# ECON 4730 Advanced Regional Economics – Solutions to the Exam

**Multiple Choice Questions. (25 points; 2.5 pts each). Please circle the best answer.**

#1. Economists measure economic efficiency using:

a. marginal utilities.
b. production possibility curves.
c. government spending multipliers.
d. IMPLAN.

#2. Return on investment (ROI) for new projects or programs is measured as the:

a. discounted sum of benefits.
b. discounted sum of costs.
c. percentage difference between benefits and costs.
d. sum of direct, indirect and induced effects.

#3. Net present value (NPV) of a project, assuming $\rho$ is the discount rate, is given by:

a. $\sum_{t=0}^{\infty}(Benefits_t - Costs_t)$.
b. $\sum_{t=0}^{\infty}\rho^t(Benefits_t - Costs_t)$.
c. $\sum_{t=0}^{\infty}(\frac{1}{1+\rho})(Benefits_t - Costs_t)$.
d. $\sum_{t=0}^{\infty}(\frac{1}{1+\rho})^t(Benefits_t - Costs_t)$.

#4. The *Growth Perspective* report from the Harvard Growth Lab concludes that Wyoming's long-term growth potential is:

a. limited because of global warming.
b. limited because of government regulations and high taxes.
c. unlimited.
d. constrained by low population, global decarbonization, and the lack of economic diversity.

#5. Gross Domestic Product (GDP) is measured as:

a. the value of all goods and service in an economy.
b. the sum of the money supply in an economy.
c. the value of all intermediate goods in an economy.
d. the sum of expenditures on all final goods and services in an economy.

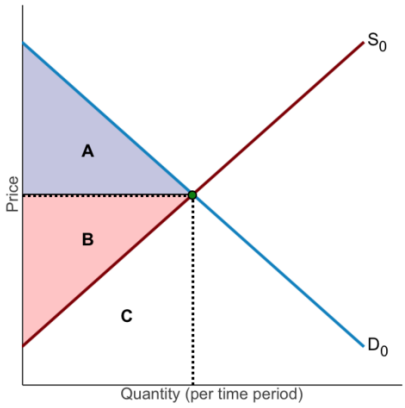
#6. A major advantage of Cost-Benefit Analysis (CBA) over Economic Impact Analysis (EIA) is:

a. the use of IMPLAN to estimate benefits.
b. the ability to consider net, rather than gross, benefits.
c. the use of Keynesian government spending multipliers.
d. the ability to measure dollars in a base year.

#7. Which of the following is NOT an example of a market failure?

a. positive externality.
b. negative externality.
c. incomplete information.
d. invisible hand theory.

#8. Benefits of a project are often measured by consumer surplus (CS). CS is given by the area:




a. A.
b. B.
c. A+B.
d. C.

#9. For the multiple regression model: $y_i = \beta_1 + \beta_2 x_i + \beta_3 z_i + \varepsilon_i$, the best interpretation of $\beta_2$ is:

a. partial derivative of $y_i$ with respect to $x_i$, holding $z_i$ constant.
b. total derivative of $y_i$ with respect to $x_i$.
c. level of $y_i$ when $x_i$ and $z_i$ are zero.
d. average level of $x_i$.

#10. The U.S. federal debt is:

a. equal to the U.S. federal deficit.
b. approximately equal to U.S. GDP.
c. ten times U.S. GDP.
d. less than the U.S federal deficit.

**Short Answer Question. (25 points)**

#11. This is a question about economic impact and program evaluation. The project under consideration is the construction of a new electrical transmission line installed in the southeastern portion of Wyoming by a public utilities company.

(a) (15 pts) Below is a table showing the IMPLAN economic impact estimates for the transmission line construction project. The IMPLAN input was estimated CAPEX for the construction project. Write a few short paragraphs interpreting the four shaded numbers.

**Table 1. Regional Economic Impacts of a New Transmission Line in Southeast Wyoming**

| Impact Type | Employment | Labor Income | Value Added | Output |
|---|---|---|---|---|
| Direct Effect | 781 | $45,592,103 | $63,725,576 | $183,497,223 |
| Indirect Effect | 294 | $10,878,361 | $21,371,911 | $43,228,776 |
| Induced Effect | 292 | $8,100,329 | $16,303,303 | $29,497,724 |
| Total Effect | 1,367 | $64,570,793 | $101,400,790 | $256,223,723 |

- *Employment Induced Effect = 292. This is the number of new jobs created by businesses that sell good and service to households who are spending the new income they receive from the transmission line project. An example of this would be a new employee hired by a local grocery store to serve the needs of the new construction workers.*

- *Labor Income Direct Effect = $45,592,103. This is the additional labor income that results directly from the jobs associated with the construction of the transmission line project. An example of this would be the income generated by a local worker that helps construct the power line.*

- *Value Added Total Effect = $101,400,790. This is the contribution to gross state product (i.e., value added) due to direct, indirect and induced effects of the transmission line project.*

- *Output Indirect Effect = $43,228,776. This is the contribution to output from business-to-business spending associated with the construction of the transmission line. Output includes the purchases of all intermediate and final goods associated with the indirect effect. An example of this effect would be the purchase of the power poles needed for the transmission line.*

(b) (10 pts) The table of economic impacts reflect the regional economic benefits of the transmission line. Discuss how you might do a full cost-benefit analysis of the transmission line project.

- *To do a full cost-benefit analysis, you would need to also incorporate ALL the costs associated with the transmission line project. There are likely to be many costs including the direct CAPEX costs, as well as the variable costs (i.e., construction labor, legal, leasing of land) associated with the power line construction. There are also likely to be possible external costs such as environmental and ecological costs. Finally, there may be intangible costs associated with the project that are difficult, if not impossible, to quantify such as reductions in the attractiveness of the landscape.*

  *Simply calculating the net benefits of the project is not sufficient for determining the optimal allocation of resources. If possible, you should also attempt to calculate the opportunity costs of the CAPEX funds to see if there an alternative use of the funds that would generate a larger return on investment (ROI).*