

Written Exam at the Department of Economics winter 2019-20

Health Economics

Final Exam

10. January 2020

(3-hour closed book exam)

Answers only in English.

This exam question consists of 4 pages in total

Falling ill during the exam

If you fall ill during an examination at Peter Bangs Vej, you must:

- contact an invigilator who will show you how to register and submit a blank exam paper.
- leave the examination.
- contact your GP and submit a medical report to the Faculty of Social Sciences no later than five (5) days from the date of the exam.

Be careful not to cheat at exams!

You cheat at an exam, if during the exam, you:

- Make use of exam aids that are not allowed
- Communicate with or otherwise receive help from other people
- Copy other people's texts without making use of quotation marks and source referencing, so that it may appear to be your own text
- Use the ideas or thoughts of others without making use of source referencing, so it may appear to be your own idea or your thoughts
- Or if you otherwise violate the rules that apply to the exam

Medical innovations, health and labor supply

Question 1: Describe trade-offs in restrictive versus permissive regulation of the pharmaceutical market.

Question 2: Explain why the following statement is true, or provide a counterexample: a receiver-operator characteristic curve, which plots the Type I error of a test against the Type II error from that same test, always slopes downward.

Question 3: Is the following statement True or False? The Food and Drug Administration (FDA) decides whether to approve a drug for use in the U.S. based in part on whether each drug is cost-effective in the treatment of some disease. Elaborate on your answer in one or two lines.



Illustration 1: a patient with joint-conditions, such as Arthritis (DK: slidgigt), which causes pain and inflammation in a joint.

Background:

The late 1990's brought new medication to treat joint-conditions (Illustration 1 above, provides an illustration of a patient with joint-conditions). The drugs labeled "*Cox-2 inhibitors*", a type of "nonsteroidal selective anti-inflammatory drugs" (NSAID), saw the market. Among the Cox-2 drug brands were Vioxx, Bextra and Celebrex. The Cox-2 inhibitors were improving standard treatments with Cox-1 inhibitors, which had shown side effects such as gastrointestinal bleeding (DK: blødninger i mavesækken). In 2002 the FDA required the producer of Vioxx to put a "black box warning" label on the product to inform consumers that Vioxx had been associated with increased risk of cardiac events (eg. heart attacks). A subsequent study confirmed the risk, and ultimately, in September 2004 the producer Vioxx globally withdrew the product from the market, although the drug had gained immense popularity among patients. Following this withdrawal, the FDA requested producers of Bextra to withdraw this product in 2005. The producer of Celebrex added labeling to the product, which described the cardiac risks.

In an empirical investigation, Garthwaite (2012) asks: What was the effects of Cox-2 inhibitors on labor supply? He relies on data on 55-75 year old Americans interviewed in the Medical Expenditure Panel Survey

(MEPS). The survey asks individuals questions over a series of five interview rounds, detailing two years of medical expenditures and services utilization. The study utilizes interviews of the same individuals conducted between 2004 and 2005, i.e., before and after the withdrawal of Vioxx.

Question 4 Explain why a simple cross-sectional association between individual consumption of Cox-2 inhibitors and labor supply would not identify causal relationship.

Consider regression Equation (1):

$$(1) \quad Y_{it} = \gamma_0 + \sum \alpha_j AGE_{it} + \gamma_1 REMOVE_t \times JOINT_i + \mu_i + v_t + \epsilon_{it} ,$$

where Y_{it} is the outcome of interest (e.g., labor supply or the use of Cox-2 inhibitors) for individual i interviewed in survey round t . AGE_{it} are age fixed effects, μ_i are individual fixed effects, v_t are survey round fixed effects and ϵ_{it} is an idiosyncratic error term. $REMOVE_t$ is an indicator of whether the interview took place after the withdrawal of Vioxx, and $JOINT_i$ is an indicator of whether individual i has been diagnosed with a joint-condition.

Question 5: What is the principal identification strategy behind Equation (1)?

Panel 1 and 2 of Table 1 show OLS estimates of the estimation of γ_1 in Equation 1. Panel 3 takes an instrumental variable approach (all estimates are statistically significant):

	Full sample	Males	Females
Panel 1- Outcome: indicator of Cox-2 inhibitor consumption (OLS estimates)	-0.1023	-0.0813	-0.1122
Panel 2 - Outcome: Labor force participation (OLS estimates)	-0.0226	-0.0280	-0.0203
Panel 3 - Outcome: Labor force participation Where Panel 3 = Panel 2 / Panel 1 (given by two-stage-least-squares estimates) First stage (Instrument) is given in Panel 1. Reduced form is in Panel 2.	0.2207	0.3240	0.1805
Observations	12,321	5,514	6,807

Question 6:

What are the effects of the withdrawal of Vioxx on the consumption of Cox-2 inhibitors?

Question 7:

What are the effects of Cox-2 inhibitors on labor supply?

Question 8: Given the Grossman model, explain how technological improvements can lead to increased labor supply.

Question 9. Write up the principal formula for the “Incremental cost-effectiveness ratio” between Cox-1 and Cox-2 inhibitors. Given your findings in the previous questions, reflect on the importance of differential inputs in cost-effectiveness analyses of medical innovations.

Question 10: Given papers from the health economics course, to what extent do health shocks affect economic outcomes for patients?