

ECONOMICS RESEARCH SEMINAR



"On the measurement of a negative
supply shock in cool-climate
viticulture"

Liam Elbourne
Oxford University

Abstract:

This paper introduces a new methodology for producing timely estimates of grapevine bud mortality and production losses after a cold event. This methodology applies multi-level regression and post-stratification – a unit-level small area estimation technique that has been adopted across a wide range of domains – to bud mortality surveys that are routinely conducted by research institutions and commercial wineries after cold events. The benefits of this methodology are illustrated through an empirical application from the 2023 vintage in British Columbia. First, by producing reliable estimates for unsampled region-variety pairs (or ‘cells’), it enables a substantial increase in modelling coverage relative to the status quo. The reliability of out-of-sample estimates are validated via leave-one-out cross-validation, which returned a mean absolute error of 4.9-8.4 percentage points across estimates. Second, the methodology enables the mean absolute error of estimates in sparsely sampled cells to be substantially reduced relative to the status quo, with small sample simulations revealing reductions as large as 6.6 percentage points in some cells. And third, by adjusting for differences between the distribution of bud samples and production capacity across cells, the methodology enables reliable estimates to be produced at alternative hierarchical levels, including for regions, grape varieties, and the industry at large. These estimates are of practical use to a wide range of industry stakeholders (including vineyards, wineries, governments, and insurance providers), with timely and comprehensive information on the magnitude and distribution of damages crucial for the effective management of these cold-induced supply shocks.

Friday Sep 25 ♦ 4:00-5:15pm ♦ MULH 3022