their personal economic and social affairs. But although national indices of economic insecurity can help in the formation of public policy they are unlikely to assist individuals in their private personal decisions – nobody is exactly “average” and each individual already knows their personal individual circumstances far more accurately than is possible for any statistical agency.
- 34 With the significant addition of widowhood, this list reflects the insecurities mentioned by Bismark (1994) more than sixty years before (see Box 1). Bismark also noted that having in place “the usual provisions for the poor” was not enough to prevent economic insecurity. As societies change and evolve, one can expect new sets of social expectations to emerge and be codified into law – e.g. the French social security system has today a separate pillar for long-term care of the frail elderly – so human rights documents of 1948 vintage should be seen as the starting point of the discussion, not the end.
- 35 One can note that “unemployment, illness and old age” were identified by the Stiglitz-Sen-Fitoussi report. This paper adds ‘disability’ and ‘widowhood’ to the list of specific hazards which create economic insecurity.
- 36 This discussion is often formalised, in standard welfare economics, by expressing the Social Welfare Function as dependent on both the mean and higher moments of the distribution of the variable of interest (in this case, insecurity), as in $SWF = f(\mu, \sigma)$ where μ = mean insecurity, and σ = inequality of insecurity and $\partial(SWF)/\partial\sigma \neq 0$. Group identity may also matter. If, for example, the gendered nature of disadvantage matters, then one would write: $SWF = f(\mu_f, \sigma_f, \mu_m, \sigma_m)$ where subscripts m and f denote male and female persons respectively. For the measurement of economic insecurity, the crucial point is that measurement cannot inform a group dependent evaluation of outcomes unless measures are calculated at this level – i.e. aggregated from micro-data observations.
- 37 Monetary policy, for example, influences the level of aggregate demand and thereby helps to establish the risk of unemployment for all citizens, while social policy on income supports and unemployment benefits help determine the personal costs of job loss for those who become unemployed.
- 38 One can take an analogy from the hazard of death or injury in a traffic accident. All societies make choices about legal environment, law enforcement and the standards (if any) established for road construction and automobile manufacture. These social choices affect the accident rate, both directly and as individuals then chose how fast and how carefully to drive. Knowing that the driving behaviour of individuals is somewhat endogenous (e.g. people probably drive faster on better roads), societies still have to decide what the speed limits on highways and the laws surrounding drunk driving are going to be. Although any society could reduce the traffic accident hazard to zero, by enforcing a speed limit of zero, none have done so and most countries also do not accept the level of risk implied by unconstrained speed. The fatality and injury rates in car accidents are thus an example of an index which can be a useful input into social decisions – even if this index is known to be partially endogenous to personal decisions.
- 39 For example, Watson (2014) estimates the impact of greater individual economic insecurity on the probability that individuals will gain weight, using “differences-in-differences” techniques with panel micro data from Canada’s National Population Health Survey, before and after Canada’s 1996 changes to unemployment insurance.
- 40 For example, Rohde et al. (2014) use local average unemployment risk exposure in their analysis, using Australia’s HILDA panel data of the implications of economic insecurity for mental health.

-
- 41 See endnote 14 for an example of why events overlapping the accounting year end may matter. The issue of time periods also affects econometric analysis of the implications of economic insecurity. If economic insecurity is an issue of forward-looking expectations, and if we are considering, for example, insecurity about unemployment, then the *ex-ante* probability of unemployment is relevant for the degree of insecurity about unemployment felt by each person. *Ex post*, we observe that some people were unemployed and some were not – but everyone at risk of unemployment had some reason, *ex ante*, to feel somewhat insecure, even if the luck of the draw determined which particular individuals actually became unemployed. If very fine-grained (e.g. weekly) data were available, researchers could then estimate the expected probability of each hazard at each point in time as dependent only on prior periods' data (e.g. the probability of unemployment in period *t* would be estimated as a function of period *t-1* unemployment, age, sex, education, occupation, etc.). An “expectation of downside risk” perspective and fine grained data would imply that one would not use contemporaneous experience of a hazard (e.g. unemployment, or income loss) in period ‘*t*’ as part of a measure of economic insecurity in the same period, because expectations of events cannot be driven by simultaneous realizations of those events. However, researchers typically only have panel data that use annual accounting periods and cannot distinguish the order of events within years. As well, using only ‘*t-1*’ and earlier period data in estimation of period ‘*t*’ insecurity can limit substantially sample size and explained variance.
- 42 Measurement of a stock (such as wealth) requires specification of the point in time at which the stock is to be assessed. Comparing stocks over time then requires some specification of a price index.
- 43 Similarly, in real life individuals may form their expectations about public pensions in their retirement years by estimating both the benefit formula currently available to them and whether or not current public debates in their jurisdiction are leaning toward future expansion or contraction of public pension benefits. Although researchers on economic insecurity can estimate the current pension entitlements of individuals according to existing regulations, they do not have a reliable way of predicting individuals’ estimations of the political likelihood of future pension entitlement reforms.
- 44 In the poverty literature, the standard axioms are: i) Focus, i.e. the poverty index should be independent of the conditions among non- poor population; ii) Weak Monotonicity, i.e. a reduction in a poor person's income, holding other incomes constant, must increase the poverty index; iii) Impartiality, i.e. the poverty index may be defined over ordered income profiles without loss of generality; iv) Weak Transfer, i.e. an increase in the poverty index should occur if the poorer of the two individuals involved in an upward transfer of income is poor and if the set of the poor people does not change; v) Strong Upward Transfer, i.e. an increase in the poverty index should occur if the poorer of the two individuals involved in an upward transfer of income is poor; vi) Continuity, i.e. the poverty index must vary continuously with incomes; vii) Replication Invariance, i.e. the poverty index does not change if it is computed based on an income distribution that is generated by the *k*-fold replication of an original income distribution (see Osberg and Xu, 2008).
- 45 The Focus Axiom only makes sense in the context of poverty measurement, and can be questioned even there. Replication and Continuity are often justified as being just “technical” – although continuity rules out qualitative, dichotomous changes in individual well-being and therefore has real, and objectionable, content. Since it is not clear that all types of insecurity can be transferred from individual to individual in the same way that income or wealth can be, Transfer Sensitivity is problematic.
- 46 Precautionary savings in excess of predictable life cycle needs should in principle be counted as reducing insecurity during working years, since the purchasing power that such savings embodies is the legal entitlement of the saver (but see Dynan (1993:1105)). Life cycle savings reduce insecurity about old age. However, in Canada and the United States, only a small fraction of the population have enough non-pension, non-housing net financial worth to meet predictable life cycle needs, so the fraction who have significant excess precautionary balances would be smaller still.
- 47 The expected value of loss is thus a considerably simpler concept to communicate than concepts like the coefficient of relative prudence (see Eeckhoudt et al., 2009).

