**HW4 ECON613 Estimation Results:**

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Coefficients Comparison Under Different Models:

|  |  |  |
| --- | --- | --- |
|  | (EDUC) | (POTEXPR) |
| Random Effects | 0.1073 | 0.0387 |
| Fixed Effects – Between | 0.0931 | 0.0260 |
| Fixed Effects – Within | 0.1237 | 0.0386 |
| Fixed Effects – First Dif | 0.0384 | 0.0040 |

For Exercise 4.1, we want to estimate 100 individual fixed effects () for 100 i’s.



For **Exercise 4.2**, regression of individual fixed effects on time-invariant variables gives us the following result:

|  |  |  |  |
| --- | --- | --- | --- |
|  | Coefficients | Std Error  No Bootstrap | Std Error by Bootstrap (4.3) |
| CONSTANT | 1.9509 | 0.1801 | 0.0161 |
| ABILITY | 0.0441 | 0.0489 | 0.0039 |
| MOTHERED | -0.0593 | 0.0149 | 0.0015 |
| FATHERED | 0.0310 | 0.0118 | 0.0012 |
| BRKNHOME | 0.2002 | 0.0950 | 0.0087 |
| SIBLINGS | 0.0711 | 0.0153 | 0.0015 |

**Exercise 4.3**

Standard errors could be incorrectly estimated in the model in Exercise 4.2, because of the inability of one 100-individual sample to accurately estimate how individual fixed effects are influenced by education and experience. It is very likely that different samplings may result in different standard errors and may not even produce consistent coefficients. In this case, standard errors for the first regression of Logwage may be incorrectly estimated as a result.

**Propose a model to compute standard errors:**

To invoke the Central Limit Theorem with our limited sample, we can ‘expand’ our initial 100-individual-sized sample by using bootstrap samples. Suppose we use 49 replications bootstrap. In each replication, we create sample with replacement of 100 random individuals from our initial sample KT\_100su. Then we optimize for individual fixed effects under that particular bootstrap sample, before regressing it on other time-invariant variables. Next, we store the estimates of standard errors of this particular regression from this particular bootstrap sample.

We basically replicate this process 49 times, and take average of the 49 sets of standard errors estimated in the bootstrap. In this bootstrap case, we could be more confident that the asymptotic behavior of our sample (including its standard errors) is closer to the true parameters.