

Institutt for samfunnsøkonomi

## **Eksamensoppgave i SØK3521 – Utdanningsøkonomi**

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**Tlf.: 73 59 17 64**

**Eksamensdato:** 3. desember 2013

**Eksamenstid:** 6 timer

**Sensurdato:** 24. desember 2013

**Tillatte hjelpemidler:** Flg formelsamling: Knut Sydsæter, Arne Strøm og Peter Berck (2006): Matematisk formelsamling for økonomer, 4utg. Gyldendal akademiske. Knut Sydsæter, Arne Strøm, og Peter Berck (2005): Economists' mathematical manual, Berlin.  
Enkel kalkulator Citizen SR-270x, HP 30S eller SR-270X College

**Annen informasjon:** Eksamensoppgaven består av 2 oppgaver med delspørsmål som alle skal besvares.

**Målform/språk:** Bokmål

**Antall sider:** 6 (inkl. tabeller)

### **Oppgave 1**

I artikkelen «Accountability, incentives and behavior: the impact of high-stake testing in the Chicago Public Sector» undersøker Brian Jacob effektene av en skolereform som ble implementert i Chicago i 1996-97.

- a) Hva forstås med et “accountability-system”? Hva er hovedelementene i Chicagos «accountability-system»?
- b) På teoretisk grunnlag: Hva kan vi forvente av effekter når «accountability-systemer innføres»?
- c) Tabellene 1 og 2 (gjengitt på side 3) gir noen av de viktigste resultatene fra analysene. Bruk tabellene til å beskrive hovedfunnene.
- d) Likningene som benyttet i tabellene 1 og 2 er forskjellige. Redegjør for hva forskjellen består i, og diskuter hvilken av tabellene som gir de mest troverdige resultatene.
- e) Skriv opp ligningen som er benyttet i Tabell 6, kolonne 1 (gjengitt på side 4), og redegjør for hva resultatene i denne kolonnen forteller oss.
- f) Er intenderte og ikke-intenderte effekter av Chicago-reformen som forventet?

### **Oppgave 2**

I artikkelen «Getting beneath the veil of effective schools (.) » gjør Dobbie og Fryer to typer analyser. I første del undersøker de om «charter schools» er mer effektive enn offentlige skoler, og i andre del undersøker de hva som karakteriserer effektive skoler.

- a) Tabell 4, gjengitt på side 5, gjengir resultatene fra første del av denne undersøkelsen. Skisser likningen som er estimert i første kolonne i denne tabellen. Redegjør for hvilke økonometriske utfordringer som OLS ikke løser, og deretter hva kolonnene 2 og 3 forteller oss. Gi en forklaring på hvorfor punkttestimatene i kolonne 3 er større enn tilsvarende punkttestimater i kolonne 1. (Det forventes ingen nøyaktig gjengivelse av likningene som Dobbie og Fryer estimerer, men at det gis likninger som er tilstrekkelig spesifisert til å diskutere hvilke problemer som løses, og hvilke som ikke løses.)
- b) Tabell 7 fra denne analysen, gjengitt på side 6, gir noen av resultatene fra andre del av undersøkelsen. Redegjør for ligningen(e) som er estimert, diskuter begrensningene ved estimeringsmetoden, og benytt denne diskusjonen til å presisere hva tabell 7 forteller oss.
- c) Dobbie og Fryer benytter tidligere empirisk forskning i «effektive schools»-tradisjonen som bakgrunn for å velge forklaringsvariabler. Diskuter alternative fremgangsmåter for å finne relevante forklaringsvariabler.

