AMK-koulutuksen vaikutukset työmarkkinoilla / Labour market effects of polytechnic education

Työ, tasa-arvo ja julkisen vallan politiikka (WIP) Workshop, Helsinki

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Two main outputs so far

(1) Haapanen, M. & Böckerman, P. (2017). “More educated, more mobile? Evidence from post-secondary education reform”, *Spatial Economic Analysis,* 12:1, 8-26.

(2) Böckerman, P., Haapanen, M. & Jepsen, C., ”More Skilled, Better Paid: Labor-Market Returns to Vocational Postsecondary Education”.

- Earlier version: IZA Discussion Paper No. 9079

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(1) More educated, more mobile? Evidence from post-secondary education reform

- We examines the causal impact of the level of (vocational) education on within-country migration
- We use a large-scale reform within the higher education system that gradually transformed former vocational colleges into polytechnics in Finland in the 1990s
- The reform created quasi-exogenous variation in the supply of higher education over time and across regions
- Comparison of graduates from post-secondary education (vocational college, polytechnic or university) in 1988–2004
- The results based on multinomial treatment effects models and population register data

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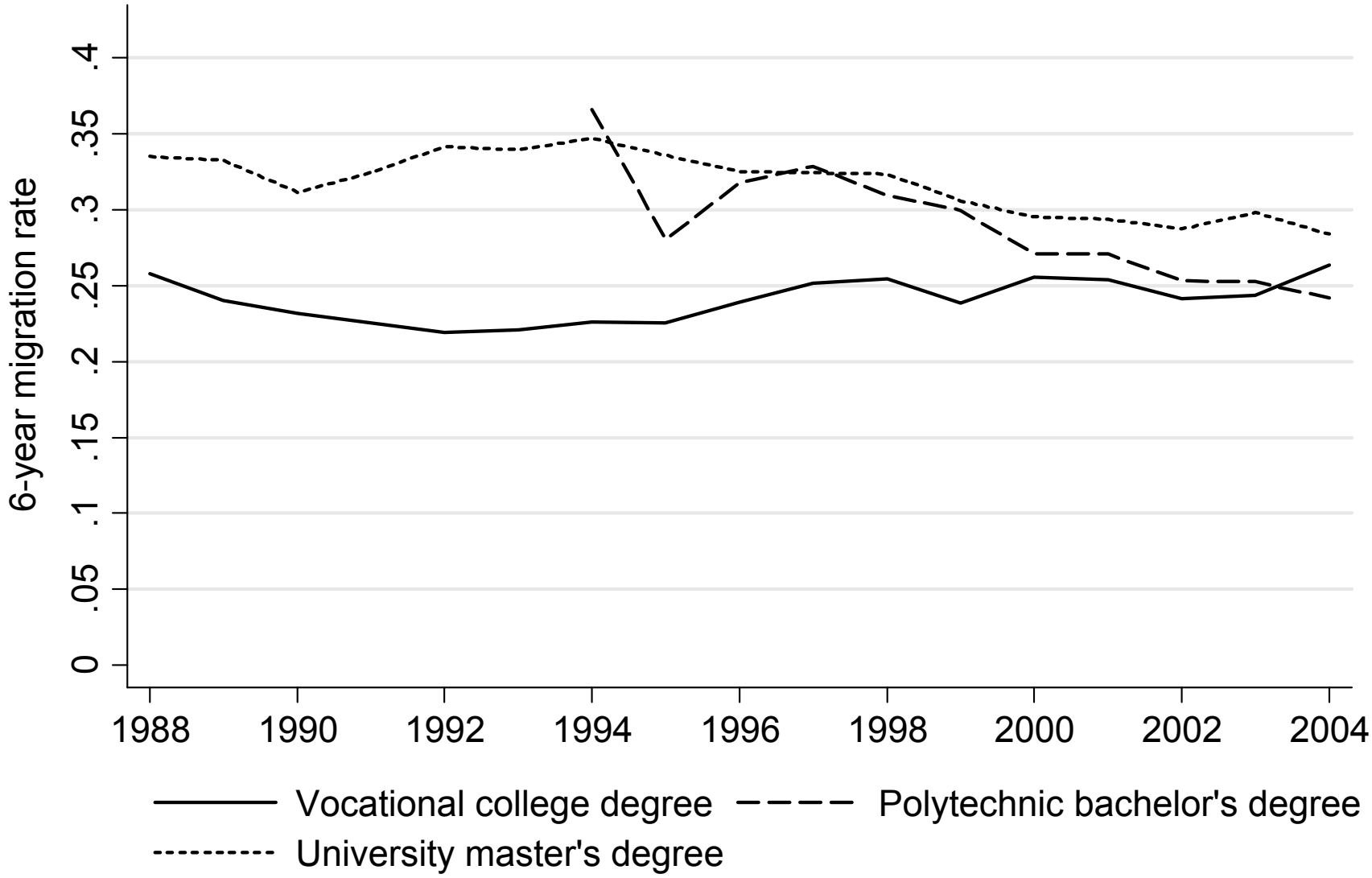
Prior literature

- The causal evidence on causal effects of education on migration primarily concerns compulsory education:
  - Machin, Salvanes, and Pelkonen (2012): length of compulsory education has a *positive* causal impact on migration in Norway.
  - McHenry (2013): additional schooling at low education levels has a significant *negative* effect on migration in the U.S.
  - Weiss (2015): an additional year of compulsory education *increases* migration (8 European countries)
- Malamud and Wozniak (2012): additional years of college education significantly *increased* the likelihood that the affected men, later in life, resided outside the (U.S.) states where they had been born

