**Table S2.** Correlation between the two measured trait (backfat thickness and carcass weight) and the 46 estimated traits of pig carcasses in all abattoirs

| Estimated traits | Abattoir A (N = 400,280) | Abattoir B (N = 416,092) | Abattoir C (N = 252,647) |
|------------------|---------------------------|--------------------------|--------------------------|
|                  | Backfat thickness | Carcass weight | Backfat thickness | Carcass weight | Backfat thickness | Carcass weight |
| Backfat thickness | 0.906          | 0.355            | 0.900            | 0.414            | 0.941            | 0.381            |
| Backfat thickness in the 11th/12th thoracic vertebra | 0.852          | 0.325            | 0.805            | 0.337            | 0.878            | 0.314            |
| Backfat thickness in the 14th thoracic vertebra/1st lumbar vertebra | 0.873          | 0.334            | 0.855            | 0.382            | 0.901            | 0.347            |
| Backfat thickness in the 7th multifidus muscle | 0.756          | 0.323            | 0.698            | 0.326            | 0.752            | 0.316            |
| Backfat thickness in the 1st/2th thoracic vertebra | 0.781          | 0.401            | 0.785            | 0.447            | 0.814            | 0.396            |
| Carcass weight   | 0.330          | 0.784            | 0.404            | 0.871            | 0.323            | 0.881            |
| Front weight     | 0.206          | 0.936            | 0.275            | 0.942            | 0.194            | 0.943            |
| Middle weight    | 0.572          | 0.936            | 0.569            | 0.941            | 0.571            | 0.933            |
| Rear weight      | 0.235          | 0.879            | 0.273            | 0.923            | 0.178            | 0.888            |
| Rib weight       | 0.102          | 0.762            | 0.150            | 0.778            | 0.080            | 0.804            |
| Rib trim weight  | -0.055         | 0.670            | 0.019            | 0.715            | -0.062           | 0.689            |
| Rib meat weight  | -0.034         | 0.673            | 0.039            | 0.750            | -0.102           | 0.715            |
| Neck weight      | 0.350          | 0.918            | 0.420            | 0.926            | 0.380            | 0.934            |
| Neck trim weight | 0.209          | 0.885            | 0.240            | 0.877            | 0.184            | 0.897            |
| Neck meat weight | -0.301         | 0.647            | -0.046           | 0.789            | -0.259           | 0.680            |
| Shoulder weight  | 0.292          | 0.944            | 0.367            | 0.949            | 0.269            | 0.938            |
| Shoulder trim weight | 0.070      | 0.899            | 0.172            | 0.911            | 0.025            | 0.874            |
| Shoulder meat weight | -0.170     | 0.732            | -0.122           | 0.705            | -0.216           | 0.724            |
| Foreshank weight | -0.228         | 0.455            | -0.132           | 0.467            | -0.188           | 0.548            |
| Front meat weight | -0.213        | 0.649            | -0.061           | 0.750            | -0.232           | 0.665            |
| Tenderloin weight | -0.060         | 0.738            | 0.067            | 0.762            | -0.024           | 0.781            |
| Tenderloin trim weight | -0.256       | 0.613            | -0.148           | 0.656            | -0.236           | 0.629            |
| Tenderloin meat weight | -0.156       | 0.611            | 0.008            | 0.680            | -0.193           | 0.605            |
| Belly weight     | 0.561          | 0.850            | 0.563            | 0.888            | 0.572            | 0.855            |
| Belly trim weight | 0.531          | 0.898            | 0.522            | 0.919            | 0.559            | 0.900            |
| Belly meat weight | -0.068         | 0.719            | 0.083            | 0.834            | -0.068           | 0.748            |
| Belly fat weight | 0.679          | 0.536            | 0.623            | 0.627            | 0.687            | 0.553            |
| Belly rate       | -0.677         | -0.229           | -0.658           | -0.220           | -0.715           | -0.222           |
| Belly trim rate  | -0.631         | -0.264           | -0.605           | -0.298           | -0.673           | -0.280           |
| 10-cm neck fat thickness | 0.783       | 0.453            | 0.775            | 0.485            | 0.796            | 0.408            |
| Intra-fat thickness | 0.584        | 0.312            | 0.606            | 0.377            | 0.642            | 0.363            |
| Diaphragm weight | 0.027          | 0.776            | 0.119            | 0.789            | -0.001           | 0.765            |
| Loin weight      | 0.607          | 0.904            | 0.600            | 0.904            | 0.604            | 0.895            |
| Loin trim weight | 0.130          | 0.729            | 0.202            | 0.790            | 0.122            | 0.763            |
| Loin meat weight | -0.012         | 0.651            | 0.021            | 0.639            | -0.028           | 0.652            |
| Middle meat weight | -0.064         | 0.789            | 0.062            | 0.829            | -0.064           | 0.801            |
| Ham weight       | 0.285          | 0.871            | 0.317            | 0.923            | 0.262            | 0.904            |
| Ham trim weight  | 0.103          | 0.705            | 0.143            | 0.812            | 0.028            | 0.765            |
| Ham meat weight  | -0.052         | 0.551            | -0.030           | 0.663            | -0.155           | 0.602            |
| Hindshank weight | -0.021         | 0.651            | 0.069            | 0.744            | -0.053           | 0.691            |
| Rear meat weight | -0.013         | 0.679            | 0.010            | 0.745            | -0.141           | 0.673            |
| Total skin weight | 0.159          | 0.808            | 0.239            | 0.822            | 0.177            | 0.781            |
| Total fat weight | 0.739          | 0.667            | 0.723            | 0.708            | 0.752            | 0.661            |
| Total bone weight | -0.289         | 0.620            | -0.217           | 0.673            | -0.346           | 0.610            |
| Total meat weight | -0.076         | 0.729            | 0.026            | 0.768            | -0.122           | 0.715            |
| Lean meat percentage | -0.563        | -0.200           | -0.425           | -0.105           | -0.593           | -0.207           |