Higher Education Funding Reforms:
A Comprehensive Analysis of Educational and Labor Market Outcomes in England

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Introduction

- Cross-country variation in levels of tuition fees charged and the degree of (and conditions for) means-tested financial support:
  - No tuition fees and very generous financial support (**Nordic countries**)
  - Moderate tuition fees and low level of financial support (**Spain, Italy, France, Belgium, Austria**)
  - High tuition fees and generous financial support (**US, UK**)

- HE funding is a highly debated public policy

- Many countries considering reform in HE funding

Share of Higher Education Costs Covered by Public Expenditure
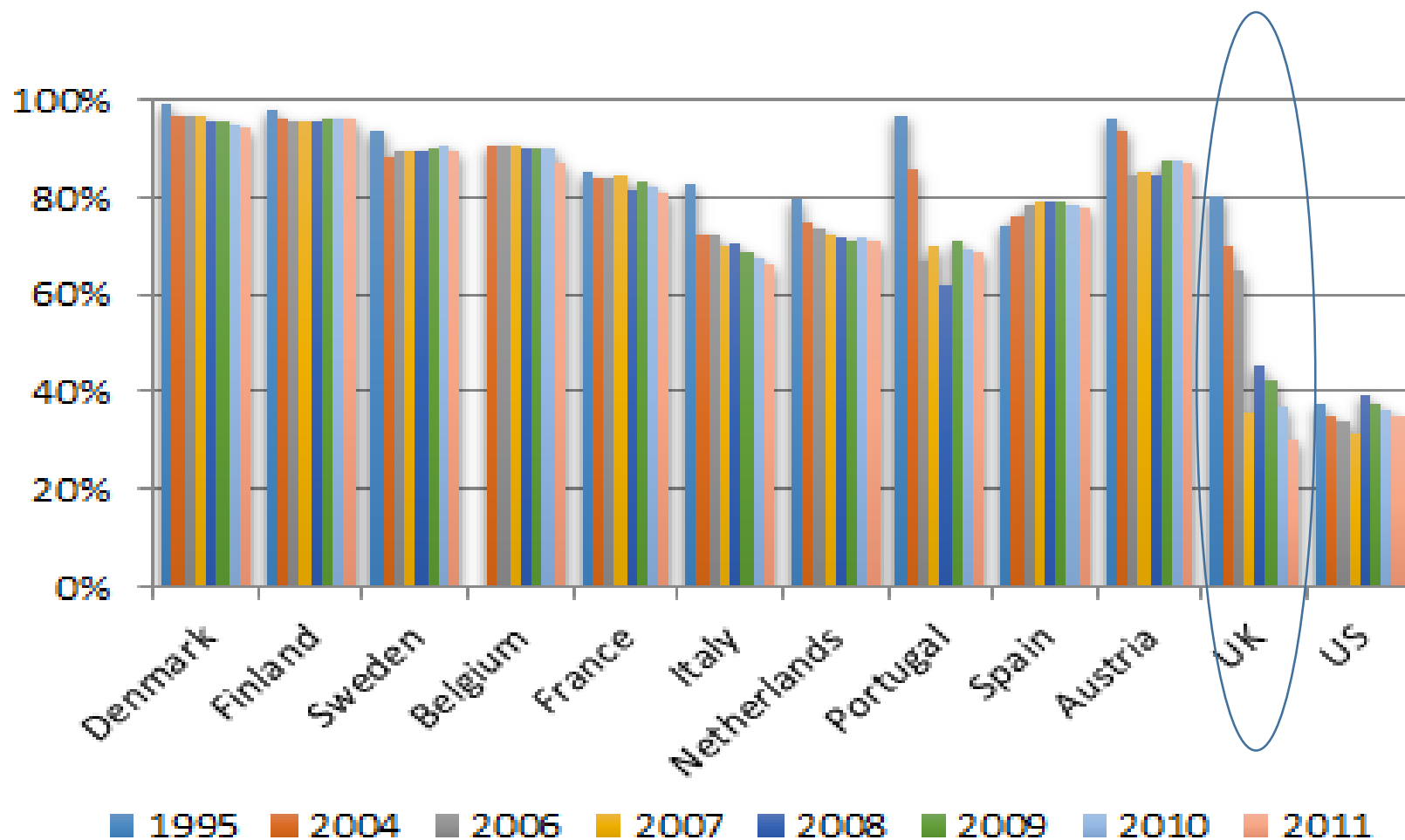
Source: OECD Indicators