Migration rates after graduation from education



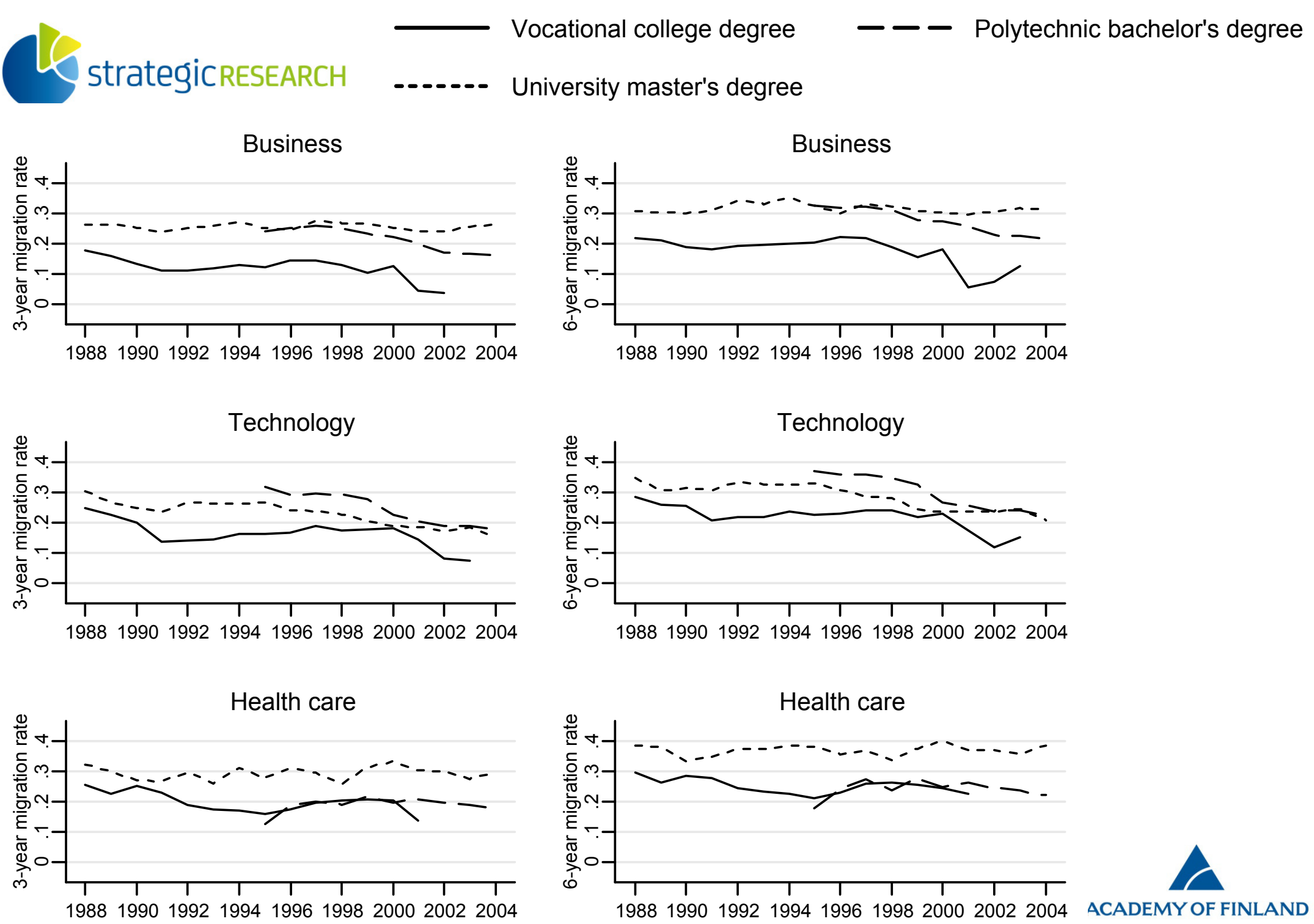

Vocational college degree
Polytechnic bachelor's degree
University master's degree
Business
3-year migration rate
0 .1 .2 .3 .4
1988 1990 1992 1994 1996 1998 2000 2002 2004
Business
6-year migration rate
0 .1 .2 .3 .4
1988 1990 1992 1994 1996 1998 2000 2002 2004
Technology
3-year migration rate
0 .1 .2 .3 .4
1988 1990 1992 1994 1996 1998 2000 2002 2004
Technology
6-year migration rate
0 .1 .2 .3 .4
1988 1990 1992 1994 1996 1998 2000 2002 2004
Health care
3-year migration rate
0 .1 .2 .3 .4
1988 1990 1992 1994 1996 1998 2000 2002 2004
Health care
6-year migration rate
0 .1 .2 .3 .4
1988 1990 1992 1994 1996 1998 2000 2002 2004

Table 3. Marginal effects of polytechnic education on migration: Heterogeneity

	Number of observations	Exogenous educ. choice		Endogenous educ. choice		
All individuals						
Mean	233,839	0.0429***	(0.0112)	0.0878***	(0.0317)	
Gender						
Male	92,150	0.0550***	(0.0120)	0.0987***	(0.0275)	
Female	141,689	0.0340***	(0.0118)	0.0655*	(0.0347)	
Matriculated						
Yes	194,287	0.0373***	(0.0114)	0.0914***	(0.0313)	
No	39,552	0.0716***	(0.0141)	0.1396**	(0.0565)	
Field of study						
Business	73,623	0.0488***	(0.0142)	0.0707***	(0.0129)	
Technology	46,364	0.0835***	(0.0150)	0.0782***	(0.0280)	†
Health	47,914	0.0127	(0.0105)	0.0280**	(0.0118)	†
Graduation region						
Uusimaa	65,447	-0.0140***	(0.0041)	-0.0289***	(0.0097)	
Other regions	168,392	0.0588***	(0.0080)	0.1190***	(0.0216)	

Notes: The marginal effects have been calculated using only the mean characteristics of the vocational college and polytechnic graduates. The specifications for these sub-sample estimations are the same as in Table 2. Heteroskedasticity-robust standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. † LR-test does not reject the exogenous model ($p > 0.1$). In all other cases, the exogenous model is rejected.

Additional findings

- The smaller estimated effect of polytechnic education on migration for women than for men is mainly explained by two patterns:
  - Women are more likely to graduate from health care fields and less likely to graduate from technology fields than men;
  - Regardless of gender, the effect of polytechnic education on migration is smaller in health care fields than in technology fields.
- Hence, the differences between the fields of education are of greater importance than the differences between genders within fields.
  - Positive effect of polytechnic education on migration is larger for male technology field graduates than female technology field graduates; reverse for business and health care graduates.

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(2) More Skilled, Better Paid: Labor-Market Returns to Vocational Postsecondary Education

- Outside the U.S., little is known about the labor-market returns to vocational (or polytechnic) postsecondary education.
- Yet, polytechnics in Europe are distinctly different from U.S. community colleges.
- This paper focuses on the labor-market returns to polytechnic attendance in Finland, where polytechnics are representative of many European countries.
- Longitudinal data, including comprehensive administrative registers on individuals who did not attend polytechnics.

Prior literature on vocational and adult education

- The majority of studies on vocational postsecondary education focus on the returns to U.S. community colleges.
  - Degrees and diplomas in vocational areas are associated with higher earnings and employment, particularly for women; see Jepsen, Troske, and Coomes (2014), Carruthers and Sandford (2015)
- Böckerman, Hämäläinen, and Uusitalo (2009) effect of polytechnic reform on the earnings and employment of graduates in business and administration.
- Hämäläinen and Uusitalo (2008) show that the earnings gains for students studying business represent both the human capital and signaling values of education.

