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PREDICTING THE CARCASS COMPOSITION OF LAMBS BY A SIMULTANEOUS EQUATIONS MODEL

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The objective of this study was to develop models to predict lamb carcass composition by simultaneous equations model (SEM), and to compare the efficiency of the ordinary least squares (OLS), weight least squares (WLS), and seemingly unrelated regressions (SUR) estimators. Forty male lambs, 22 of Churro Galego Bragançano Portuguese local breed and 18 of Suffolk breed were used. Lambs were slaughtered and carcasses were weighed approximately 30 min after slaughter in order to obtain hot carcass weight (HCW). After cooling at 4°C for 24-h, the subcutaneous fat thickness measurement (C3) was taken between the 12th and 13th ribs. The left side of all carcasses was dissected into muscle, subcutaneous fat, inter-muscular fat, bone, and remainder (major blood vessels, ligaments, tendons, and thick connective tissue sheets associated with muscles). The carcasses lean meat percentage (LMP), total fat percentage (FP), and bone percentage (BP) were calculated. A SEM model was fited by OLS, WLS and SUR estimators. Models fitting quality was evaluated by the coefficient of determination, the root mean square error, and Log-likelihood statistic. This study shows that SUR estimates are consistently better than the OLS and WLS estimates for modeling the carcass composition of lambs, and this trend was noticeably visible for the LMP.

The use simultaneous equations model open a path to classify and grade lamb carcasses using the predictions of all carcass tissues rather than the use of carcasses muscle proportion as the unique pricing driver. Finally, results shows that a novel approach can be applied to the old problem of objective classification of carcasses using simple models having as predictors the HCW and the C3 measurement.

Keywords: bias, seemingly unrelated equations, weighted least squares, ordinary least squares.