



Statistical Society of Australia Inc.

Victoria Branch Newsletter: July 2005

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1) July Meeting

The next meeting of the Victorian Branch is a joint meeting with the Australian population Association and will be held at **6:00 p.m.** on Tuesday 19 July in the seminar room AR103, Graduate Research Centre, Swinburne University of Technology, Hawthorn campus. A map is available at

http://www.swin.edu.au/cwis/maps/maps_hawthorn.htm.

The meeting room is in building AR on that map. There is a similar (but better) map in the Melways (Page 581). There building AR is marked clearly as "The Graduate School of Research".

The meeting will be preceded by light refreshments at 5:30 p.m. Members and guests are invited to join the speaker for dinner at a nearby restaurant after the meeting. The speaker is

Paul Williamson
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Topic: Synthetic estimation of sub-district population microdata

Abstract:

An essential requirement for all microsimulation models is an initial set of population microdata. If processes are to be modelled at the sub-regional level these microdata must be spatially detailed. Unfortunately, confidentiality and sample size restrictions preclude

the provision of such microdata via either census or social survey. This paper considers a number of potential estimation techniques that might help to fill this gap. The performance of all approaches considered is necessarily affected by the nature of between-place difference, which is shown to be surprisingly resistant to conventional data reduction techniques. The synthetic microdata arising from the preferred approach of combinatorial optimisation are shown to have a very high degree of fit to estimation constraints, and to produce good estimates for margin-constrained distributions. In certain circumstances it is shown that these synthetically generated microdata actually offer better accuracy than real survey data (due to the adverse impacts of sampling error). They also provide better statistical estimates of unknown multi-way distributions than those obtainable using Iterative Proportional Fitting. To conclude an example is given of using synthetically estimated population microdata to estimate and forecast future domestic water demand.

2) June Meeting: Talk Summary

This meeting was held on 21 June at Swinburne University of Technology. The speaker was Alan Brown, Adjunct Professor, Swinburne University of Technology and a tired Actuary. His interesting talk titled, *“The risk of $1 + 2 + 3 + 4 - 5$ being negative, when planning for the future”* gave the author’s ideas and models he has played with for many years. Alan took the numbers in the title of his talk to be expected values. When he added variation the expected values in this model, the possibility that the total could become negative was obvious.



Alan Brown

To illustrate this he conducted a practical demonstration using the two point “double or nothing” distribution for each variable. It is pleasing to report that the volunteer who put his \$1 on the table collected $2 * \$0.20 + 0 * \$0.40 + 2 * \$0.60 + 2 * \$0.80 - 0 * \$1.00 = \0.60 . This amount was actually greater than his expected gain of \$0.50, and not less. The speaker showed how the Normal Power asymptotic expansion could be used to estimate the probability of a loss.

Using exponential utility to express his risk aversion, with $R > 0$ is the risk capital, the speaker then derived a risk adjusted value of a random variable Y as $a(Y, R) = -R \log E [- Y/R]$. He noted that the risk adjusted value is a multiple of the cumulant generating function of Y , and used a property of cumulant generating functions to prove that risk adjusted values are additive provided the random variables are independent.

In many practical situations where random variables are being summed, the variables are not independent and adjustments to the second and higher cumulants of the total are required. The speaker built a copula model for the adjustments in terms of cumulants generating function based on a known result for the second cumulant, or variance.

The last part of the talk covered the portfolio allocation problem introduced by Markowitz in 1952. This problem was re-interpreted as finding the asset mix that maximised the risk adjusted return. In this setting the problem has a unique solution. The resulting mix based on Australian sector data of annual returns for the years 1983-2004 showed a strong preference for shares and property trusts, whilst the same analysis for the period 1984-2003 showed a preference for government bonds. The speaker emphasised the need to look to the future and finished with a disclaimer about providing financial advice. A discussion followed on the current issue of Member's Choice for superannuation.

Alan Brown

Secretary

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