Share of Higher Education Costs Covered by Public Expenditure (in UK)
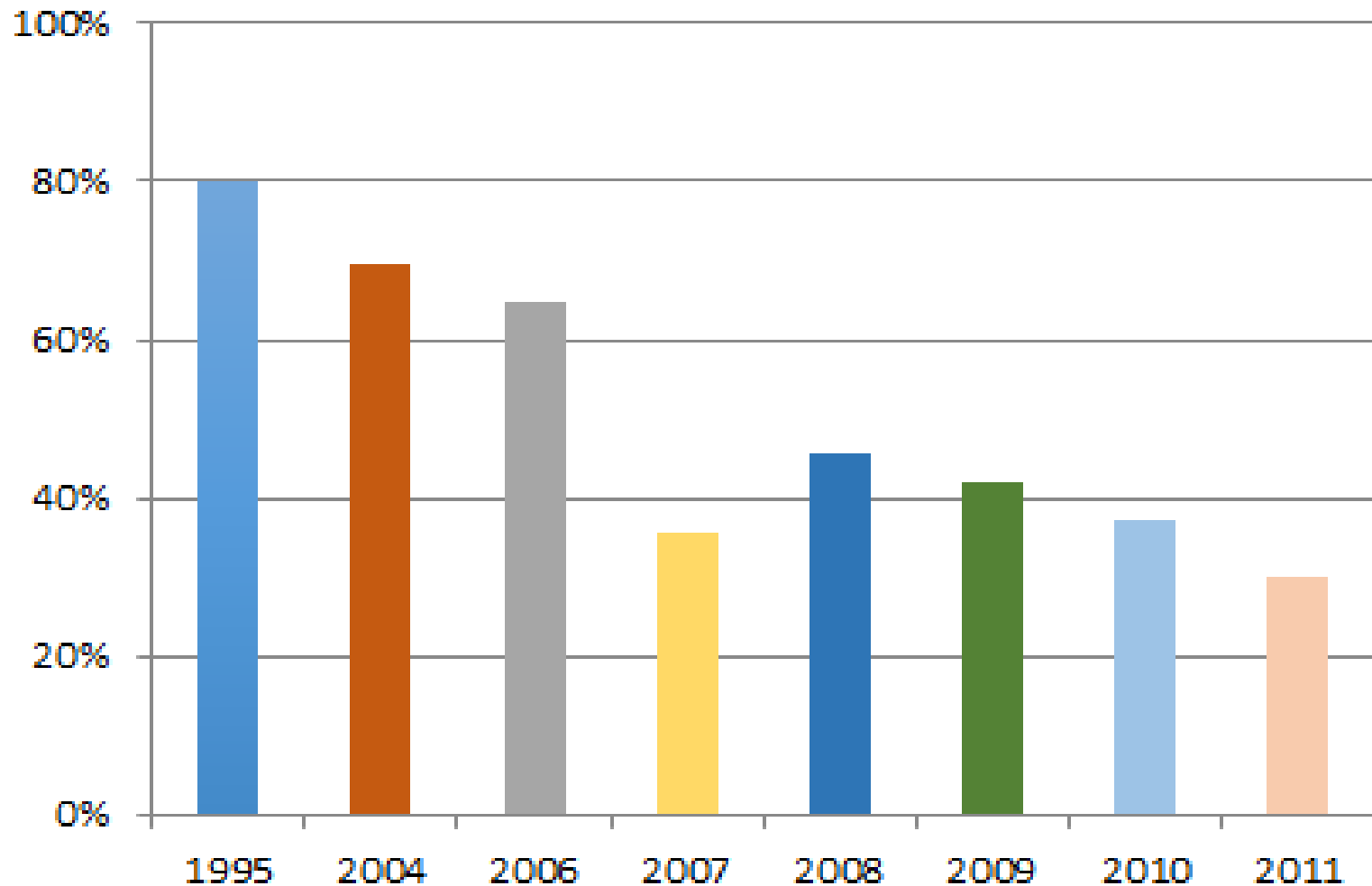
Source: OECD Indicators

Main Questions

1. **Did HE funding reforms affect student outcomes in England?**
    - **Extensive Margins:** **University enrolment**
    - **Intensive Margins:** **Choices, conditional on enrolment**
    - **Labor market outcomes**

2. **Differential impact across socio-economic groups?**

The UK Case: Tuition Fees

- Until 1998, (full-time) undergraduate education in public universities was **free** of charge