Prior literature on vocational and adult education

- Riphahn et al. (2010) compare labor-market returns between polytechnics and universities in Germany, and, using OLS regressions on survey data, they find that universities have higher returns.
- Verhaest and Baert (2015) find no evidence of a difference in early labor-market effects between vocational and general (i.e. academic) postsecondary education programs in Belgium.

- **Adult education**
  - Stenberg (2011) finds that a year of adult education increases earnings by 4.4% at the (upper) secondary-school level.
  - Stenberg and Westerlund (2016) find positive long-run returns to attendance at postsecondary adult education in Sweden, but the estimate is a combined effect of academic and vocational education.

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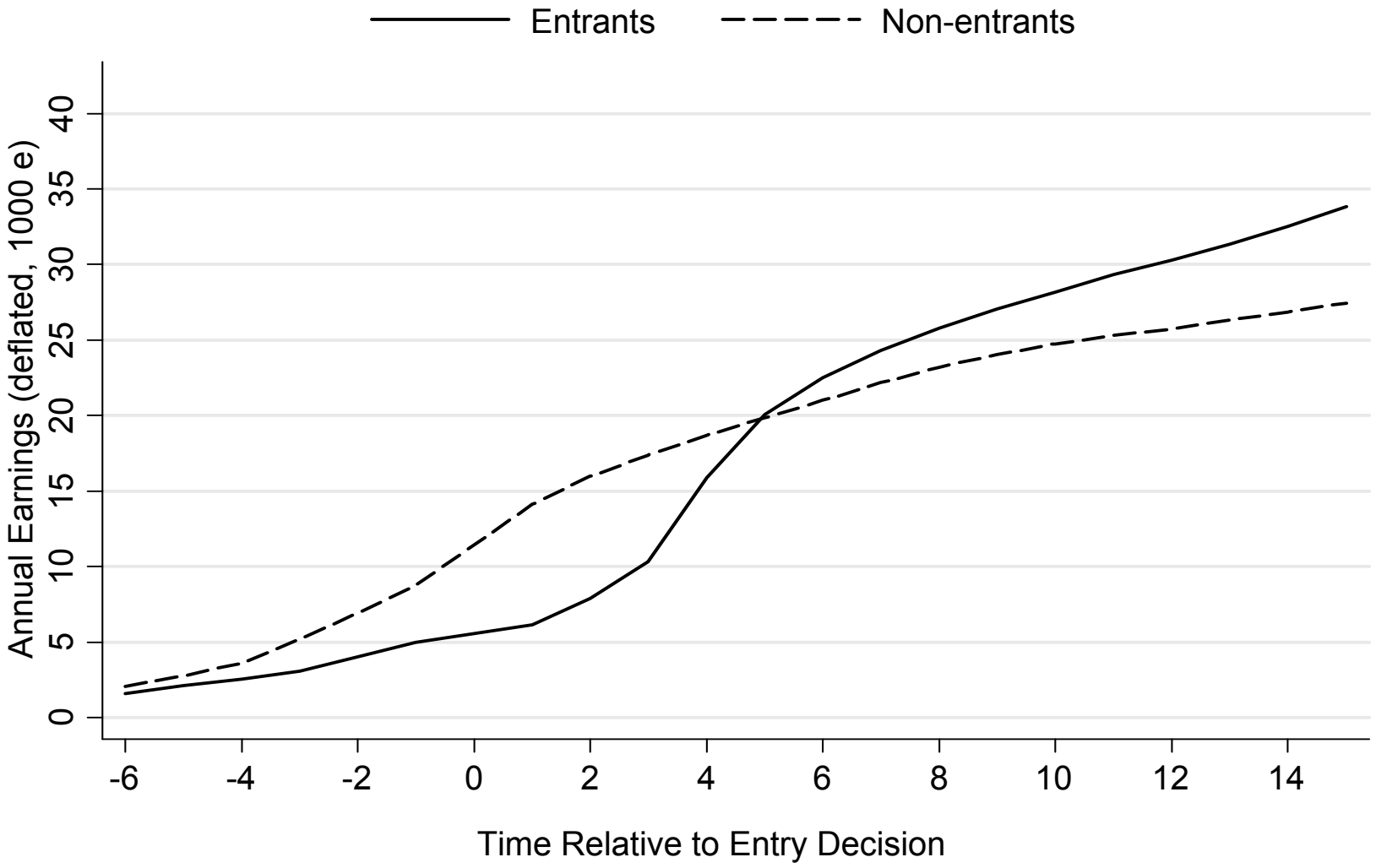
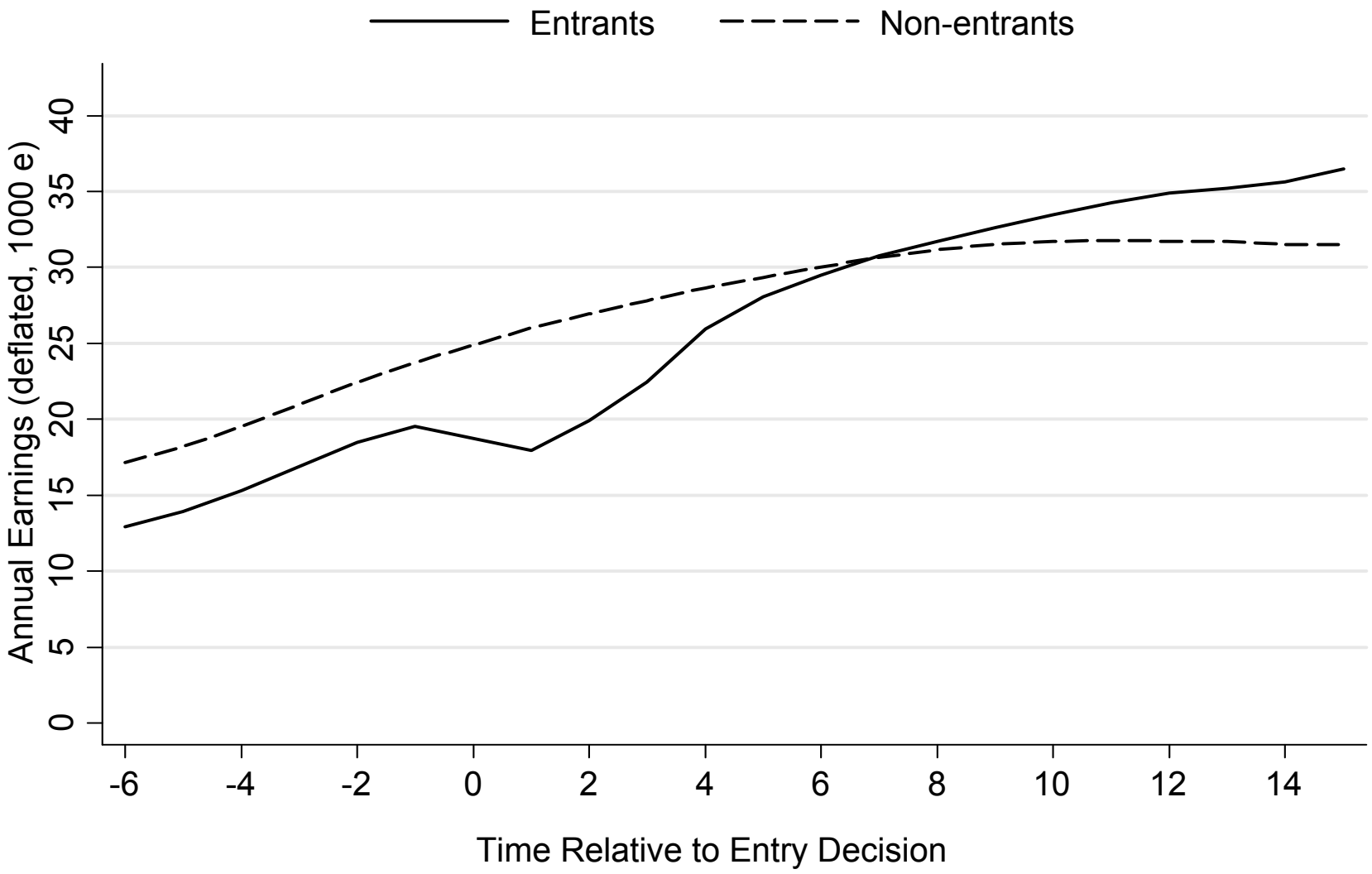
Our analyses

