(A)

$$
\begin{aligned}
&= \left(\mathbb{E}\left(x_{1i}x_{1i}'\right)\right)^{-1}\mathbb{E}\left(x_{1i}y_i\right) \\
&= \left(\mathbb{E}\left(x_{1i}x_{1i}'\right)\right)^{-1}\mathbb{E}\left(x_{1i}\left(x_{1i}'\beta_1 + x_{2i}'\beta_2 + e_i\right)\right) \\
&= \beta_1 + \left(\mathbb{E}\left(x_{1i}x_{1i}'\right)\right)^{-1}\mathbb{E}\left(x_{1i}x_{2i}'\right)\beta_2
\end{aligned}
$$

$$E(b_R) = \beta_1 + P\beta_2.$$

(B)

$$
\begin{aligned}
&= E[(b_R - \beta)(b_R - \beta)'] = E[(X'X)^{-1}X'\varepsilon\varepsilon'X(X'X)^{-1}] \\
&= (X'X)^{-1}X'E[\varepsilon\varepsilon']X(X'X)^{-1} = (X'X)^{-1}X'(\sigma^2 I)X(X'X)^{-1}
\end{aligned}
$$

$$\text{var}(b_R) = \sigma^2(X_1'X_1)^{-1}$$

(C)

In the restricted model (where *y* is regressed on *k – g* regressors) the *(k – g) X 1* vector of least squares estimates is given by $b_R = (X'_1X_1)$-1 X'_1y. In the unrestricted model (where *y* is regressed on *k – g* regressors and g addritional regressors) and k X 1 vector of east squares estimates is given by b = (X'_1X_1)-1 X'_1y .

Let b be decomposed in two parts as b = (b'_1, b'_2)1, where the (k – g)X1 vector b_1 correspnds to the refressors of the restricted model and b_2 to the g added regressors. Then, the relation between b_R nd b_1 is given by $b_R = b_1 + Pb_2$

$$b_R = b_1 + Pb_2$$

(D)

Dependent: Logwage		
Variable	Coefficients	Std. Error
(Constant)	4.734	.024
Female	-.251	.040
R^2	.073	

Dependent: Logwage	
Variable	Coefficients
(Constant)	3.866
Female	-.248
Age	.022
R^2	.344

Dependent: Logwage	
Variable	Coefficients
(Constant)	3.866
Female	-.137
Edu	.339
R^2	.350

Dependent: Logwage	
Variable	Coefficients
(Constant)	3.866
Female	-.277
Partime	.106
R^2	.083

(E)

P = 4.734

(F)

$$\frac{4.734}{0.024} == \frac{3.866}{-0.248} + \frac{40.051}{-0.110} \times 0.022$$