Econometria I - REC2301 Prof. Daniel Santos

Nome: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ # USP: \_\_\_\_\_\_\_\_\_\_

**ATENÇÃO**

**Só considerarei o que estiver escrito no espaço designado para a questão. Use o rascunho para organizar suas ideias.**

1. (2 pontos) Considere o modelo:

$$y=a+bx+ε$$

Suponha que E[εx] = 0 e E[εx2] = 0. Calcule a fórmula do estimador de Método dos Momentos para a e b.

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1. Considere o modelo y = a + bx + ε. Suponha que E[ε | X] = 0.
2. (2 pontos) (ATENÇÃO: uma errada anula uma certa) Quais das propriedades abaixo tem o estimador de MQO neste caso?
3. $\hat{b}^{MQO}→b$ (c) $E\left(\hat{b}^{MQO}\right)=b$
4. $\hat{b}^{MQO}|X\~N\left(b,\frac{σ^{2}}{\sum\_{i=1}^{N}\left(x\_{i}-\overbar{x}\right)^{2}}\right)$ (d) $\hat{b}^{MQO}→N\left(b,\frac{σ^{2}}{NVar(x)}\right)$
5. (1 ponto) Como sua resposta muda se adicionalmente supusermos a hipótese de homocedasticidade, isto é, Var(ε|X) = σ2?

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1. (1 ponto) Escolha uma das propriedades marcadas acima (no item 2) e demonstre rigorosamente sua validade.

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1. Considere a seguinte base de dados:

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| --- | --- | --- |
| Empresa | Barris (x105) | Plataformas |
| ACME | 1 | 4 |
| TabaX  | 2 | 4 |
| KPX | 2 | 20 |
| ZZZ | 3 | 20 |

Suponha que a função de produção de petróleo seja do tipo B = a + bP + ε, onde B é o número de barris de petróleo, P é o número de plataformas, e ε é um fator de produção não-observável, onde E[ε | P] = 0. Para facilitar seu trabalho, foram calculados que, na amostra:

Cov(B,P) = 4

Var(B) = 0,5

Var(P) = 64

Calcule:

1. (0,5 ponto) Os estimadores de MQO de a e b:

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1. (0,5 ponto) Os valores de $\hat{ε}$ para ACME, TabaX, KPX e ZZZ:

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1. (0,5 ponto) Os estimadores $\hat{σ}^{2}e S^{2}$ da variância de ε:

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1. (0,5 ponto) A variância de $\hat{b}^{MQO}$:

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1. (1 ponto) No espaço abaixo desenhe, em um gráfico BxP, (i) os pares (Bi,Pi) para as quatro empresas de sua amostra; (ii) a reta $\hat{B}=\hat{a}+\hat{b}P$
2. Considere o modelo y = a + bx + ε. Suponha que ε|X ~ N[0,σ2], e que você estimou o modelo em amostra com 20 observações independentes, e obteve os seguintes resultados:

|  |  |
| --- | --- |
| Coeficiente Estimado | Desvio Padrão Estimado |
| a = 0,81 | 0,03 |
| b = 1,44 | 0,12 |

 Com base na tabela em anexo, calcule:

1. (1 ponto) A estatística de teste *t* de â para um teste da hipótese H0: a = 0,9 a um nível de significância de 5%.

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1. (0,5 ponto) Intervalo de confiança de $\hat{b}$ a 1% de significância.

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1. (0,5 ponto) O valor crítico de um teste de hipótese onde H0: b > 0 para um nível de significância de 10%.

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1. Suponha que **x** denote um vetor composto por duas variáveis aleatórias, x1 e x2, que conjuntamente se distribuem segundo uma Normal Multivariada do tipo:

$$\left(\genfrac{}{}{0pt}{}{x\_{1}}{x\_{2}}\right)\~N\left[\left(\genfrac{}{}{0pt}{}{1}{2}\right);\left(\begin{matrix}25&-1\\-1&4\end{matrix}\right)\right]$$

1. (0,5 ponto) Qual a distribuição (marginal) de 5x2?

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1. (0,5 ponto) Qual a distribuição de 2x1 – 3x2 + 1?

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