- Labor-market outcomes of Finnish individuals who are aged 19 to 50 when they initially enroll in polytechnics bachelor's programs between 1997 and 2004.
- Throughout the analysis, we divide the sample into
  - traditional-age students, age 19 to 24 at entry, and
  - mature students, age 25 to 50 at entry.
- *Matching Estimators*
  - entrants vs. non-entrants in a particular year
- Additional Person Fixed Effects Models
  - for the mature students only
  - Including dropouts vs. completers

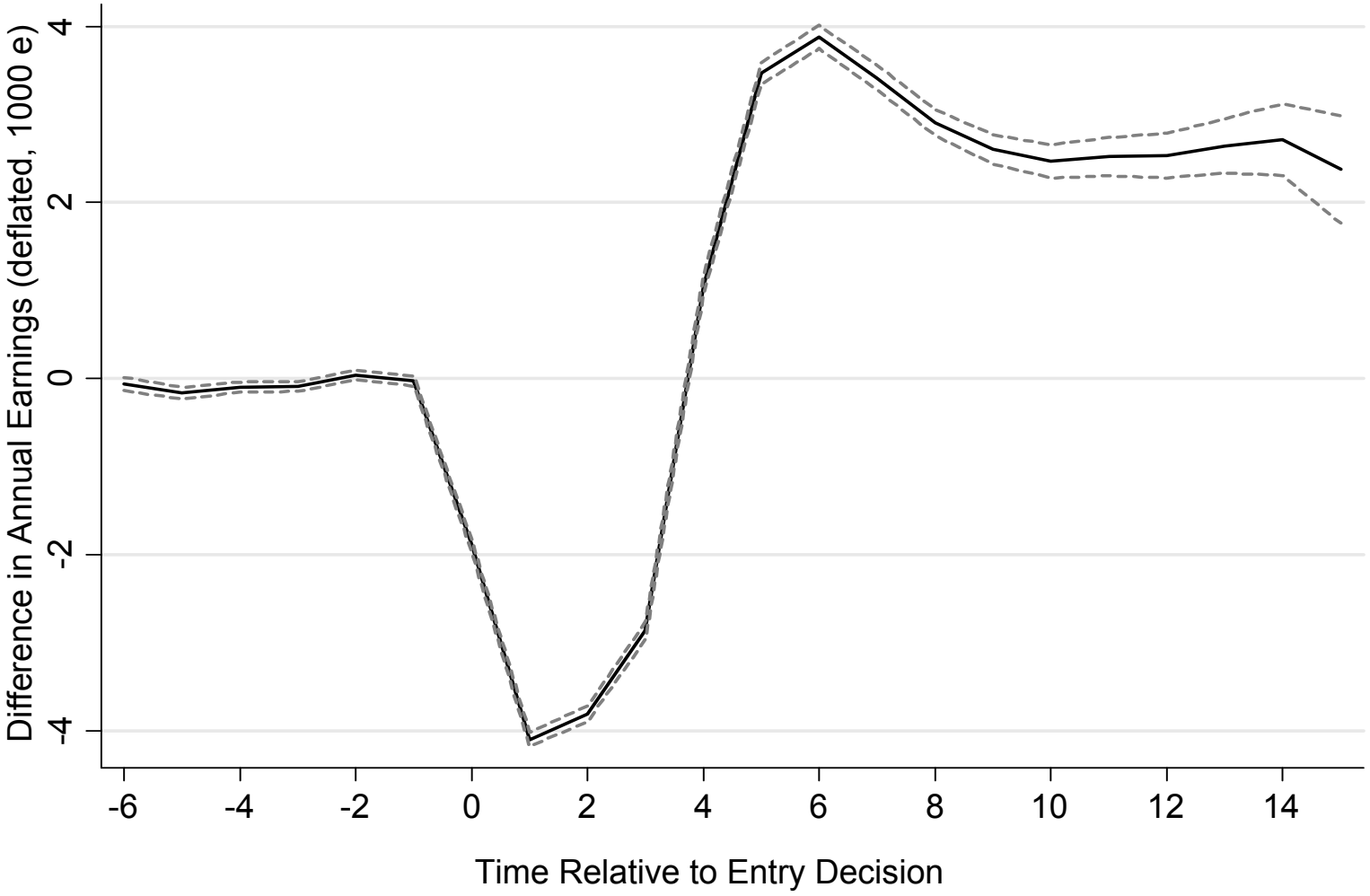
Annual Earnings by Treatment Status, Aged 19 to 24 at Entry



