Econometrics 2 2017
Problem set 1

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1 Problem 1

1.1 (a)

Let $\epsilon = y - \alpha - x^{'}\beta$, where $\alpha = E[y] - E[x^{'}]\beta$ and $\beta = \Sigma^{-1}\delta$, then I show $E[\epsilon] = 0$ and $E[\epsilon x] = 0$.

$$E[\epsilon] = E[y - E[y] + E[x^{'}]\beta - x^{'}\beta] = E[(y - E[y]) - (x^{'} - E[x^{'}])\beta] = (E[y] - E[y]) - (E[x^{'}] - E[x^{'}])\beta = 0$$

$$E[\epsilon x] = E[x\epsilon] = E[x(y - E[y] + E[x^{'}]\beta - x^{'}\beta)] = E[x(y - E[y]) - x(x^{'} - E[x^{'}])\beta]$$

$$= E[(x - E[x])(y - E[y]) + E[x](y - E[y]) - (x - E[x])(x^{'} - E[x^{'}])\beta - E[x](x^{'} - E[x^{'}])\beta]$$

$$= \delta - E[(x - E[x])(x^{'} - E[x^{'}])]\Sigma^{-1}\delta = \delta - \delta = 0$$

So now I get the result.