| | | | |
|---|---|---|---|
| **FACULTY** | AGRICULTURE, ENGINEERING AND NATURAL RESOURCES | | |
| **SCHOOL** | AGRICULTURE AND FISHERIES SCIENCES | | |
| **DEPARTMENT** | ANIMAL PRODUCTION, AGRIBUSINESS & ECONOMICS | | |
| **SUBJECT** | AGRICULTURAL PRICE ANALYSIS AND FORECASTING | | |
| **SUBJECT CODE** | AEA 3782 | | |
| **DATE** | NOVEMBER 2023 | | |
| **DURATION** | **3 HOURS** | **MARKS** | **100** |

## FIRST OPPORTUNITY EXAMINATION QUESTION PAPER

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**Internal Moderator:** Professor H. J. Sartorius von Bach

This question paper consists of Six (6) pages including this front page

***Instructions***

- Answer all questions in section A and B
- Please write legibly and number your questions clearly
- Show your calculations to two decimal places

**UNIVERSITY OF NAMIBIA EXAMINATIONS**

## SECTION A

## [50 MARKS]

a) Discuss the process or steps you would follow to evaluate the price movements over time (15)

b) Distinguish between price determination and price discovery. (10)

c) Explain the role played by commodity price in an economy (10)

d) Explain the concept of constructing moving average on price cycles for any agricultural commodity of your choice. (15)

## SECTION B APPLICATION QUESTION

## [50 MARKS]

a) Namibia Statistical Agency (NSA) provided the following dataset for you, in addition the Chief Economist and Statistician at NSA have partially analysed the dataset using a set of models. The results are attached as appendices A. Use the information and appendix to answer the questions below:

i) What are the two major reasons for engaging in price analysis? (4)

ii) Which model would you choose from appendix A? Motivate your answer? (10)

iii) Does the estimated coefficients stated in chosen equation (in question ii above) display the *apriori* expectation and economic theory? Justify your answer by explaining the coefficient on chicken price (12)

iv) Calculate and explain the following elasticities (1) own price elasticity of chicken, (2) income elasticity and (3) cross-price elasticity for 2019. (9)

v) Use the model 3 to forecast the price of chicken for 2022. (6)

b) Suppose NSA provided you with the following data on the most consumed meat products in Namibia. Use the data to answer the questions below:

| **Year** | **Retail Price (N$) per kilogram** | | | **Quantity purchased (in hundred kgs)** | | |
|---|---|---|---|---|---|---|
| | Beef | Mutton | Chicken | Beef | Mutton | Chicken |
| 2019 | 48.50 | 38.90 | 55.00 | 30 | 22 | 19 |
| 2020 | 48.90 | 44.50 | 56.00 | 35 | 20 | 21 |
| 2021 | 58.50 | 45.50 | 56.50 | 35 | 20 | 18 |
| 2022 | 59.50 | 38.90 | 55.50 | 23 | 25 | 19 |

i) Calculate the average price index for meat products using 2020 as the base period and make recommendation to NSA. [9]

# APPENDICES

## Dataset

| Year | Trend | QTYC [1] | CHKP[2] | AINC[3] | PBEE[4] |
|---|---|---|---|---|---|
| 2019 | 1 | 211.865 | 168.2 | 5118 | 75.00 |
| 2019 | 2 | 216.183 | 168.2 | 5073 | 75.90 |
| 2019 | 3 | 216.481 | 161.8 | 5026 | 74.80 |
| 2019 | 4 | 219.891 | 157.2 | 5131 | 73.70 |
| 2019 | 5 | 221.934 | 155.9 | 5250 | 73.60 |
| 2019 | 6 | 217.428 | 157.2 | 5137 | 74.60 |
| 2019 | 7 | 219.486 | 152.9 | 5138 | 71.40 |
| 2019 | 8 | 218.972 | 151.9 | 5133 | 69.30 |
| 2019 | 9 | 218.742 | 147.4 | 5152 | 70.90 |
| 2019 | 10 | 212.243 | 160.4 | 5180 | 72.30 |
| 2019 | 11 | 209.344 | 168.4 | 5189 | 76.20 |
| 2019 | 12 | 215.232 | 172.1 | 5213 | 75.70 |
| 2020 | 13 | 222.379 | 159.7 | 5219 | 75.00 |
| 2020 | 14 | 219.337 | 152.9 | 5247 | 73.70 |
| 2020 | 15 | 224.257 | 149.9 | 5301 | 74.20 |
| 2020 | 16 | 235.454 | 144.6 | 5313 | 75.10 |
| 2020 | 17 | 230.326 | 151.9 | 5319 | 74.60 |
| 2020 | 18 | 228.821 | 150.1 | 5315 | 77.10 |
| 2020 | 19 | 229.108 | 156.5 | 5339 | 85.60 |
| 2020 | 20 | 225.543 | 164.3 | 5343 | 93.30 |
| 2020 | 21 | 220.516 | 160.6 | 5348 | 81.90 |
| 2020 | 22 | 221.239 | 163.2 | 5344 | 92.50 |
| 2020 | 23 | 223.737 | 162.9 | 5351 | 82.70 |
| 2020 | 24 | 226.66 | 160.4 | 5345 | 81.80 |
| 2021 | 25 | 221.4733 | 167.0533 | 5361.467 | 89.65 |
| 2021 | 26 | 220.5243 | 168.983 | 5366.861 | 91.07 |
| 2021 | 27 | 219.5753 | 170.9127 | 5372.255 | 92.48 |
| 2021 | 28 | 218.6263 | 172.8424 | 5377.648 | 93.89 |
| 2021 | 29 | 217.6773 | 174.7721 | 5383.042 | 95.31 |
| 2021 | 30 | 216.7283 | 176.7018 | 5388.436 | 96.72 |
| 2021 | 31 | 215.7793 | 178.6315 | 5393.83 | 98.13 |
| 2021 | 32 | 214.83 | 180.5612 | 5399.224 | 99.55 |
| 2021 | 33 | 213.8813 | 182.4909 | 5404.618 | 100.96 |
| 2021 | 34 | 212.9323 | 184.4206 | 5410.012 | 102.37 |
| 2021 | 35 | 211.9833 | 186.3503 | 5415.406 | 103.79 |
| 2021 | 36 | 211.0343 | 188.28 | 5420.8 | 105.20 |
| 2022 | 37 | 210.0853 | 190.2097 | 5426.194 | 106.61 |