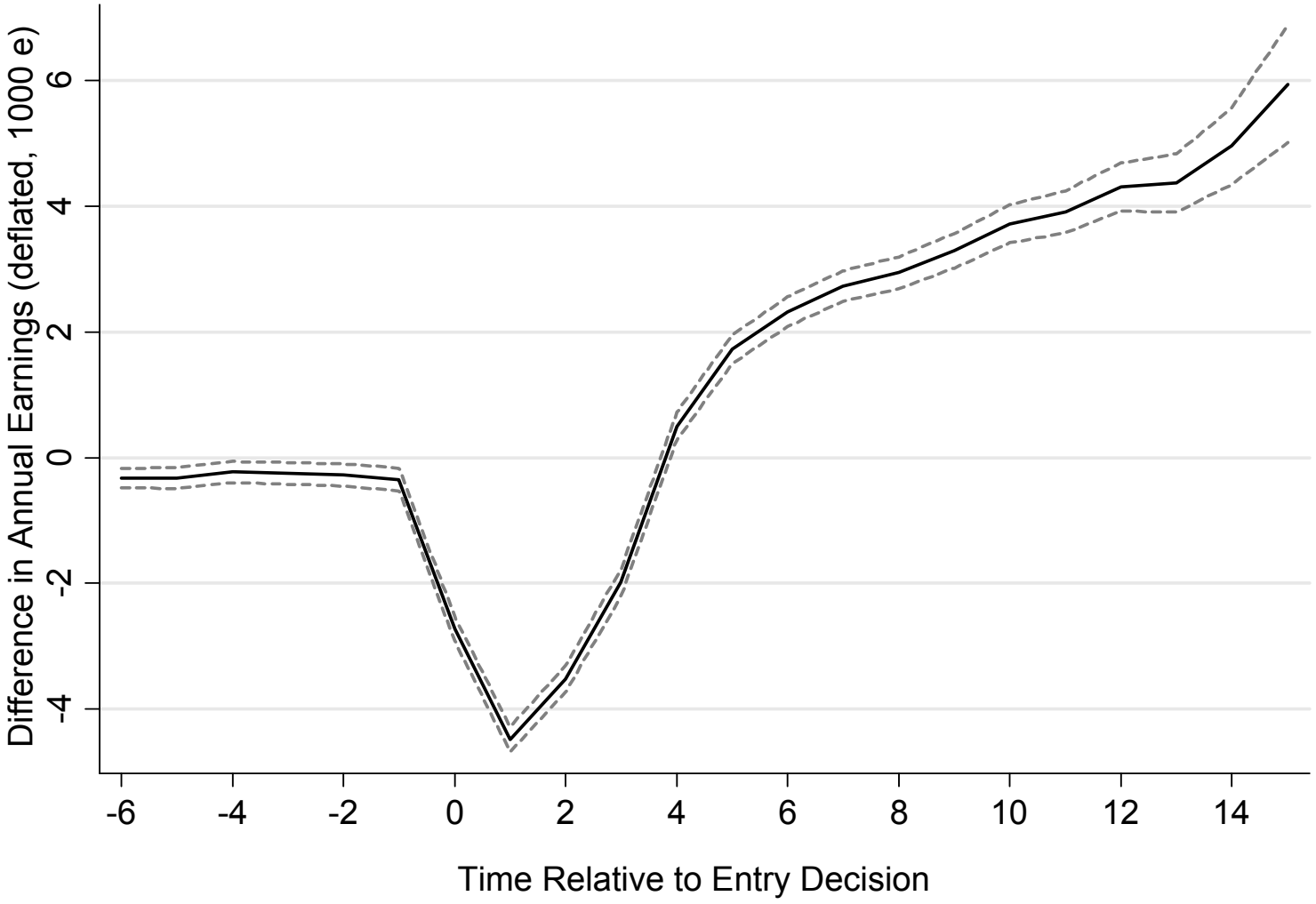
Annual Earnings by Treatment Status, Aged 25 to 50 at Entry



Difference in Earnings Development between the Matched Polytechnic Entrants and Non-Entrants, Aged 19 to 24 at Entry

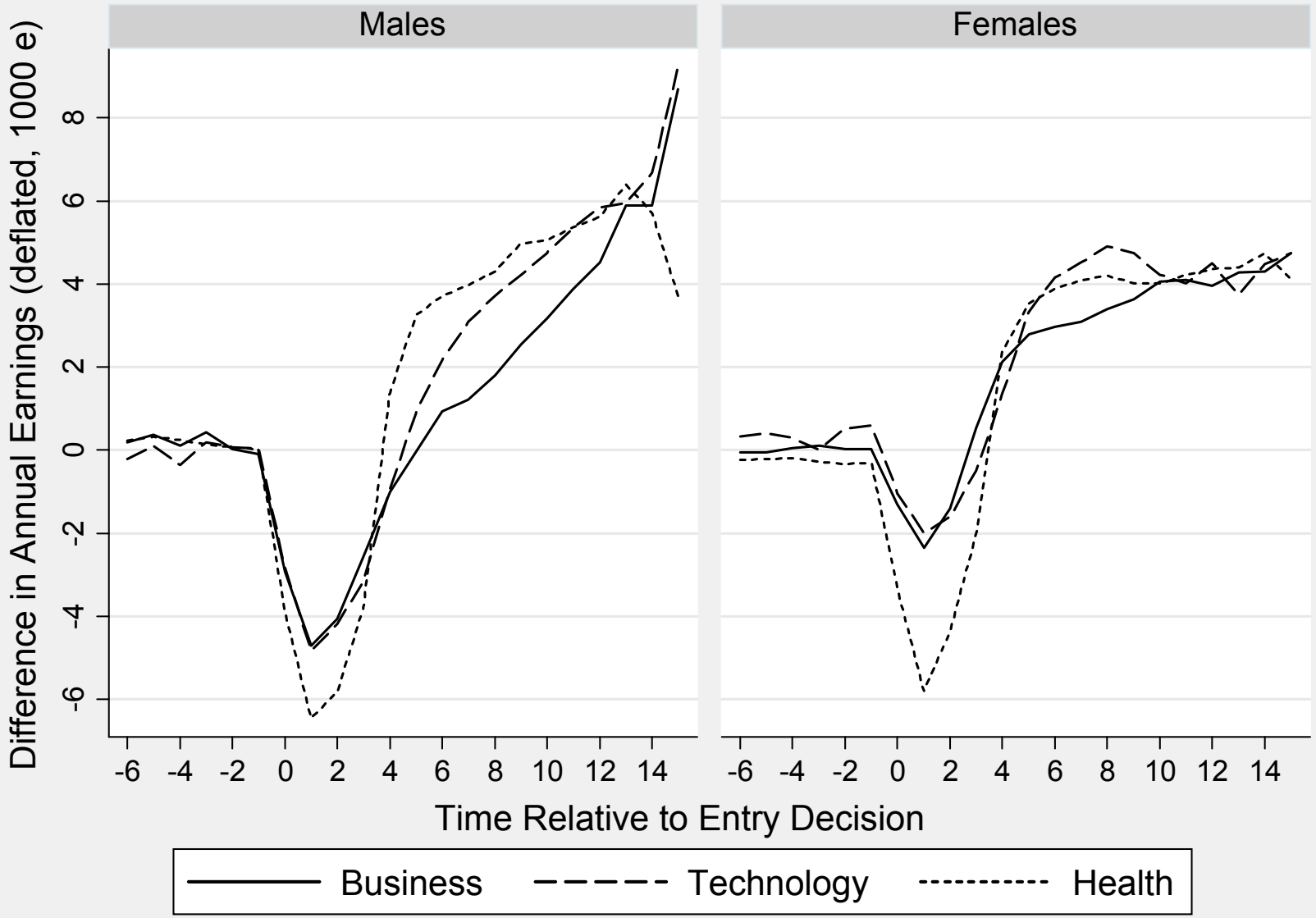


Difference in Earnings Development between the Matched Polytechnic Entrants and Non-Entrants, Aged 25 to 50 at Entry