- Since then, several reforms:
  - **Reform 1 (1998):** Means-tested tuition fees of max £1,000 per year
  - **Reform 2 (2006):** Fees increased to £3,000 per year for ALL
  - **Reform 3 (2012):** Fees increased to £9,000 per year for ALL

- Since 2006 - ALL students could apply to "The Student Loan Company" for up to these amounts

- Repayment:
  - The tuition fees are not paid upfront by student
  - Payable only after income is above a certain threshold
  - Written off after 30 years if not paid back

The UK Case: Means-Tested Support

- Included in each reform were changes to means-tested support:
  - **Reform 1 (1998):** Pre-1998 grants of up to £2,000 per year eliminated
  - **Reform 2 (2006):** Grants re-introduced in 2004 of up to £1,000 per year. This increased to up to £2,700 per year
  - **Reform 3 (2012):** Grants increased up to £3,250 per year

- Additionally:
  - Universities instructed to use at least 10 percent of fee revenue for additional grants for low-income students
  - Means-tested loans also made available

UK Reforms: Main Components

Parental income (£)	Tuition fees (£)			Maintenance grants (£)			Max maintenance loans (£)		
	1998	2006	2012	1998	2006	2012	1998	2006	2012
<=10,000	0	3,000	9,000	949	2,700	3,250	2,255	3,205	3,875
20,000	373	3,000	9,000	949	2,284	3,250	2,255	3,205	3,875
30,000	1,172	3,000	9,000	569	832	2,341	2,315	3,573	4,330
40,000	1,172	3,000	9,000	0	0	523	2,403	4,172	5,239
>=50,000	1,172	3,000	9,000	0	0	0	2,403	3,305	4,788

Notes: The figures for maintenance grants and maintenance loans refer to students who do not study in London and do not live at home with their parents.
Source: Student Loan Company & Dearden et al (2011)

This Paper

- Use detailed longitudinal micro-data on all students in state schools in England (2004-2013) to evaluate the short-run and long-run effects of the **2006** and 2012 reforms.

- Outcomes:
    - **University outcomes:** enrolment, quality of the university attended; behavior during university
    - **Geographical mobility:** distance from home, affluence of location choice
    - **Labor market outcomes:** employment, further study, type of contract, wages.

    Focus: **Distributional effects of policy reforms.**

"Theoretical" Predictions

If we consider the policy as a whole, the predicted effect on participation and other outcomes is not clear.

- Higher Income Group: Unambiguous increase in cost

- Medium and Lower Income Groups: Ambiguous effect
    - More progressivity in upfront costs:
        - Increase in tuition fees
        - Increase in means tested grants
    - Release of financing constraints: additional loans, protection against personal bankruptcy due to student loans.