- 48 Within OECD nations, there are a range of employment related risks shaping economic insecurity (e.g. in-work poverty, work contracts that do not provide access to social benefits) beyond unemployment. Where to draw the line in identifying such risks is a judgement call, and no internationally agreed document like the UN Universal Declaration of Human Rights provides guidance. While this paper focusses on OECD countries, in poorer developing countries most people depend either on farming their own land or on working in the informal sector of petty trading and self-employment. In these countries there is often no social welfare or unemployment insurance system to support the jobless. In this context, Osberg (2014) suggests that a plausible index of risk of loss of livelihood might be a population weighted average of the risks of loss of livelihood associated with agricultural and non-agricultural employment.
- 49 OECD indicators on Tax and Benefit Systems are available at <http://www.oecd.org/social/benefits-and-wages.htm>
- 50 The disadvantage of this approach is that only the immediate wage loss cost of unemployment is captured. Current unemployment also has psychic costs and can lead to long-term unemployment and permanent wage declines. Both are strong reasons why, in survey data, the negative impact of unemployment on self-reported happiness is much greater than the offsetting impact of unemployment insurance. The Index of Economic Well-Being therefore uses a compound index of unemployment hazard which weights a sub-index of the prevalence of unemployment more heavily than a sub-index of the availability of unemployment benefits. In their work, Berloff and Medina propose a similar weighted index approach which incorporates an *inactive/unemployed dependency rate (IUDR)*. An index approach has the disadvantages that country rankings can be sensitive to the set of countries included and that it requires an arbitrary weighting of sub-indices.
- 51 For example, 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. This section does not propose that total medical costs for each household be estimated since in several countries individual households have no way of knowing how much their insured medical expenses actually are.
- 52 Under fairly general conditions, unreimbursed medical expenses can be assumed to be proportionate to unreimbursed medically necessary medical expenses, expressed as a fraction of disposable income. See Osberg (2009), Appendix 1, which also discusses the risk of medical bankruptcy.
- 53 Food and shelter costs vary with household size, hence calculating discretionary income in this way implicitly accounts for household size. Although both food and housing also include a ‘discretionary’ element, observed food costs can be adjusted for the percentage of meals consumed in restaurants to get an approximation of “necessary” food costs. Other ‘necessary consumption’ items are much smaller percentages of total spending. However, since this modified net income concept requires surveys that measure both income and expenditure and may therefore be difficult to implement, a “second best” alternative is to focus first on net disposable income (i.e. after tax).
- 54 Define, for the h^{th} household, X_h = vector of household characteristics; Y_h = household income after tax and after food and housing expenditures; M_h = MOOP expenditures; ϵ = random variation. Using micro-data one can estimate: $M_h / Y_h = X_h \beta + \epsilon$ and then impute to all households $E(M_h / Y_h) = E(X_h \beta + \epsilon) = X_h \beta$, where β are the estimated coefficients.
- 55 Averaging expenditure ratios across households keeps the aggregate index person-weighted – which will not be quite the same as the expenditure weighted methodology (used in the IEWB) of taking the ratio of aggregate MOOP expenditure to total income after tax, food and housing.
- 56 In principle, one would calculate a discounted present value. However, including the discount factor would, at current interest rates, make very little difference, so this term is ignored. Household earnings while a household member is ill would include both any sick pay received by the sick person and any sacrifice in earnings of household care-givers.

