Quantitative methods
Final exam for group MBA4 – 2017

Task 1. (4 points)

A box contains five green balls, three black balls, and seven red balls. Two balls are selected at random without replacement from the box. What is the probability that both balls are the same colour?

Task 2. (4 points)

A family has five children. Assuming that the probability of a girl on each birth was 0.5 and that the five births were independent, what is the probability the family has at least one girl, given that they have at least one boy?

Task 3. (4 points)

Sixty percent of new drivers have had driver education. During their first year, new drivers without driver education have probability 0.08 of having an accident, but new drivers with driver education have only a 0.05 probability of an accident. What is the probability a new driver has had driver education, given that the driver has had no accident the first year?

Task 4. (4 points)

The phone central connects 15 talks during one hour in average. What is the probability that during 4 minutes it connects:

a) exactly one talk,

b) at least one talk,

c) at least two talks and in maximum 5 talks

Task 5. (4 points)

A salary survey conducted on behalf of the Institute of Management Accountants and the publication Management Accounting revealed that the average salary for all members of the Institute was $56,391. A random sample of 122 members from New

York were questioned and found to have a mean salary of $62,770 and a standard deviation of s = $28972. Assume that the national mean is known with certainty. Do the sample data provide sufficient evidence to conclude that the true mean salary of Institute members in New York is higher than the National Average (alpha=0.05)?

Task 6. (20 points)

J. M. Keynes postulated that aggregate real consumption (RCONS) is positively related to aggregate real GNP (RGNP) in such a way that the marginal propensity to consume– the change in consumption resulting from a one-unit change in income –is less than the average propensity to consume – the ratio of consumption to income. There remains the question of whether consumption is negatively related to the rate of interest (or, which is the same thing, savings is positively related to the interest rate). The table presents some data on consumption, real GNP and interest rates in Canada. A dummy variable is included to test whether consumption depends on whether the exchange rate is fixed or flexible. In all tasks set alpha=0.05.

Year	RCONS	RGNP	INTRATE	DUMMY
1961	105.4	161.4	3.37	0
1962	111.1	173.4	4.38	0
1963	116.4	182.8	4.01	1
1964	122.8	196.6	4.20	1
1965	129.7	211.5	5.01	1
1966	136.8	228.2	6.27	1
1967	142.9	236.3	5.84	1
1968	150.0	248.4	6.82	1
1969	157.1	262.0	7.84	1
1970	160.6	271.9	7.34	0
1971	169.3	288.5	4.51	0
1972	181.0	308.0	5.10	0
1973	192.4	335.8	7.45	0
1974	202.7	361.1	10.50	0
1975	211.9	367.5	7.93	0
1976	225.3	393.2	9.17	0
1977	231.3	399.7	7.47	0
1978	236.2	405.4	8.83	0
1979	241.5	423.8	12.07	0
1980	246.3	432.0	13.15	0
1981	249.3	438.3	18.33	0
1982	241.4	415.2	14.15	0
1983	250.8	427.5	9.45	0
1984	261.8	449.2	11.18	0
1985	276.1	465.9	9.56	0
1986	287.1	474.2	9.16	0

1. Write down the model with all factors included. Estimate and check it for significance. (**2 points**).

2. Can we conclude that consumption is positively related to income? (**2 points**).

3. How would you test the proposition that the marginal propensity to consume equals the average propensity to consume? (**2 points**).

4. Can we conclude that the interest rate has a negative effect on consumption? (**2 points**).

5. Is aggregate consumption affected by whether the country was on fixed as opposed to flexible exchange rates? (**2 points**).

6. Test whether the regression that includes all three independent variables is statistically significant. (**2 points**).

7. Do a test of the proposition that consumption depends on whether the country was on a fixed or flexible exchange rate. (**2 points**).

8. Test the model with all factors for autocorrelation, heteroscedasticity, stability, multicollinearity, normality of residuals. (**2 points**).

9. Test the model if linear trend is omitted. (**2 points**).

10. Calculate the forecast of real consumption for 1987, using linear trend model for predicting repressors. (**2 points**).