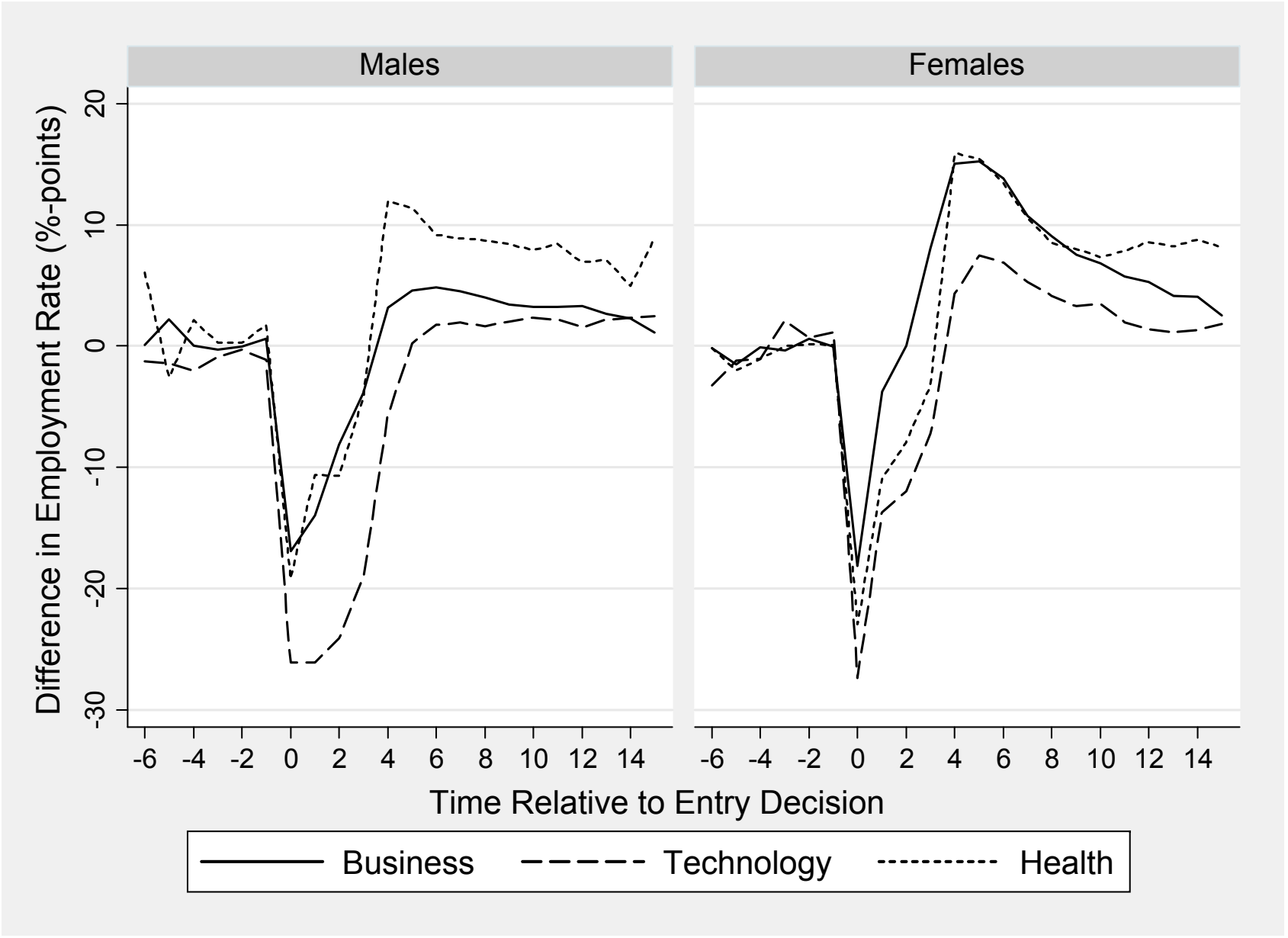


Matched Polytechnic Entrants and Non-Entrants by Gender, *Aged 19 to 24 at Entry*