- 57 Administrative records (e.g. for unemployment or pension benefits) are often monthly, but usually lack any data on health. Some Labour Force Surveys (e.g. Canada or the United States) use a six month rotation panel design, and do record hours of work and monthly earnings, which might capture short duration spells and the inception of longer spells. As Engel and Schaffner (2012) note, in EU-SILC both monthly labour force activity and annual income are recorded, and researchers must impute monthly incomes.
- 58 Since consumer finance survey and labour force survey data sets may not share exactly the same list of variables on individuals and households, one has to define, for each adult in the h^{th} household in the reference survey, a common vector (X'_h) of variables found in both the consumer finance survey and the labour force survey of the characteristics of each individual adult in household h . Denote annual earnings of each adult as Y and define a dummy variable P_s [if healthy $P_s = 0$ and if sick $P_s = 1$]. Call P^* the individual probability for each adult, conditional on personal characteristics, of ill health sufficient to lose work time – i.e. ($P^* = E(P_s \mid X'_h)$). The simplest way to estimate the impact of ill health is then to estimate $\ln(Y) = X'_h \alpha + a P_s + \epsilon$ where the coefficient a is the percentage difference in individual earnings associated with ill health. This implies a dollar loss, if sick, of $\Delta Y = a(\exp(X'_h \alpha))$. For any individual we call L^* the expected value of the earnings loss due to illness ($L^* = P^* \Delta Y$). A similar procedure gives the change in transfer payments received ($T^* = P^* \Delta T$) – from which one calculates net income change ($L^* - T^*$) and then adds up over all adults within a household h to get $\Sigma(L^* - T^*)$ and imputes to all households $E((\Sigma(L^* - T^*) + M_h) / Y_h)$. Note that adding a random draw from the distribution of ϵ will preserve the unexplained dispersion around the conditional expectation of L^* .
- 59 The key word here is “relatively”. The job search criterion of unemployment is, for example, sensitive to the questions about specific job search methods asked in national surveys and to the evolution over time of job search methods (e.g. through internet search) as well as to local labour market conditions (e.g. isolated one-industry towns versus large metropolitan labour markets).
- 60 In 2005, fairly similar percentages of adults received disability benefits in Hungary (12.6%) and Norway (10.0%).
- 61 Parts 5d and 5e of this section refer to measures of “poverty”. When income poverty is the issue, the most commonly used poverty line criterion in international debates is one half the median equivalent disposable household income (i.e. after taxes and transfers, adjusted for household size). Poverty is also defined within the European Union as the proportion of households below 60% of median equivalent income. Either definition can be used in the discussions which follow.
- 62 The statistical distinction between ‘family’ and ‘household’ hinges on whether co-resident individuals are related by blood, marriage or adoption but the key behavioural issue is whether income is pooled for consumption – hence this paper uses the terms interchangeably.
- 63 In OECD countries, on average, men comprise only 15.5% of the single parent population (with a high of 22.5% in the United States and a low of 6.9% in Lithuania), and have substantially smaller increases in poverty probability following separation.
- 64 Incarceration is also an important cause of family breakup in the United States, particularly for African-Americans.
- 65 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 private and social benefits, we do not attempt to model these issues. Our focus is a more limited financial one.
- 66 One can define each household member’s current equivalent income as Y , future expected equivalent income in the event of divorce, separation or widowhood as Y' , the poverty line as Z , the margin between Y' and the poverty line as $M = Y' - Z$ and the size of a future income loss as $L = Y - Y'$. [Note that Y' embodies any changes in transfer payments or earnings driven the husband’s exit.] One can then decompose the cumulative density of the frequency distribution of future income losses [$f(L)$] into the

- density of probability of loss that is less than the individual's margin with respect to poverty [$f_1(L \mid L < M)$] and the density of the probability of loss such that the loss will push the individual into poverty [$f_2(L \mid L \geq M)$]. The operator Δ denotes the change in such probabilities associated with male death or divorce, which in total can be formalized as: $\{\Delta f_1(L \mid L < M) + \Delta f_2(L \mid L \geq M)\}$. Section 5.4 discusses whether economic security in the event of 'widowhood' should be seen as depending only on transitions to poverty (i.e. $\Delta f_2(L \mid L \geq M)$) or whether to also consider $\Delta f_1(L \mid L < M)$.
- 67 The Index of Economic Well-Being (IEWB) now follows this general approach, although it currently omits consideration of the risk of adult male mortality.
- 68 In Canada, for example, among households with a head aged 65-74, median total household financial wealth of \$66,000 ($\approx 44,000$ €) in 2005 was equal to less than a year and a half of average industrial earnings. Arguably, this pattern of wealth holdings in retirement is about as much private savings for retirement as one can hope for – Canadians have known for nearly 50 years that public pensions will not replace much of their working life earnings. See MacDonald and Osberg (2014).
- 69 Where z = poverty line and y_h = household disposable equivalent income per person, poverty is defined to occur when $y_h < z$. Define the poverty gap ratio G_h for household h as $G_h = (z - y_h)/z$ when $y_h < z$ and $G_h = 0$ when $y_h \geq z$. When N_p is the number of poor people and N is the population size, the poverty rate for the elderly is $R = N_p / N$ and the average poverty gap ratio of the poor is $G^* = \sum_N G_h / N_p$. Hence the summary index is $R^*(G^*)$ – see Osberg and Xu (2008) for further discussion.
- 70 Elderly households currently experience poverty gaps with a likelihood that can be explained statistically, for an elderly household with a vector of characteristics X_h , by a regression such as $G_h = X_h * \beta + \varepsilon$, where ε is a random error term. The insecurity about old age poverty now experienced by individual non-elderly households can be modelled as $E(X_h * \beta)$ where E is the expectations operator.
- 71 At a national level, the Index of Economic Well-Being (IEWB) of Osberg and Sharpe (2005) has reported this index of elderly poverty – the underlying aggregate data are available at www.csls.ca.
- 72 See, for example, Baldwin (2009), Liu, Ostrovsky and Zhou (2013) or the US Social Security Administration (2008).
- 73 Define a_h = adequate income for a given retiree (by assumption $a_h = 0.7 * Y_{lh}$ where Y_{lh} is a measure of income while employed). If a_h is the income adequacy line and y_{rh} = retirement pension income, inadequacy is defined to occur when $y_{rh} < a_h$. Define the living standards gap ratio A_h for household h as $A_h = (a_h - y_{rh})/a_h$ when $y_{rh} < a_h$ and $A_h = 0$ when $y_{rh} \geq a_h$. When N_a is the number of elderly people with inadequate income to maintain living standards (i.e. $y_{rh} < a_h$) and N is the number of elderly, the adequacy rate for the elderly is $R_A = N_a / N$ and the average living standards gap ratio is $A^* = \sum_N A_h / N_a$. Hence the summary index is $R_A^*(A^*)$.
- 74 Workers are assumed to enter the labour market at age 20 and work full-time until the standard pension-eligibility age, earning the same percentage of average worker earnings in every year of the working life. Price inflation is set at 2.5% per year and real earnings growth at 2% per year, which implies nominal wage growth of 4.55%. Since individuals retain always their relative position in a stable earnings distribution, in which all incomes grow steadily at the same rate, there is no labour market insecurity – i.e. this assumes away the pension consequences of unstable work histories or of losing a good job with pension rights in middle age, followed, with delay, by a lower paying substitute, with/without pension rights. Panel data is needed if these long run effects of labour market dynamics are to be estimated.
- 75 McDonald and Osberg (2014), using the LifePaths micro-simulation model of Statistics Canada, found a very wide variation in the forecast retirement living standards of “Baby Boom” Canadians whose conventionally defined replacement rate fell in the 65-75% range – even without considering the value of any in-kind public services received.