Table 1  
OLS estimates of ITBS math and reading achievement in Chicago

	Dependent variable: standardized ITBS score	
	Reading	Math
<i>3rd grade</i>		
2000 cohort	0.186 (0.033)	0.263 (0.037)
1999 cohort	0.212 (0.028)	0.190 (0.031)
1998 cohort	0.173 (0.019)	0.213 (0.021)
1997 cohort	0.026 (0.018)	-0.081 (0.019)
<i>6th grade</i>		
2000 cohort	0.161 (0.022)	0.326 (0.027)
1999 cohort	0.118 (0.018)	0.154 (0.023)
1998 cohort	0.212 (0.014)	0.243 (0.017)
1997 cohort	0.085 (0.012)	0.088 (0.014)
<i>8th grade</i>		
2000 cohort	0.240 (0.024)	0.459 (0.026)
1999 cohort	0.192 (0.021)	0.485 (0.022)
1998 cohort	0.197 (0.015)	0.306 (0.015)
1997 cohort	0.100 (0.013)	0.318 (0.014)
Includes controls for demographics, prior achievement and pre-existing trends	Yes	Yes

Includes students in the specified grades from 1993 to 2000. Control variables not shown include age, race, gender, race\*gender interactions, guardian, bilingual status, special education placement, prior math and reading achievement, school demographics (including enrollment, racial composition, percent free lunch, percent with limited English proficiency and mobility rate) demographic characteristics of the student's home census tract (including median household income, crime rate, percent of residents who own their own homes, percent of female-headed household, mean education level, unemployment rate, percent below poverty, percent managers or professionals and percent who are living in the same house for five years) and test form. See text for details on the exact specification. Robust standard errors that account for the correlation of errors within schools are shown in parentheses.

Table 2  
OLS estimates of achievement trends in Chicago and other mid-western cities

Independent variables	Dependent variable: standardized achievement score			
	Math		Reading	
Chicago	0.039 (0.056)	-17.94 (63.03)	-0.048 (0.034)	-2.95 (32.95)
1997–2000	-0.022 (0.038)	-0.015 (0.048)	-0.003 (0.023)	-0.032 (0.026)
Chicago*(1997–2000)	0.364 (0.061)	0.330 (0.136)	0.253 (0.037)	0.235 (0.076)
Fixed effects for each district and grade	Yes	Yes	Yes	Yes
Pre-existing trends for Chicago and other districts	No	Yes	No	Yes
Number of observations	131	131	131	131

Observations are district-level averages by grade, subject and year. Scores are standardized using the mean and standard deviation for the earliest available year for that grade and subject. The comparison cities include Cincinnati, Gary, Indianapolis, Milwaukee and St. Louis.

Table 6  
The relationship between item type, position and improvement on the ITBS math exam

Independent variables	Dependent variable=proportion of students answering the item correctly		
	(1)	(2)	(3)
1998 cohort	0.017 (0.011)	0.015 (0.014)	0.035 (0.013)
Basic skills*1998	0.022 (0.005)		
Math computation*1998		0.025 (0.008)	
Whole numbers*1998			
Decimals*1998			0.000 (0.010)
Fractions*1998			0.022 (0.017)
Number concepts*1998		0.023 (0.008)	
Equations and inequalities*1998			0.002 (0.015)
Fractions, decimals, percents*1998			0.004 (0.013)
Geometry*1998			0.002 (0.013)
Measurement*1998			-0.028 (0.016)
Numeration and operations*1998			0.001 (0.011)
Probability and statistics*1998			0.011 (0.018)
Other skills*1998			
Estimation*1998		0.003 (0.012)	
Compensation*1998			-0.043 (0.012)
Order of magnitude*1998			-0.013 (0.015)
Standard rounding*1998			-0.002 (0.011)
Data analysis*1998		0.006 (0.013)	
Compare quantiles*1998			-0.018 (0.015)
Interpret relationships*1998			-0.024 (0.012)
Read amounts*1998			-0.002 (0.016)
Problem solving*1998			
Multiple step*1998			-0.023 (0.012)
Use strategies*1998			-0.032 (0.014)
Single step*1998			-0.017 (0.013)
2nd quintile of the exam*1998	0.001 (0.001)	0.001 (0.008)	0.002 (0.008)
3rd quintile of the exam*1998	-0.001 (0.008)	-0.002 (0.008)	-0.002 (0.008)
4th quintile of the exam*1998	0.011 (0.008)	0.008 (0.011)	0.008 (0.011)
5th quintile of the exam*1998	0.006 (0.009)	0.003 (0.012)	0.002 (0.012)
Number of observations	1038	1038	1038
R <sup>2</sup>	0.960	0.962	0.962