| | | | | | |
|---|---|---|---|---|---|
| 2022 | 38 | 209.1363 | 192.1394 | 5431.588 | 108.03 |
| 2022 | 39 | 208.1873 | 194.0691 | 5436.982 | 109.44 |

**Notes on variable description:**

1. QTYC = denotes quantity of chicken consumed at household level measured in kg
2. CHKP = denoted the retail chicken price in real terms, expressed N$ per kg.
3. AINC = is the average income per household, N$1000.
4. PBEE = is the average price of beef (real terms) as an alternative to chicken, N$ per kg.

## Appendix A: Model 1

| Source | SS | df | MS | Number of obs | = | 39 |
|---|---|---|---|---|---|---|
| | | | | F(4, 34) | = | 42.47 |
| Model | 1255.56989 | 4 | 313.892473 | Prob > F | = | 0.0000 |
| Residual | 251.317905 | 34 | 7.39170309 | R-squared | = | 0.8332 |
| | | | | Adj R-squared | = | 0.8136 |
| Total | 1506.8878 | 38 | 39.654942 | Root MSE | = | 2.7188 |

| QTYC | Coef. | Std. Err. | t | P>\|t\| | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| CHKP | -.6097969 | .0946512 | -6.44 | 0.000 | -.8021514 | -.4174425 |
| AINC | .0404072 | .014591 | 2.77 | 0.009 | .0107546 | .0700597 |
| PBEE | .2761236 | .1547643 | 1.78 | 0.083 | -.0383952 | .5906424 |
| MonthTrend | -.2809922 | .1947888 | -1.44 | 0.158 | -.6768507 | .1148663 |
| _cons | 88.37938 | 80.45305 | 1.10 | 0.280 | -75.12088 | 251.8797 |

## Appendix B: Model 2

| Source | SS | df | MS | Number of obs | = | 39 |
|---|---|---|---|---|---|---|
| | | | | F(3, 35) | = | 54.25 |
| Model | 1240.18817 | 3 | 413.396057 | Prob > F | = | 0.0000 |
| Residual | 266.699625 | 35 | 7.61998928 | R-squared | = | 0.8230 |
| | | | | Adj R-squared | = | 0.8078 |
| Total | 1506.8878 | 38 | 39.654942 | Root MSE | = | 2.7604 |

| QTYC | Coef. | Std. Err. | t | P>\|t\| | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| CHKP | -.6371991 | .0941465 | -6.77 | 0.000 | -.8283267 | -.4460715 |
| AINC | .0236503 | .0089649 | 2.64 | 0.012 | .0054505 | .0418501 |
| PBEE | .1934153 | .1459551 | 1.33 | 0.194 | -.1028894 | .4897199 |
| _cons | 183.1545 | 47.14684 | 3.88 | 0.000 | 87.44128 | 278.8676 |

## Appendix C: Model 3

| Source | SS | df | MS | Number of obs | = | 39 |
|---|---|---|---|---|---|---|
| | | | | F(1, 37) | = | 51.39 |
| Model | 3965.89909 | 1 | 3965.89909 | Prob > F | = | 0.0000 |
| Residual | 2855.34504 | 37 | 77.1714875 | R-squared | = | 0.5814 |
| | | | | Adj R-squared | = | 0.5701 |
| Total | 6821.24413 | 38 | 179.506425 | Root MSE | = | 8.7847 |

| CHKP | Coef. | Std. Err. | t | P>\|t\| | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| MonthTrend | .8959987 | .124987 | 7.17 | 0.000 | .6427509 | 1.149246 |
| _cons | 148.9266 | 2.868355 | 51.92 | 0.000 | 143.1148 | 154.7385 |