- 76 Australia is a notable exception.
- 77 Response categories were: 1. None or almost none of the time; 2. Some of the time; 3. Most of the time; 4. All or almost all of the time.
- 78 ESS is about the only one that asks about a specific source of anxiety. In addition, ESS 2008 asked for beliefs about likely future events that would plausibly produce anxiety – but never directly asked whether the respondent was anxious: (“Please tell me how likely it is that during the next 12 months you will be unemployed and looking for work for at least four consecutive weeks?”; “And during the next 12 months how likely is it that there will be some periods when you don't have enough money to cover your household necessities?”; “And during the next 12 months how likely is it that you will not receive the health care you really need if you become ill?”).
- 79 Happiness or misery within the same household may be contagious, which implies that the life-satisfaction or happiness of one partner may be a good predictor of the other's, and that household subjective well-being can be imputed from individual respondent data. However, it can be observed that marital partners sometimes specialize in anxious/carefree roles – as in: “Oh, I never worry about getting to the airport in time for the flight – my husband takes care of that”. The empirical question is whether anxiety about downside economic risks (such as health care expenses or unemployment) are correlated or not among members of the same households.

REFERENCES

- Baldwin B (2009), “Research Study on the Canadian Retirement Income System: Final Report”, Prepared for the Ministry of Finance, Government of Ontario.
- Barr N. (1992), “Economic theory and the welfare state: a survey and interpretation”, *Journal of Economic Literature*, 30 (2), pp. 741-803. ISSN 0022-0515.
- Berloffo, G. and Modena, F. (2014), Measuring (In)Security in the Event of Unemployment: Are We Forgetting Someone?. *Review of Income and Wealth*, 60: S77–S97. doi: 10.1111/roiw.12062.
- Bonoli G. (2003), *Social Policy through Labor Markets - Understanding National Differences in the Provision of Economic Security to Wage Earners*, *Comparative Political Studies*, November, Vol. 36, No. 9, pp. 1007-1030, doi: 10.1177/0010414003257099.
- Bossert W. and C. D'Ambrosio (2009), “Measuring Economic Insecurity”, Working Paper, April 14.
- Bossert W. and C. D'Ambrosio (2013), “Measuring Economic Insecurity”, *International Economic Review*, Vol. 54/3, pp. 1017-1030, August.
- Bryceson D. (1990), *Food Insecurity and the Social Division of Labour*, MacMillan Press, Basingstoke.
- Burgard, S., J. Brand and J. House (2009) “Perceived job insecurity and worker health in the United States” *Social Science & Medicine* 69 (2009), pp. 777-785.
- Catalano, R. (1991), “The health effects of economic insecurity”, *American Journal of Public Health*, 81, pp. 1148-52.
- Chetty R., N. Hendren, P. Kline, E. Saez and N. Turner (2014), “Is the United States Still a Land of Opportunity? Recent Trends in Intergenerational Mobility”, NBER Working Paper No. w19844.
- Clark T. and M. Taylor (2014), “Insecure Britain: poll shines light on nation's economic anxiety”, *The Guardian*, Tuesday 17 June, <http://www.theguardian.com/society/2014/jun/16/insecure-britain-poll-economic-recovery-immigration>.
- Disability Rights Commission (2010), “Learning lessons: Defining, representing and measuring disability”, <http://disability-studies.leeds.ac.uk/files/library/DRC-Learning-lessons-defining-measuring-and-classifying-disability.pdf>.
- Dominitz, J. and C. F. Manski (1997) Perceptions of Economic Insecurity: Evidence From the Survey of Economic Expectations *The Public Opinion Quarterly*, Vol. 61, No. 2.
- Dynan, K. E. (1993), “How Prudent are Consumers?”, *Journal of Political Economy*, Vol. 101, No. 6, December, pp. 1104-1113.
- Eeckhoudt, L., J. Etner and F. Schroyen (2009) “The values of relative risk aversion and prudence: A context-free interpretation”, *Mathematical Social Sciences*, Vol. 58, Issue 1, July 2009, pp. 1-7.