Tuition Fees versus Means-Tested Support

Average tuition fees charged by public institutions, bachelor's and equivalent programmes, in USD converted using PPPs
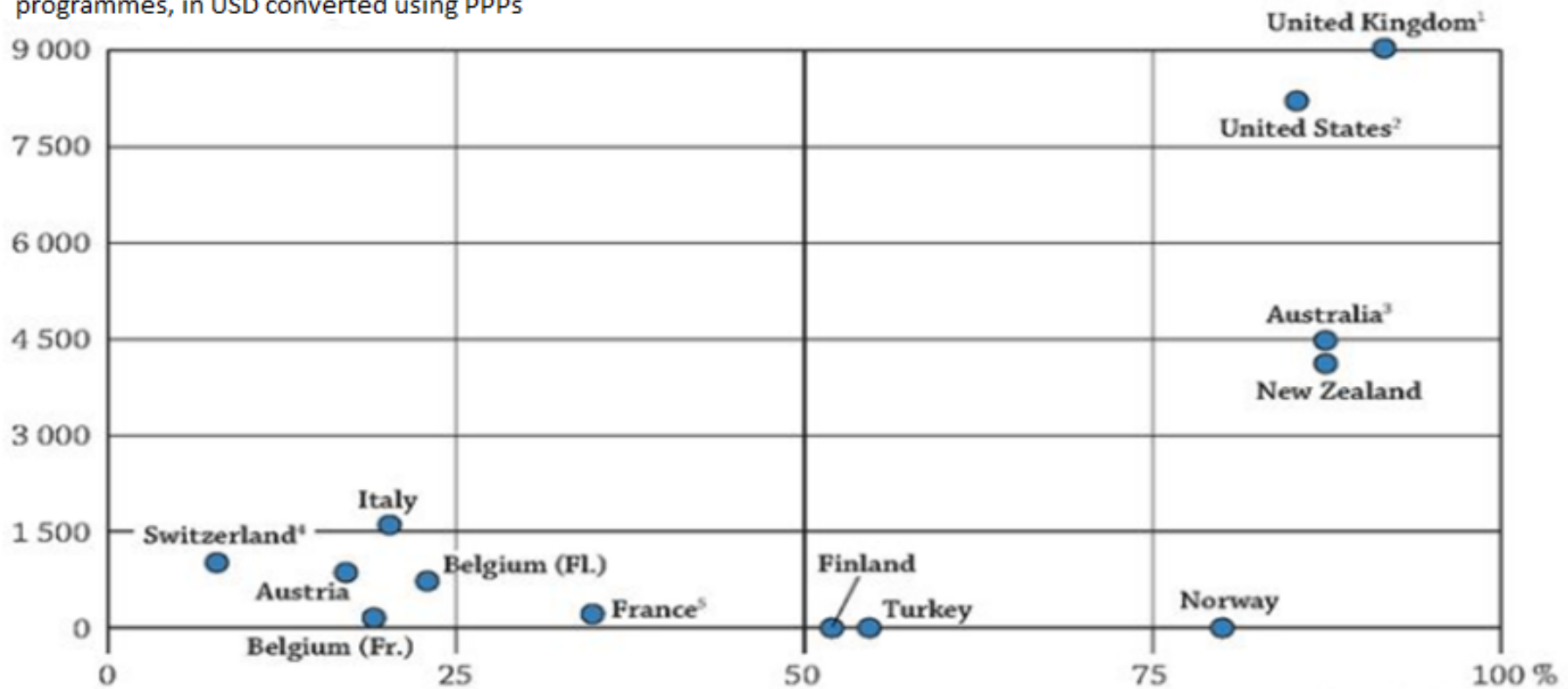
Percentage of students who benefit from public loans, scholarships or grants

Data Description

Data Description

- **NPD**: administrative micro-data on cohorts of UK-domiciled pupils in English state schools. Data from 2002 to 2009:
  - Demographics, school information, detailed location
  - Academic performance in national level exams at end of compulsory education (KS4 taken at 16)

- **HESA**: links to NPD and follow students who enrol in an English university. Data from 2004 to 2011:
  - University and field of study pursued:118 universities and 5 field of study
  - Measures of behaviour while in university

- **DLHE:** survey collecting individual level information on leavers of higher education six months after graduation. Data available from 2007-2013 (around 80% response rate):
  - Labour market status, type of contract, earnings
  - Further study

IDACI score – SES Index

- The IDACI score is a continuous variable between 0 and 1

- It measures the percentage of children aged 0-15 years old living in income-deprived families in local neighborhood

- Define **three SES categories** using the terciles of the IDACI score (when in school).
    - Lowest SES index category correspond to average household income less than or equal to £29,000
    - Middle SES index category correspond to an average household income of around £34,000
    - High SES index correspond to an average household income of around £43,000 or above.

Identification

- To look across wealth groups we estimate:

$$y_{it} = \beta_0 + \sum_{g=1}^{3} (T_{it} * \lambda_g)_{it} + \mathbf{X_i}\beta_2 + \beta_3 \ln CS_i + trends + FE_s + FE_r + \varepsilon_{it}$$

y_{it}: the outcome variable

T_{it}: takes the value 0 if year before 2006 reform and 1 if after reform

$\mathbf{X_i}$: gender, ethnicity, wealth index, no. of GCSEs, grades

Time: Ln Cohort Size and time trends and higher orders

FE_r: Neighborhood FE (around 32,000)

FE_s: School FE (around 5,000)

g: represents different terciles of the IDACI score

Robustness checks

- Most of analysis uses years before and after reform:
  - 2006 Reform: Before (2004,2005) and After (2006 to 2009, inc.)