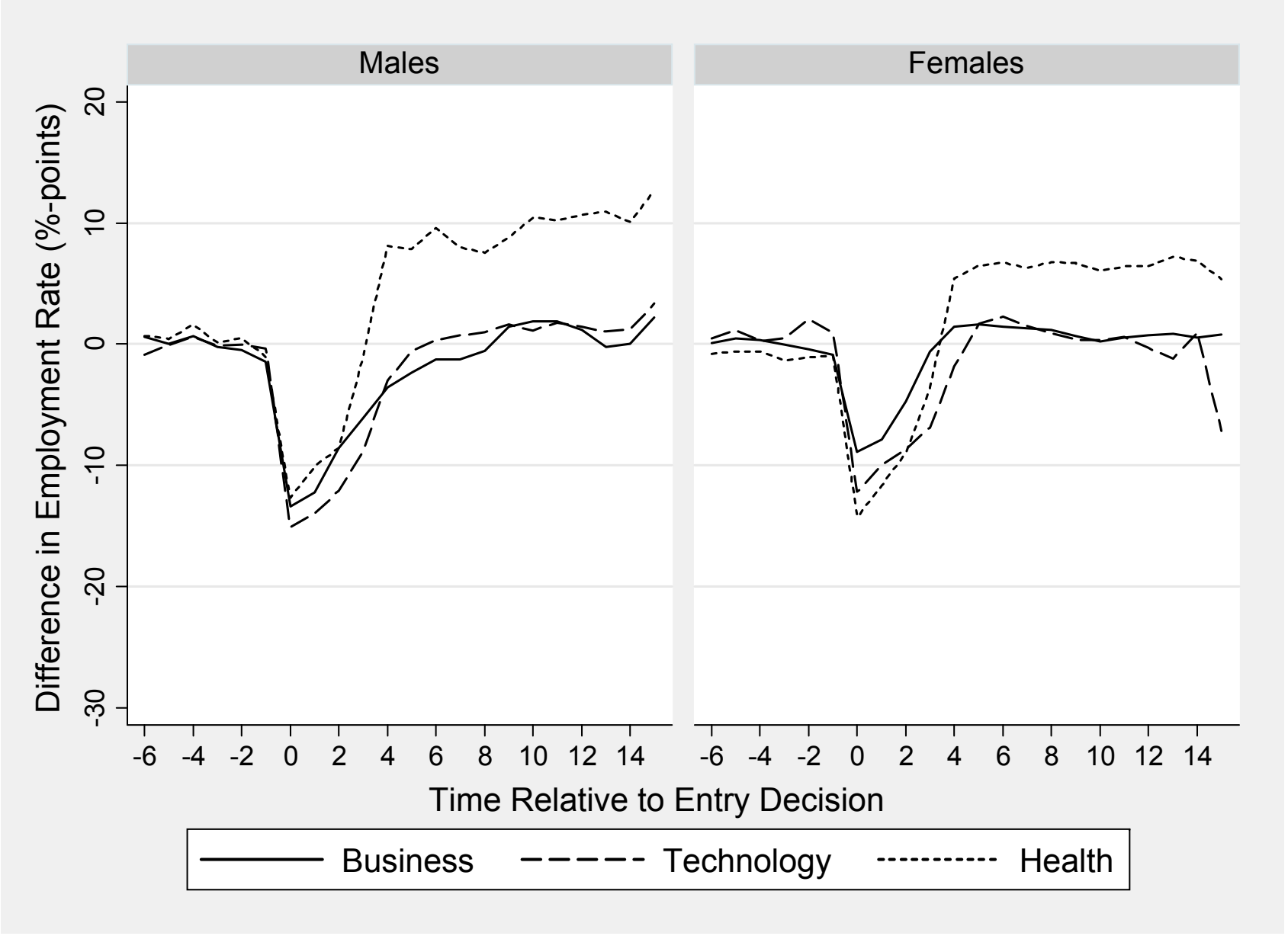
Matched Polytechnic Entrants and Non-Entrants by Gender, *Aged 25 to 50 at Entry*



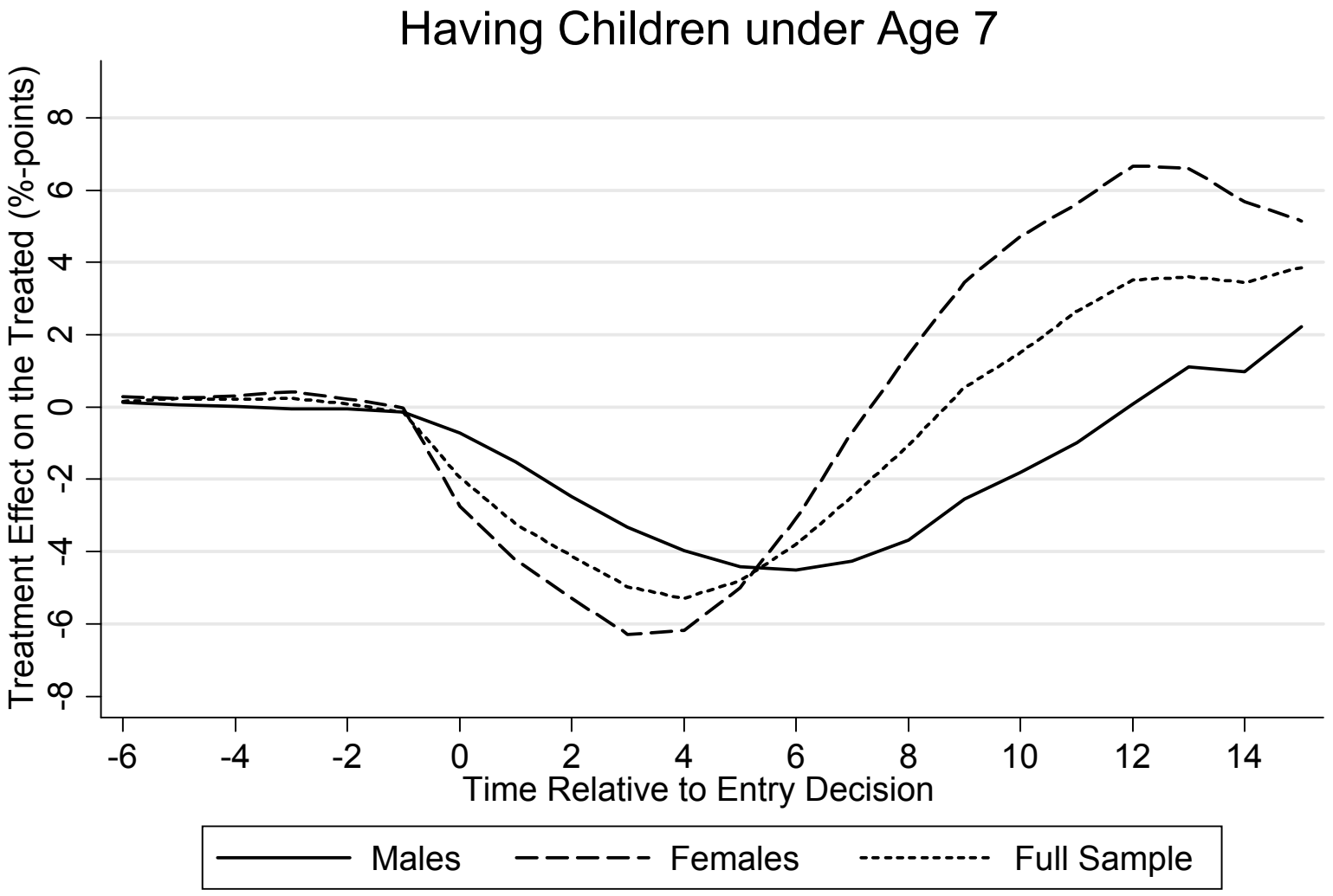
Matched Polytechnic Entrants and Non-Entrants by Gender, *Aged 19 to 24 at Entry*