- Elliott L. (2014), “After the recession: welcome to Britain in the age of insecurity”, *The Guardian*, Monday 16 June, <http://www.theguardian.com/society/2014/jun/16/after-recession-britain-insecurity-food-banks-poverty-prosperity>.
- Engel M. and S. Schaffner (2012), “How to Use the EU-SILC Panel to Analyse Monthly and Hourly Wages”, *Ruhr Economic Papers* #390, http://www.rwi-essen.de/media/content/pages/publikationen/ruhr-economic-papers/REP_12_390.pdf.
- Espinosa, J., Friedman, J. and Yevenes, C. (2014), “Adverse Shocks and Economic Insecurity: Evidence from Chile and Mexico”, *Review of Income and Wealth*, 60: S141–S158. doi: 10.1111/roiw.12052.
- Green, F., A. Felstead and B. Burchell (2000), “Job Insecurity and the Difficulty of Regaining Employment”, *Oxford Bulletin of Economics and Statistics*, Vol. 62, Special Issue, pp. 855-883.
- Greenhalgh L. and Z. Rosenblatt (1984), “Job Insecurity: Toward Conceptual Clarity”, *The Academy of Management Review*, Vol. 9, No. 3, pp. 438-448, July.
- Guha-Khasnobis B., S. Acharya and B. Davis, eds. (2007), *Food Insecurity, Vulnerability and Human Rights Failure*, Palgrave-MacMillan in association with United Nations University – World Institute for Development Economics Research.
- Gustman A. L., T. L. Steinmeier and N. Tabatabai (2010), “What the Stock Market Decline Means for the Financial Security and Retirement Choices of the Near-Retirement Population”, *Journal of Economic Perspectives*, Vol. 24, Number 1, Winter, pp. 161-182.
- Guvenen, F., F. Karahan, S. Ozkan and J. Song (2015), “What Do Data on Millions of U.S. Workers Reveal about Life-Cycle Earnings Risk?”. NBER Working Paper No. 20913, January.
- Hacker J. (2008), *The Great Risk Shift: The New Economic Insecurity and the Decline of the American Dream*, rev. and exp. ed., New York: Oxford University Press.
- Hacker J.S., G.A. Huber, P. Rehm, M. Schlesinger and R. Valletta (2010), “Economic Security at Risk”, The Rockefeller Foundation.
- ILO (2004), *Economic Security for a Better World*, International Labour Organization, Geneva.
- Jacobs E. (2007) *The Politics of Economic Insecurity*, The Brookings Institution: Issues in Governance Studies, 12, 1{13.
- Hogan M.L J., T. Chiricos and M. Gertz (2005), “Economic Insecurity, Blame, and Punitive Attitudes”, *Justice Quarterly*, 22:3, pp. 392-412.
- Huber G., P. Rehm, M. Schlesinger, and R. Valletta (2010), *Economic Security at Risk: Findings from the Economic Security Index*, <http://www.economicsecurityindex.org/>.
- Huber G., A. Nichols, P. Rehm, and S. Craig (2011), *The Technical Appendix for the Economic Insecurity and the Great Recession*.
- Kahneman D. (2011), *Thinking, Fast and Slow*, Farrar, Straus and Giroux.

- Killingsworth, M. (1983) *Labor Supply* Cambridge Surveys of Economic Literature, Cambridge University Press, 1983.
- Korpi W. and J. Palme (1998), "The Paradox of Redistribution and Strategies of Equality: Welfare State Institutions, Inequality, and Poverty in the Western Countries", *American Sociological Review*, Vol. 63, No. 5, October, pp. 661-687.
- László K.D. et al. (2010), "Job insecurity and health: a study of 16 European countries", *Social Science & Medicine*, March, 70(6), pp. 867-74, Epub Jan 8.
- Leamer E. (2007), "Housing IS The Business Cycle", National Bureau Of Economic Research, Working Paper 13428, September, <http://www.nber.org/papers/w13428>.
- Leggett, J. (1964), "Economic Insecurity and Working Class Consciousness", *American Sociological Review*, 29, April, pp. 226-234.
- Liu, L. and J. Meyer (2012), "Decreasing absolute risk aversion, prudence and increased downside risk aversion", *Journal of Risk and Uncertainty*, Vol. 44, pp. 243-260.
- Macdonald B.J. and L. Osberg (2014), "Canadian Retirement Incomes: How Much do Financial Market Returns Matter?", *Canadian Public Policy*, Vol. 40, Issue 4, pp. 315-335, December.
- Maxwell S. (2001), "The Evolution of Thinking about Food Security", in S. Devereux and S. Maxwell, eds., *Food Security in Sub-Saharan Africa*, pp. 13-31, University of Natal Press, Institute of Development Studies.
- Minsky, Hyman P. and C. J. Whalen (1997), "Economic Insecurity and the Institutional Prerequisites for Successful Capitalism", *Journal of Post Keynesian Economics*, Vol. 19(2), January, pp.155-170.
- OECD (2014), "How Good is your Job?", *OECD Employment Outlook 2014*, OECD Publishing, http://dx.doi.org/10.1787/empl_outlook-2014-en
- Offer A., R. Pechey and S. Ulijaszek (2010), "Obesity under affluence varies by welfare regimes: The effect of fast food, insecurity, and inequality", *Economics and Human Biology*, 8, pp. 297-308.
- Osberg, L. (1998) "*Economic Insecurity*," SPRC Discussion Paper No. 88, Social Policy Research Centre, University of New South Wales, Sydney, Australia, October 1998.
- Osberg, L. (2009) "Measuring Economic Security in Insecure Times: New Perspectives, New Events, and the Index of Economic Well-being", CSLS Research Report 2009-12 Centre for the Study of Living Standards, Ottawa.
- Osberg L. and K. Xu (2008), "How Should We Measure Poverty in a Changing World? Methodological Issues and Chinese Case Study", *Review of Development Economics*, 12(2), pp. 419-441.
- Osberg, L. and Sharpe, A. (2014), "Measuring Economic Insecurity in Rich and Poor Nations", *Review of Income and Wealth*, 60: S53-S76. doi: 10.1111/roiw.12114.
- Ostrovsky Y. and G. Schellenberg (2009), "Pension Coverage, Retirement Status, and Earnings Replacement Rates Among a Cohort of Canadian Seniors", *Statistics Canada Analytical Studies Branch Research Paper Series*, December, Ottawa.

