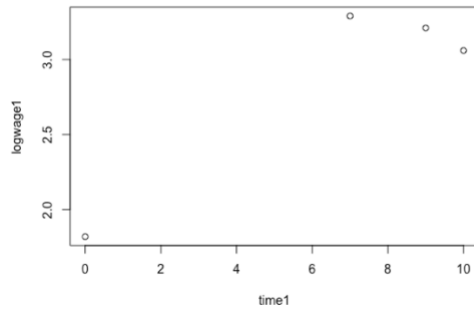


# HW4

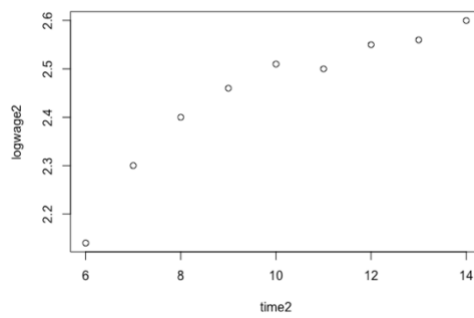
## 1. Exercise 1 Data

Represent the panel dimension of wages for 5 randomly selected individuals.

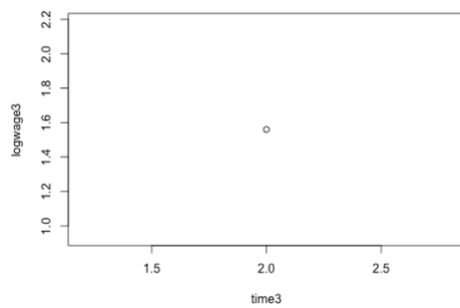
# personid = 1



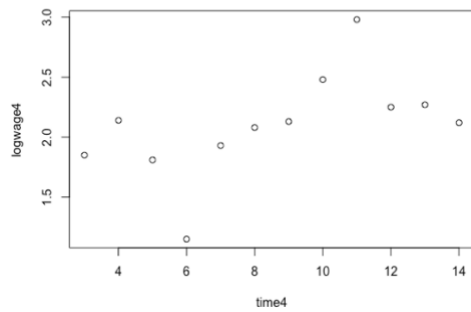
#personid = 2



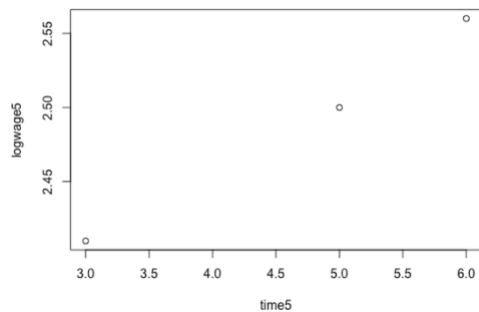
#personid = 3



#personid = 4



#personid = 5



## 2. Exercise 2 Random Effects

#Estimate the random effect model under the normality assumption of the disturbance terms.

Coefficients:

(Intercept)	educ	potexper
0.79419112	0.09386374	0.03740530

## 3. Exercise 3 Fixed Effects Model

### 3.1 Between Estimator

Coefficients:

(Intercept)	edu	potexper
0.8456	0.0931	0.0260

### 3.2 Within Estimator

Coefficients:

edu	potexper
0.12366	0.03856

### 3.3 First time difference Estimator

```

Coefficients:
(Intercept)      edu      potexper
    0.049464    0.038352    0.003989

```

#### 4. Exercise 4 Understanding Fixed Effects

- 4.1 Write and optimize the likelihood associated to the problem and estimate the individual fixed effect parameters

```

> print(betar)
[1] 0.028775911 -0.002261693

```

- 4.2 Run a regression of estimated individual fixed effects on the invariant variables.

```

Coefficients:
(Intercept)      ability      mothered      fathered      brknhome      siblings
    0.913649    0.100666   -0.004147    0.001647   -0.145571    0.016016

```

- 4.3 The standard errors in the previous may not be correctly estimated. Explain why, and propose an alternative method to compute standard errors.

- 1) Explain: Because the previous model made an assumption that the variables are independent from time, but in practice, they are possibly positive correlated over time, which means in practice there might exist heteroskedasticity. Therefore, the standard error might not be correctly estimated.
- 2) Propose an alternative method.

```

      edu      potexper
0.0065770140 0.0007708869

```