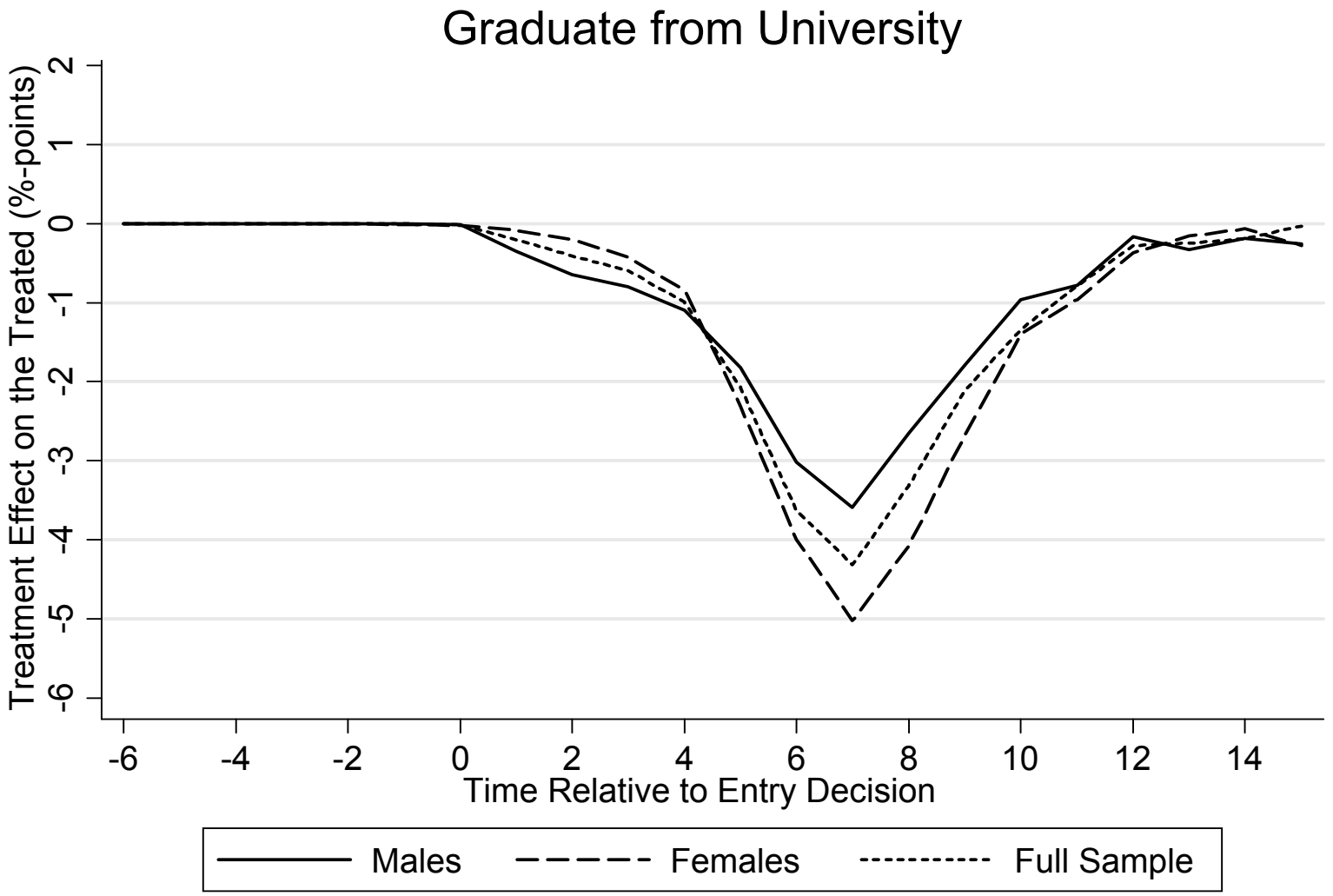
Matched Polytechnic Entrants and Non-Entrants by Gender, *Aged 25 to 50 at Entry*



Matched Polytechnic Entrants and Non-Entrants by Gender, *Aged 19 to 24 at Entry*



Matched Polytechnic Entrants and Non-Entrants by Gender, *Aged 19 to 24 at Entry*



Fixed effects models

Table 8: Fixed Effects Earnings and Employment Results, Students Aged 25 to 50 at Entry

	Earnings		Employment	
	(1)	(2)	(3)	(4)
Panel A: Full sample (N=1,314,938)				
Post attendance	1.690***	2.090***	0.036***	0.005
	(0.110)	(0.104)	(0.003)	(0.003)
Attendance	-1.021***	-1.127***	0.013***	-0.024***
	(0.097)	(0.091)	(0.003)	(0.003)
Adjusted R-squared	0.606	0.748	0.303	0.399
Person fixed effects	Yes	Yes	Yes	Yes
Person time trends	No	Yes	No	Yes

Notes: N = number of observations. All models also include the following control variables: NUTS 5 unemployment rate, calendar year dummy variables, not attending this year, and dummy variables for each year prior to entry (except the year before). Statistical significance in two-sided tests are denoted by * for the ten-percent level, ** for the five-percent level, and *** for the one-percent level.

Dropouts vs. Completers

Table W8: Fixed Effects Earnings and Employment Results, Matched Sample for Individuals Aged 25 to 50 at Entry

	Earnings		Employment	
	(1)	(2)	(3)	(4)
Entrant × Post entry	1.237***		-0.003	
	(0.079)		(0.003)	
Entrant × Post attendance		3.426***		0.036***
		(0.094)		(0.003)
Entrant × Attendance		-3.304***		-0.091***
		(0.069)		(0.003)
Entrant × Before attendance	-0.008	-0.005	0.003	0.003
	(0.068)	(0.068)	(0.003)	(0.003)
Adjusted R-squared	0.594	0.599	0.315	0.318
Person fixed effects	Yes	Yes	Yes	Yes

Notes: Number of observations is 2,485,451. All models also include the following control variables: NUTS 5 unemployment rate, calendar year dummy variables, and time dummy variables for each year prior to and after entry decision (except the year before). Columns 2 and 4 also include dummy variable for studying but not attending this year. Statistical significance in two-sided tests are denoted by * for the ten-percent level, ** for the five-percent level, and *** for the one-percent level.

Conclusions

- *For the younger cohort*, the increase in annual earnings is €3,500 for five years after entry (21%) and €2,500 for ten years after entry (10%). The gain in employment is around 5–9 percentage points.
- *For the older cohort*, the gain in earnings is around €1,700 five years after entry (7%) and over €3,700 ten years after entry (13%). The post-attendance gains in employment are modest (1–2 percentage points).
- Using 4% discount rate, the total gains are €10,800 for the traditional-age students and €14,700 for the mature students over the period 0–15.

Conclusions

- Men and women have roughly similar earnings returns, but women generally have higher employment returns than men.
- For the younger cohorts, returns are higher at Helsinki than elsewhere. Vice versa for the mature cohorts.
- Health is related to sizeable increases in employment and short-run earnings, but long-run earnings are marginally better for technology entrants.
- Business has considerable increases in employment for the younger cohort, as well as in earnings for both cohorts.

The next step

- Böckerman, P., Haapanen, M. & Jepsen, C., Back to School: Labor-Market Returns to Higher Vocational Schooling
  - Returns to polytechnic master programs (*"ylempi AMK"*)