- Palmer M and D. Harley (2011), “Models and measurement in disability: an international review”, *Health Policy and Planning*, first published online 4 July, 2011, doi:10.1093/heapol/czr047.
- Poterba J. M., S. F. Venti, D. A. Wise (2011), “Demographic Trends, Housing Equity, and the Financial Security of Future Retirees”, in John B. Shoven, ed., *Demography and the Economy*, pp. 227-287, National Bureau of Economic Research, University of Chicago Press.
- Rehm P. and M. Schlesinger (2010), *Standing on Shaky Ground: Americans’ Experiences with Economic Insecurity*, <http://www.economicsecurityindex.org>.
- Rehm P. and M. Schlesinger (2013), “The Insecure American: Economic Experiences and Policy Attitudes amid the Great Recession”, *Perspectives on Politics*, March.
- Rohde N., K. K. Tang, and D.S. Prasada Rao (2014), “Distributional Characteristics of Income Insecurity in the US, Germany and Britain”, *Review of Income and Wealth*.
- Ruggles P. (1991), “Short and Long-Term Poverty in the United States: Measuring the American ‘Underclass’”, in L. Osberg ed., *Economic Inequality and Poverty: International Perspectives*, pp. 134-156, M.E. Sharpe.
- Scheve, K. and M. J. Slaughter (2004), “Economic Insecurity and the Globalization of Production”, *American Journal of Political Science*, Vol. 48, No. 4, October, pp. 662-674.
- Sen A. (1976), “Famines as Failures of Exchange Entitlements”, *Economic and Political Weekly*, 11, pp. 1273-1280.
- Sen A. (1981), *Poverty and Famines: An Essay on Entitlement and Deprivation*, Oxford University Press, Oxford.
- Skinner J. (2007), “Are You Sure You’re Saving Enough for Retirement?”, *Journal of Economic Perspectives*, 21(3), pp. 59-80.
- Smith T.G. (2009), “Reconciling psychology with economics: Obesity, behavioral biology, and rational overeating”, *Journal of Bioeconomics*, 11, pp. 249-282.
- Smith T.G. (2012a), “Behavioural biology and obesity”, in A. Offer, R. Pechey and S. Ulijaszek, eds., *Insecurity, Inequality, and Obesity in Affluent Societies*, Oxford University Press.
- Smith T.G., C. Stoddard and M. G. Barnes (2009), “Why the poor get fat: Weight gain and economic insecurity”, *Forum for Health Economics & Policy*, 12, Article 5.
- Smith T. G., S. Stillman and S. Craig (2013), “The U.S. Obesity Epidemic: New Evidence from the Economic Security Index”, paper prepared for presentation at the Agricultural & Applied Economics Association's Annual Meeting, August 4-6, Washington D.C.
- Smith J. (2003), “Trends and projections in income replacement during retirement”, *Journal of Labor Economics*, 21(4), pp. 755-781.
- SSA (2008), *The future of Social Security*, Social Security Administration, SSA Publication No. 05-10055, ICN 462560, Washington D.C.

- Sologon, D. M. and O'Donoghue, C. (2014), "Shaping Earnings Insecurity: Labor Market Policy and Institutional Factors", *Review of Income and Wealth*, 60: S205–S232. doi: 10.1111/roiw.12105.
- Springstead G. and A. Biggs (2008), "Alternate Measures of Replacement Rates for Social Security Benefits and Retirement Income", *Social Security Bulletin*, 68(2).
- Sologon D. M. and C. O'Donoghue (2014), "Shaping earnings insecurity: labour market policy and institutional factors", *Review of Income and Wealth*, forthcoming.
- Stiglitz J., A. Sen and J-P. Fitoussi (2009), *The Measurement of Economic Performance and Social Progress Revisited, Reflections and Overview*, <http://www.stiglitz-sen-fitoussi.fr/documents/overview-eng.pdf>.
- Sverke M. H. and J.K. Näswall (2002), "No security: A meta-analysis and review of job insecurity and its consequences", *Journal of Occupational Health Psychology*, Vol. 7(3), July, pp. 242-264. doi: 10.1037/1076-8998.7.3.242.
- Tversky A. and D. Kahneman (1992), "Advances in Prospect Theory: Cumulative Representation of Uncertainty", *Journal of Risk and Uncertainty*, 5, pp. 297-323.
- UNDESA (2008), *World Economic and Social Survey 2008: Overcoming Economic Insecurity*, United Nations Department of Economic and Social Affairs.
- Van Langendonck, J. (2007), *The Right to Social Security*, Social Europe Series Volume 12, Intersentia Press, Antwerp and Oxford.
- Venn, D. (2011), "Earnings Volatility and its Consequences for Households", *OECD Social, Employment and Migration Working Papers*, No. 125, OECD Publishing, <http://dx.doi.org/10.1787/5kg3v00zgslw-en>.
- Watson B. (2014), "Three Essays on the Health Implications of Economic Insecurity", PhD Thesis, (In progress) Dalhousie University, Halifax, Canada.
- Webb P. and A. Thorne-Lyman (2007), "Entitlement Failure from a Food Quality Perspective: The Life and Death Role of Vitamins and Minerals in Humanitarian Crises", in B. Guha-Khasnobis, S. Acharya and B. Davis, eds., *Food Insecurity, Vulnerability and Human Rights Failure*, Palgrave-MacMillan, World Institute for Development Economics Research, pp. 243-265.
- Western, B., D. Bloome, B. Sosnaud and L. Tach, (2012), "Economic Insecurity and Social Stratification", *Annual Review of Sociology*, Vol. 38, pp. 341-359.
- Wisman J. D., K. W Capehart (2010), "Creative Destruction, Economic Insecurity, Stress, and Epidemic Obesity", *The American Journal of Economics and Sociology*, Vol. 69, No. 3, pp. 936-982, July.
- Wolff E. N. (1991), "The Distribution of Household Wealth: Methodological Issues, Time Trends and Cross-Sectional Comparisons", in L. Osberg, *Economic Inequality and Poverty: International Perspectives*, pp. 60- 92, M.E. Sharpe.
- Wolff E. N. (2012), *The Asset Price Meltdown and the Wealth of the Middle Class*, New York University, August 26.

