S1.

Table 1. Primary multiple coefficient of determination of jth independent variables on other variables.

Variable	R_j^2	Variables	R_j^2
Average number of households	0.787	Proportion of population 25 to 64 years old	0.678
Average number of rooms at each household	0.441	Proportion of higher education (Logarithm)	0.603
Proportion of households headed by a male	0.359	Gross domestic products(Cubic)	0.418
Proportion of the active population employed	0.484	Proportion of households joined to charity organization (logarithm)	0.302
Sex ratio (logarithm)	0.388	Distance from province capital(Cubic)	0.199
Proportion of population >65 years	0.672	Per capita income for municipalities	0.193
Proportion of population 25 to 64 years old	0.834	Migration rate	0.524

Table 2. Final multiple coefficient of determination of jth independent variables on other variables.

Variable	R_j^2	Variables	R_j^2
Average number of households	0.773	Proportion of population 25 to 64 years old	0.427
Average number of rooms at each household	0.430	Proportion of higher education (Logarithm)	0.394
Proportion of male-headed households	0.321	Gross domestic products(Cubic)	0.406
Proportion of the active population employed	0.406	Proportion of households joined to charity organization (logarithm)	0.279
Sex ratio (Logarithm)	0.211	Distance from province capital(Cubic)	0.198
Proportion of population >65 years	0.657	Per capita income for municipalities	0.177
		Migration rate	0.521

S2.

```
library(MASS (
for(j in 1:1000} (
A=abs(mvrnorm(round(998*1.2),grapes[,1],sigma.kmw ( (
for(i in 1:274} (
B[i,1:2]=c(mean(A[1:round(food.work.w1[113+i,37]*1.2),i]),var(A[1:round(food.work.w1[113+i,
37]*1.2),i{ ( ( [
rm(A (
w=kmw(B[,1]~grapes[,2] + grapes[,3] - 1, B[,2]/food.work.w1[-(1:113),37],dis1[-(1:113),-
(1:113)],method="REML ("
kk.20ps.20pn[,j]=w$eblup{

sigma.kmw=dis1[-(1:113),-(1:113)]*165+diag(grapes[,4]*food.work.w1[-(1:113),37 ( [
```

S3.

```
library(MASS (
for(j in 1:1000} (
A=abs(mvrnorm(round(998*1.2),grapes[,1],sigma.sar ( (
for(i in 1:274} (
B[i,1:2]=c(mean(A[1:round(food.work.w1[113+i,37]*1.2),i]),var(A[1:round(food.work.w1[113+i,
37]*1.2),i{ ( ( [
rm(A (
w=eblupSFH(B[,1]~grapes[,2] + grapes[,3] - 1, B[,2]/food.work.w1[-(1:113),37],proxi.s[-(1:113),-
(1:113)],method="REML ("
a3.uu.20pn[,j]=w$eblup{

  sigma.sar=solve( t(diag(1,274)-0.2*proxi.s[-(1:113),-(1:113)])%*%(diag(1,274)-0.2*proxi.s[-
(1:113),-(1:113)]))*101+diag(grapes[,4]*food.work.w1[-(1:113),37 ( [
```