Written Exam at the Department of Economics winter 2017-18

Health Economics

Final Re-Exam

February 20, 2018

(closed book exam)

Please note that the language used in your exam paper must correspond to the language for which you registered during exam registration.

This exam question consists of 6 pages in total

NB: If you fall ill during an examination at Peter Bangsvej, you must contact an invigilator in order to be registered as having fallen ill. In this connection, you must complete a form. Then you submit a blank exam paper and leave the examination. When you arrive home, you must contact your GP and submit a medical report to the Faculty of Social Sciences no later than seven (7) days from the date of the exam.

Part 1: The legacy of Barker

Question 1:
Explain the fetal origins hypothesis (FOH) and its predictions for effects of pregnant mothers' health behavior on their children's health outcomes at different stages of their life cycle.

Bharadwaj et al. (2014) study the impact of a smoking ban in Norwegian bars and restaurants introduced in July 2004. They examine the birth outcomes of children of female workers who were affected by the smoking bans in the workplace. They compare outcomes, Y_{ijt} (eg., whether the mother quit smoking and birth weight of her child) for women, i, in different occupations, j, (the treatment group works in a bar or a restaurant and the control group works in a store) gave birth at different times, t, and estimate the following equation:

$$Y_{ijt} = \alpha_1 + \alpha_2 Treat_j + \alpha_3 Post_t + \alpha_4 (Treat_j * Post_t) + \alpha_5 X_{ijt} + \epsilon_{itj} \qquad (1)$$

$Treat_j$ =1 means that mother works in a bar or a restaurant in 2003 and $Treat_j$ =0 means that she works in a store. $Post_t = 0$ indicates whether the mother gave birth prior to the reform and $Post_t = 1$ means that the woman gave birth after the reform. X_{ijt} is a set of control variables.

Question 2:
Imagine that the outcome of interest, Y_{ijt}, is the child's birth weight. What is the interpretation of the sign of α_4 in equation (1)?

Estimating equation (1) the authors find that the reform leads to a reduction in smoking probability by 9-52 percentage points for pregnant women working in bars/restaurants compared to pregnant women working in stores. Table 1 reports the estimated results of α_4 for three different measures of birth weight of the child: 1) Birth weight in grams (Columns i and iv), 2) an indicator of birthweight being below 1500g (Columns ii and v), and 3) an indicator of birthweight being below 2500g (Columns iii and vi). Columns (i)-(iii) show the results for women who smoked at the start of their pregnancies and Columns (iv)-(vi) show the results for women who did not smoke at the start of their pregnancies.

Table 1 estimates of α_4

	Women smoking at start of pregnancy			**Women not smoking at start of pregnancy**		
		Indicators for low birthweight			Indicators for low birthweight	
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
	Birth weight (BW)	bw<1500g	bw<2500g	Birth weight (BW)	bw<1500g	bw<2500g
$Treat_j * Post_t$	165.4**	-.018*	.008	7.86	-.006	.003
N	793	793	793	2554	2554	2554

Notes: * significant at 10% level, **significant at 5% level

Question 3:
Given the results in Table 1, how would access active versus passive smoking during pregnancy to affect birth outcomes of the child?

Question 4:
Referring to the empirical results from papers in the health economics course, explain and discuss how you expect birth weight to affect the long run outcomes of the children, who were exposed to maternal smoking during pregnancy.

Question 5:
Two studies from the health economics course both use administrative data from Scandinavian countries to access whether stress during pregnancy affects children outcomes at different stages of their life cycle. How do these studies identify maternal stress and how do the studies' results differ?

Now, consider the following constant elasticity of substitution production function for health in adulthood:

$$H_{adult} = A[I_{prenatal}^{\theta} + (1-\gamma)I_{postnatal}^{\theta}]^{1/\theta} \qquad (2)$$

H_{adult} represents health in adulthood, $I_{prenatal}$ is in utero investments in health and $I_{postnatal}$ is health investments that take place after birth, θ is the elasticity and A reveals economies of scale .

Question 6:
Write up the investment equation from the Grossman model. Compare the predictions from the Grossman model and equation (2) on how adverse maternal health behaviors during pregnancies affect her child's health in adulthood.

Question 7:
Given your answers to questions 1-7, discuss whether and how you expect smoking bans affecting one cohort of mothers to spillover to their children's health and economic outcomes in adulthood.

Part 2: Health Insurance Innovations

In the textbox below you will find a description of an insurance product (a "smart watch contract") from Aetna (a large health insurance company) in which insurance customers are freely provided with a smart-watch. The insurance company describe the virtues of the product to help "guiding costumers through health events", medicine adherence and personalize their health plans. Beyond these benefits, the costumer also shares his or her health information with the insurer.

Aetna to Transform Members' Consumer Health Experience Using iPhone, iPad and Apple Watch

Launches New Customer Program featuring Apple Watch

HARTFORD, Conn.--(BUSINESS WIRE)--Sep. 27, 2016-- Aetna today announced a new initiative to revolutionize members' consumer health experience by combining the power of iOS apps and the unmatched user experience of Apple products including Apple Watch, iPhone and iPad with Aetna's analytics-based wellness and care management programs. Beginning this fall, Aetna will make Apple Watch available to select large employers and individual customers during open enrollment season, and Aetna will be the first major health care company to subsidize a significant portion of the Apple Watch cost, offering monthly payroll deductions to make covering the remaining cost easier.

With support from Apple, Aetna is planning several iOS-exclusive health initiatives, starting with deeply integrated health apps for iPhone, iPad and Apple Watch that will significantly improve the ability of consumers to manage their health and increase healthy outcomes. The initial solutions under development are among the first health apps designed for multi-device use.

Aetna's iOS-exclusive health apps will aim to simplify the healthcare process through a number of features, including:

- Care management and wellness, to help guide consumers through health events like a new diagnosis or prescription medication with user-driven support from nurses and people with similar conditions.
- Medication adherence, to help consumers remember to take their medications, easily order refills and connect with their doctor if they need a different treatment through their Apple Watch or iPhone.
- Integration with Apple Wallet, allowing consumers to check their deductible and pay a bill.
- Personalized health plan on-boarding, information, messaging and decision support to help Aetna members understand and make the most of their benefits.

Source: http://investor.aetna.com/phoenix.zhtml?c=110617&p=irol-newsArticle&ID=2206242

Question 8:
How do you expect a "smart watch contract" to affect different types of moral hazard for the customers?

Now, assume that population of potential insurance customers consists of individuals with differential risks of falling ill. Without a technology like the smart watch, the insurance company have no means to distinguish between their customers in terms of their risk profiles.

Imagine that a pool of customers work at the same workplace (no government contract is offered if the employee leaves the firm). All employees are initially covered by the same insurance contract and pay the same premium. Then, each November every year, the "smart-watch contract" is offered to any employee in the firm who voluntarily wants to sign up for it. The premiums of the different contracts are determined separately and are actuarially fair.

Question 9:
Abstract from moral hazard effects and illustrate graphically a standard framework of adverse selection in the health insurance market. Explain how you expect the insurance premium to evolve and the characteristics of population to change in the existing contract after the option to choose the "smart-watch contract" is introduced.

Question 10:
Imagine that the firm forces all its employees to buy the "smart watch contract" and all employees pay the same premium. Assume that any employee can switch jobs to another firm that offers the initial insurance contract. Would you expect all the employees to stay in the firm? Explain