ANNEX 1

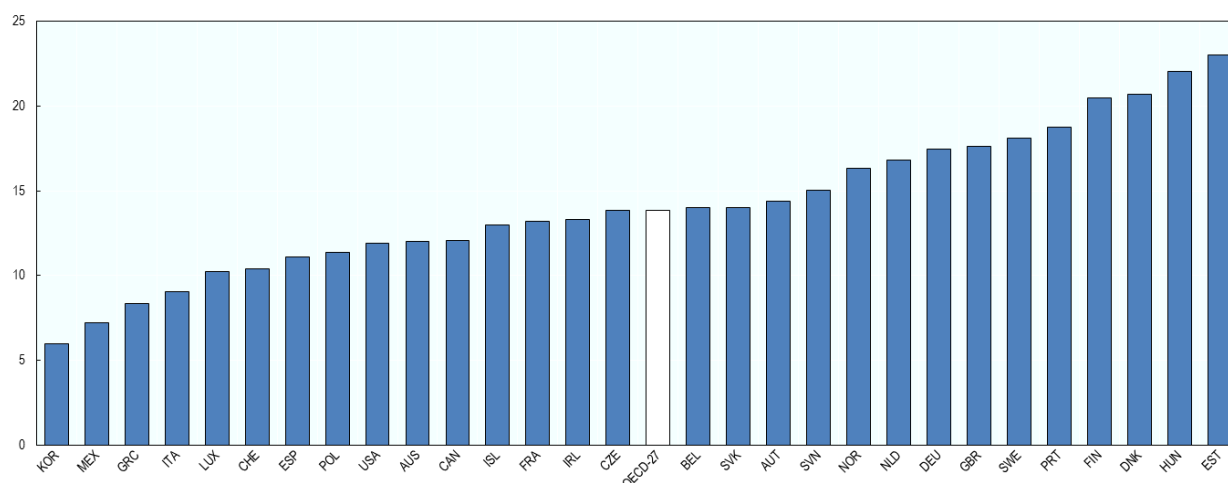
Table A.1. Social government expenditures as a share of GDP, 2009

Percentage

	TOTAL GVT EXP	OTHER GVT EXP	OLD AGE	SURVI- VORS	DISA- BILITY	HEALTH	FAMILY	UNEMP- LOYMENT	OTHER SOCIAL EXP
Mexico	22.77	15.07	1.6	0.3	0.1	2.8	1.1		
Korea	30.22	21.22	2.1	0.3	0.5	4	0.9	0.4	2.2
Chile			2.6	0.7	0.8	3.2	1.3	0.1	3
Turkey	37.37	25.17	6.2	1.4	0.3	4.2	0	0.1	0
Israel	44.62	29.42	4.3	0.7	3	4	2.2	0.4	3.2
Estonia	38.3	21.5	6.9	0.1	2.2	4.5	2.3	1.1	3
Canada	44.08	26.68	4	0.3	0.8	7.2	1.2	1	4.8
Australia	36.31	18.51	5	0.2	2.6	5.8	2.8	0.5	3.7
Iceland	47.29	29.19	2.6	0	2.8	5.6	3.5	1.7	5.7
Slovak Republic	38.33	20.23	6.4	0.9	1.9	5.6	2.1	0.7	2.7
United States	41.7	22.7	6	0.7	1.4	8	0.7	0.9	1.6
Switzerland	33.9	14.6	6.5	0.3	2.6	6.5	1.4		
Czech Republic	43.23	23.13	8.4	0.7	2	6.2	1.6	1	2.3
Poland	43.4	23.3	9	1.9	2.5	4.5	1.3	0.3	1.9
New Zealand	49.48	28.78	4.7	0.1	2.5	8.3	3.3	0.5	4.9
OECD	45.2	23.8	7.4	1.0	2.2	6.2	2.2	1.1	3.7
Norway	43.92	22.12	7.1	0.3	3.9	5.6	3.1	0.4	4.6
Ireland	48.15	25.85	4.7	1.1	2.3	5.8	3.9	2.6	5.9
Luxembourg	41.77	19.27	5.9	1.8	2.7	5.8	3.6	1.2	5.4
Hungary	49.58	26.98	9.3	1.3	2.1	4.9	3.3	0.9	4.7
United Kingdom	48.62	25.92	6.1	0.1	2.5	7.7	4	0.5	5.8
Japan	42.02	18.92	10.4	1.4	1	7.7	1.4	0.4	1.8
Netherlands	49.87	26.37	6.2	0.2	3.3	7.9	1.6	1.4	4.8
Slovenia	50.76	26.76	9.8	1.7	2.2	6.4	2.2	0.5	2.2
Portugal	49.38	24.58	11.3	1.8	2	6.3	1.2	1.2	2.7
Germany	45.3	19.8	8.6	2	2	8	2.2	1.7	3.9
Greece	51.96	26.26	12.3	2.3	1	6.6	1.4	0.7	2.6
Spain	45.15	18.35	8.9	2.3	2.6	6.8	1.4	3.5	2.9
Sweden	51.2	24	9.4	0.4	4.3	6.7	3.6	0.7	6.1
Italy	49.86	22.36	13.4	2.6	1.8	7	1.5	0.8	2.1
Austria	50.74	23.04	12	1.9	2.4	6.7	2.7	1.1	4.2
Finland	55.16	26.86	10.6	0.9	4	5.7	3.2	2	5.4
Belgium	53.35	23.95	8.3	2	2.8	8	2.9	3.7	5.2
Denmark	57.63	27.53	8.4	0	4.7	6.7	4	2.3	7.1
France	55.89	24.49	12.5	1.7	1.7	8.6	2.9	1.5	5.5