- Checks:
  - Tighter band before and after
  - More SES groups categories than just three
  - Define SES using Free Scholl Meal Eligibility
  - Exclude London Universities

Enrolment

Enrolment Effect

	Pr(Enrol in University)	
	ALL	ALL
HE Reform 2006	**0.006*****	**-0.005*****
	(0.001)	**(0.001)**
Trend		-0.013***
		(0.001)
Trend Sq.		0.003***
		(0.000)
Ln(Cohort Size)		0.289***
		(0.021)
Constant	0.233***	-3.611***
	(0.000)	(0.279)
Observations	2,828,432	2,828,432

Adding Controls

	Pr(Enrol in University)		
	ALL	ALL	ALL
HE Reform 2006	**-0.006***	**-0.006***	**-0.005***
	(0.001)	**(0.001)**	**(0.001)**
Trend	-0.011***	-0.012***	-0.012***
	(0.001)	(0.001)	(0.001)
Trend Sq.	0.003***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)
Ln(Cohort Size)	0.251***	0.318***	0.317***
	(0.020)	(0.015)	(0.018)
Female	0.078***	0.005***	0.004***
	(0.000)	(0.000)	(0.001)
White	-0.108***	-0.083***	-0.084***
	(0.001)	(0.001)	(0.002)
Wealth Index	-1.464***	-0.793***	-0.675***
	(0.100)	(0.090)	(0.107)
Observations	2,828,431	2,758,930	2,758,930
Region FE	Yes	Yes	Yes
Education Controls	No	Yes	Yes
School FE	No	No	Yes

Educational controls include no. of GCSEs and grades

Enrolment Effect by SES

	Pr(Enrol in University)		
	WI High	WI Med	WI Low
HE Reform 2006	**-0.012***	**0.002**	**0.003**
	(0.003)	**(0.002)**	**(0.002)**
Trend	-0.017***	-0.015***	-0.007***
	(0.003)	(0.002)	(0.002)
Trend Sq.	0.004***	0.003***	0.002***
	(0.000)	(0.000)	(0.000)
Ln(Cohort Size)	0.400***	0.266***	0.144***
	(0.042)	(0.035)	(0.030)
Constant	-4.850***	-3.140***	-1.590***
	(0.561)	(0.475)	(0.398)
Observations	900,893	948,736	978,465
Controls	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
School FE	Yes	Yes	Yes

Differential participation effect by SES

Enrolment Effect by SES

	Pr(Enrol in University)	
HE Reform 2006	**-0.011*****	**-0.014*****
	(0.002)	**(0.002)**
Med WI*HE 2006	**0.010*****	**0.008*****
	(0.001)	**(0.001)**
Low WI*HE 2006	**0.017*****	**0.015*****
	(0.001)	**(0.001)**
Med WI	-0.101***	-0.051***
	(0.002)	(0.001)
Low WI	-0.183***	-0.074***
	(0.002)	(0.001)
Observations	2,828,094	2,713,761
Controls	Yes	Yes
Education Controls	No	Yes
Region FE	Yes	Yes
School FE	Yes	Yes

Other Outcomes

Outcomes beyond Participation

- Geographical mobility: Table Geographical Mobility

- Choice of university or FoS and behaviour during university: Table Uni Choice and FoS

- Labour market outcomes: Table Labor Market Outcomes

Possible Mechanism?

- Lower SES: Effect of reduced (short-run) financing constraints for lower SES outweighs future holding of debt:
  - Not strong enough to change entry into university decision
  - *BUT* has an effect on choices – more willing to take "risks" (e.g., with course choice) and reduces sorting
  - This transmits to labour market outcomes

- Higher SES: Making education more costly has (small) impact on entry decision
  - (Small) improvements in outcomes when in university/labour market could be explained by the better selection

Conclusion

Policy Conclusions

- **Overall, only modest effects of reforms on various margins**

- Cost effectiveness of the policy?
  - Might expect lower taxes for the approx. 60% who do not go to university
  - For those who go, the system is more progressive
  - *But* it will ultimately depend on default rate
    - For 2006 policy projected to be 30% and for 2012 still too early to say but expected to be higher
- Other considerations:
  - Heterogeneous effect of holding debt? Does this generate other types of inequalities in the long-run?
  - Scope for an improved design (e.g., increase low SES enrolment, improve sorting once in university etc…)

Extra slides

Same Commuting Zone

	Same Commuting Zone		
HE Reform 2006	0.007***	0.010***	0.012***
	(0.002)	(0.002)	(0.002)
Med WI*HE 2006		0.000	-0.000
		(0.002)	(0.002)
Low WI*HE 2006		-0.018***	-0.020***
		(0.003)	(0.003)
Observations	670,324	670,324	669,848
Region FE	Yes	Yes	Yes
School FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Education Controls	No	No	Yes