The sample consists of all tested and included students in grades 3, 6 and 8 in years 1994, 1996 and 1998. The units of observation are item\*year proportions, reflecting the proportion of students answering the item correctly in that year. Other covariates included but not shown: main effects for grade, item difficulty, item position, item type and interactions for item difficulty×1998.

**Table 4**  
**The Effect of Attending a Charter School on Test Scores**

Level	Subject	Reduced Form (1)	First Stage (2)	2SLS (3)	Lottery OLS (4)	Survey OLS (5)
<i>Element</i>	Math	0.119***	0.755***	0.158***	0.054***	0.041***
		(0.029)	(0.054)	(0.038)	(0.004)	(0.003)
		9706	9706	9706	666928	666928
	ELA	0.056**	0.755***	0.074**	0.050***	0.036***
	(0.027)	(0.054)	(0.036)	(0.003)	(0.003)	
		9706	9706	9706	666928	666928
<i>Middle</i>	Math	0.064***	0.403***	0.159***	0.051***	0.029***
		(0.015)	(0.024)	(0.037)	(0.004)	(0.002)
		11712	11712	11712	1061829	1061829
	ELA	0.023*	0.404***	0.057*	0.013***	0.015***
	(0.014)	(0.024)	(0.034)	(0.004)	(0.002)	
		11712	11712	11712	1061829	1061829

Notes: This table reports reduced form, first stage, and two-stage least squares results for the lottery study (Columns 1 - 3) and observational estimates for the survey study (Columns 4 - 5). The lottery sample is restricted to students in an elementary or middle school charter school lottery, excluding students with sibling preference. All lottery specifications control for lottery risk set, race, sex, free lunch eligibility, grade, and year. All observational specifications include match cell, race, sex, free lunch eligibility, grade, and year. Middle school specifications also include baseline test scores. All specifications cluster standard errors at the student level. \*\*\* = significant at 1 percent level, \*\* = significant at 5 percent level, \* = significant at 10 percent level.

**Table 7**  
**The Partial Correlation of Each Non-Traditional Input**

	Panel A: Math Results				
	(1)	(2)	(3)	(4)	(5)
Teacher Feedback	0.038*				
	(0.022)				
Data Driven Instruction		0.051**			
		(0.022)			
Tutoring			0.044*		
			(0.026)		
Instructional Time				0.059***	
				(0.015)	
High Expectations					0.014
					(0.011)
Index	0.046***	0.051***	0.052***	0.039***	0.054***
	(0.012)	(0.010)	(0.011)	(0.009)	(0.010)
$R^2$	0.471	0.479	0.470	0.482	0.494
Observations	35	35	35	35	35

  

	Panel B: ELA Results				
	(6)	(7)	(8)	(9)	(10)
Teacher Feedback	0.028*				
	(0.015)				
Data Driven Instruction		0.025			
		(0.020)			
Tutoring			0.064***		
			(0.021)		
Instructional Time				0.020	
				(0.020)	
High Expectations					0.015
					(0.012)
Index	0.031***	0.035***	0.031***	0.033***	0.035***
	(0.009)	(0.009)	(0.009)	(0.011)	(0.010)
$R^2$	0.498	0.499	0.544	0.503	0.510
Observations	35	35	35	35	35

Notes: This table reports regressions of school-specific treatment effects on school characteristics. The sample includes all schools with at least one tested grade that completed the charter survey. Regressions weight by the inverse of the standard error of the estimated school impact. \*\*\* = significant at 1 percent level, \*\* = significant at 5 percent level, \* = significant at 10 percent level.