Figure A.1. Disability prevalence at working age is high in most OECD countries

Self-assessed disability prevalence, as a percentage of the population aged 20-64, late 2000s

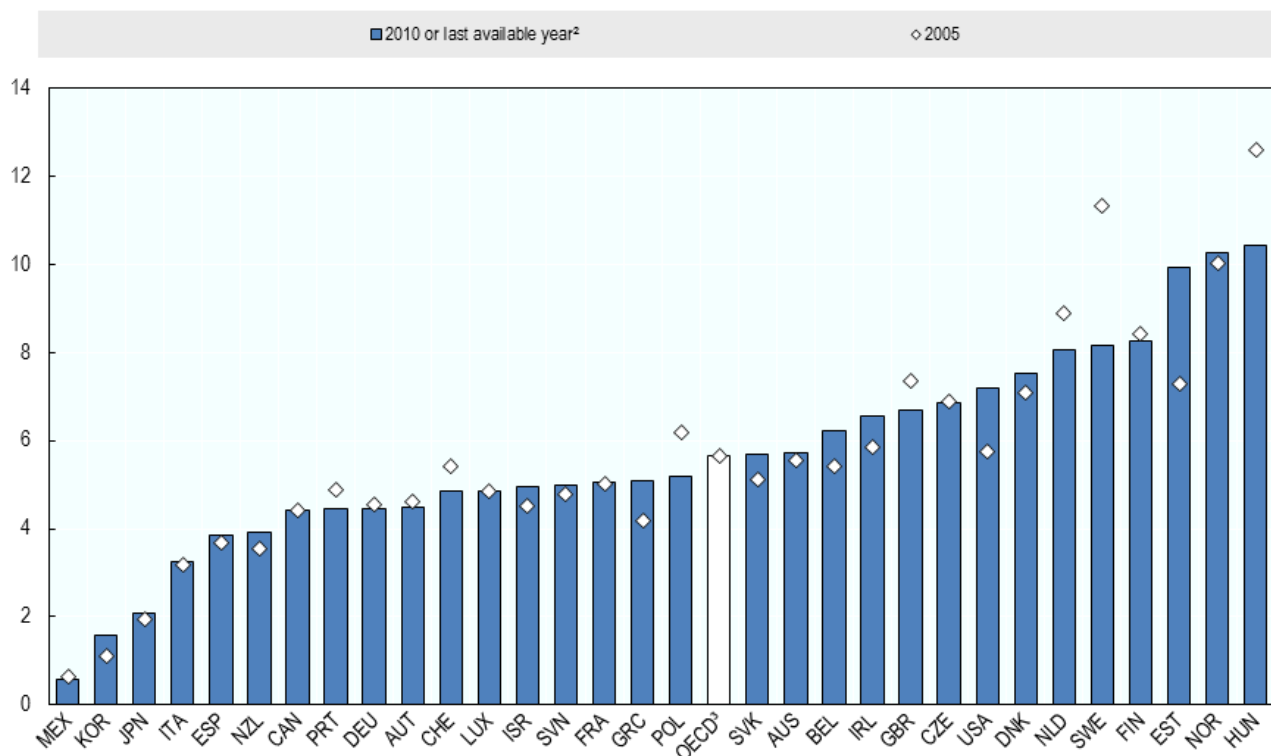


Definitions and Sources: Chronic health problem for at least six months limiting daily activities from EU-SILC (Income, Social Inclusion and Living Conditions) 2007 (wave 4), except: Australia: profound/severe or moderate/mild core activity restriction, from SDAC (Survey of Disability and Carers) 2003; Canada: persons with health and activity limitation (from mild to very severe), from PALS (Participation and Activity Limitation Survey) 2006; Denmark, Norway: persons with a long-standing health problem or disability, from LFS (Labour Force Survey) 2005; Korea: persons registered to the local government with their type of disability and level of severity as assessed by a medical doctor, from National Survey on Persons with Disabilities 2005; Mexico: permanent or temporary disability, from ENES (National Survey of Employment) 2004; Netherlands: suffering from a long-lasting complaint, illness or disability which impedes carrying out or obtaining a paid job (work disabled), from LFS 2006; Poland: persons declaring they are legally disabled, from LFS 2004; Switzerland: persons with reduced capacity due to a long-lasting health problem of more than a year, from LFS 2008; United Kingdom: persons with reduced capacity due to a long-lasting health problem of more than a year, from LFS 2006; United States: work-limiting physical or mental condition from SIPP (Survey of Income and Program Participation) 2008.

Notes: OECD-27 is an unweighted average for 27 countries. Estonia and Slovenia are not included in the OECD average.

Figure A.2. Income support for disability and sickness, late 2000s

Percentage of population aged 20-64 years old receiving disability benefits*



Notes: 1. Disability benefits include benefits received from schemes to which beneficiaries have paid contributions (contributory), programmes financed by general taxation (non-contributory) and work injury schemes.

2. The last available year is 2005 for Luxembourg; 2007 for Canada, France, Italy and Poland; 2008 for Austria, Greece, Japan, Korea and Slovenia; 2009 for Germany, Mexico, the Netherlands, Norway, New Zealand, the Slovak Republic and the United States; 2011 for Switzerland, Australia and Estonia; 2012 for the United Kingdom.

3. The OECD average excludes Chile, Iceland and Turkey.

Information on data for Israel: <http://oecdcode.org/disclaimers/israel.html>

Source: OECD Questionnaire on Disability.