Distance from Home to University

	Ln(Distance)		
HE Reform 2006	-0.027***	-0.039***	-0.048***
	(0.008)	(0.008)	(0.008)
Med WI*HE 2006		0.005	0.007
		(0.007)	(0.007)
Low WI*HE 2006		0.058***	0.066***
		(0.009)	(0.009)
Observations	670,324	670,324	669,848
Region FE	Yes	Yes	Yes
School FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Education Controls	No	No	Yes

Field of Study (Expected earnings)

	FOS with expected wage>median		
HE Reform 2006	0.004	0.011***	0.010***
	(0.003)	(0.004)	(0.004)
Med WI*HE 2006		-0.011***	-0.011***
		(0.003)	(0.003)
Low WI*HE 2006		-0.018***	-0.018***
		(0.004)	(0.004)
Observations	666,571	666,571	666,145
Region FE	Yes	Yes	Yes
School FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Education Controls	No	No	Yes

Field of Study

	Medicine		STEM		Social Science		Languages		Arts & Education	
HE Reform 2006	0.001	-0.003	0.003	0.016***	0	-0.004	0.002	0.009***	-0.005**	-0.017***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	-0.002	(0.002)	-0.002	(0.002)
Med WI*HE 2006		0.005*		-0.005**		-0.007**		0.005***		0.001
		(0.003)		(0.002)		(0.003)		(0.002)		(0.002)
Low WI*HE 2006		0.010***		-0.010***		-0.004		0.005**		-0.001
		(0.003)		(0.003)		(0.003)		(0.002)		(0.002)
Constant		2.503***		0.023		6.488***		-6.417***		-1.597***
		(0.617)		(0.551)		(0.666)		(0.459)		(0.475)
Observations	670,104	650,647	670,104	650,647	670,104	650,647	670,104	650,647	670,104	650,647
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Within University Behavior

	Length Degree		Dropout		Switch Degree	
HE Reform 2006	0.014***	0.020***	0.001*	-0.003***	0	-0.011***
	(0.005)	(0.005)	(0.001)	(0.001)	(0.001)	(0.001)
Med WI*HE 2006		-0.005		0.002***		0.011***
		(0.004)		(0.001)		(0.001)
Low WI*HE 2006		-0.034***		0.006***		0.019***
		(0.006)		(0.001)		(0.001)
Observations	552,096	552,096	753,675	753,675	753,675	753,675
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
School FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Education Controls	Yes	Yes	Yes	Yes	Yes	Yes

Labor Market Activity

	Employed		Unemployed		Further Study	
HE Reform 2006	-0.007**	-0.005	-0.002	-0.004**	0.012***	0.013***
	(0.004)	(0.004)	(0.002)	(0.002)	(0.003)	(0.004)
Med WI*HE 2006		-0.004		0.003		-0.001
		(0.003)		(0.002)		(0.003)
Low WI*HE 2006		-0.009**		0.010***		-0.007**
		(0.004)		(0.002)		(0.004)
Constant	4.961***	5.041***	-2.065***	-1.815***	-2.583***	-2.884***
	(0.785)	(0.783)	(0.431)	(0.429)	(0.688)	(0.685)
Observations	484,083	483,724	484,083	483,724	484,083	483,724
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
School FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Education Controls	Yes	Yes	Yes	Yes	Yes	Yes

Earnings

	Ln (wages)	
HE Reform 2006	0.008*	0.015***
	(0.004)	(0.004)
Med WI*HE 2006		-0.015***
		(0.003)
Low WI*HE 2006		-0.025***
		(0.005)
Constant	5.790***	5.621***
	(0.867)	(0.835)
Observations	157,388	157,280
Region FE	Yes	Yes
School FE	Yes	Yes
Controls	Yes	Yes
Education Controls	Yes	Yes

Other Outcomes

	Full-Time Emp.		Perm. Contract	
HE Reform 2006	-0.015***	-0.011***	-0.002	0.001
	(0.004)	(0.004)	(0.004)	(0.004)
Med WI*HE 2006		-0.009**		-0.006*
		(0.004)		(0.004)
Low WI*HE 2006		-0.016***		-0.010**
		(0.004)		(0.004)
Constant	6.599***	6.529***	7.240***	7.490***
	(0.808)	(0.808)	(0.777)	(0.779)
Observations	484,083	483,724	484,083	483,724
Region FE	Yes	Yes	Yes	Yes
School FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Education Controls	Yes	Yes	Yes	Yes

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