

Supplemental Results: March 2007

Table S1. Adding Control for R&D Expenditures (Federal Grants)

Negative Binomial Regressions	1	2	3	4
	No IV	IV	IV	IV
Total Students, Predicted	0.0024*** (0.0001)	0.0094*** (0.0003)	0.0086*** (0.0003)	0.0088*** (0.0003)
Share foreign (missing = 0)	0.0345*** (0.0105)	-0.5478*** (0.0272)	-0.5057*** (0.0283)	-0.4899*** (0.0353)
Real non-equipment R&D expenditures, 5 yr MA	0.0026*** (0.0005)	0.0043*** (0.0005)	0.0049*** (0.0005)	
Real equip & phys. plant exp, 5 yr MA (\$millions)			0.0113*** (0.0013)	0.0118*** (0.0013)
Constant	2.8389*** (0.1237)	15.7849*** (1.0957)	14.0238*** (1.1097)	15.1292*** (1.1223)
Observations	54883	52727	47942	49011
Number of group(univ field)	2238	2234	2205	2234
Standard errors in parentheses				
* significant at 10%; ** 5%; *** 1				
univ&field trends				
Foreign IV only, in (2), (3) and (4), not (1)				
	Marginal Effects		Reg 1	Reg 2
	US		0.27%	1.32%
	Foreign		0.20%	0.17%
	\$m R&D		0.26%	0.43%
	\$m Eq.			1.18%
	Elasticities			
	US		0.08	0.39
	Foreign		0.024	0.01
	\$m R&D		0.016	0.02
	\$m Eq.			0.009

Table S2. Accounting for Quality of Undergraduate Institution

Negative Binomial Reg.	1	2	3	4	Regression 3	
Dep. Var: Publication Counts						
US student count, high-rank BA inst	0.0041 (0.0000)	0.0075*** (0.0025)	0.0019 (0.0024)	0.0016 (0.0025)	Marginal Effects	
US student count, low-rank BA inst	0.0203*** (0.0018)	0.0156*** (0.0013)	0.0191*** (0.0013)	0.0171*** (0.0013)	US low	1.91%
Foreign student count, high-rank BA inst	-0.0093 (0.0000)	-0.0023 (0.0018)	0.0003 (0.0018)	0.0010 (0.0018)	For Low	0.17%
Foreign student count, low-rank BA inst	0.0033*** (0.0002)	0.0027*** (0.0006)	0.0017*** (0.0006)	0.0027*** (0.0006)	\$m	
Real non-equipment R&D expenditures, 5 yr MA		0.0058*** (0.0005)	0.0048*** (0.0005)		R&D	0.48%
Real equip & phys. plant exp, 5 yr MA (\$ millions)			0.0133*** (0.0013)	0.0117*** (0.0013)	\$m	
Constant	3.6070 (0.0000)	1.8922 (2.5002)	4.9154** (2.4684)	0.3020 (2.4763)	Equip	1.33%
Observations	57475	52727	47942	49011	Elasticities	
Number of group(univ field)	2299	2234	2205	2234	US low	0.41
Standard errors in parentheses	* significant at 10%; ** significant at 5%; *** significant at 1%				For Low	0.03
Foreign Instruments used for US & Foreign, all Regressions					\$m	
					R&D	0.02
					\$m	
					Equip	0.01

Table S3. Impacts on Elite versus Non-Elite US Publishing Universities

Negative Binomial	1	2	3	4
Dep. Var.: Publication Counts	Elite	Non-Elite	Elite	Non-Elite
All Regs. Use Foreign IV, univ&field trends				
Total Students, Predicted	0.0073*** (0.0005)	0.0094*** (0.0004)	0.0067*** (0.0005)	0.0097*** (0.0004)
Share Foreign (missing = 0)	-0.2264*** (0.0454)	-0.6471*** (0.0339)	-0.2123*** (0.0466)	-0.6438 (0.0000)
Real non-equipment R&D expenditures, 5 yr MA			0.0066*** (0.0008)	0.0043*** (0.0007)
Real equip & phys. plant exp, 5 yr MA ()			0.0045*** (0.0017)	0.0212*** (0.0018)
Constant	- 67.5414*** (1.7090)	- 13.2452*** (1.3982)	- 65.1766*** (1.7990)	- 14.0906*** (1.3255)
Observations	16675	40800	14464	33478
Number of group(univ field)	667	1632	648	1557

Standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Elite universities defined as having 25th percentile of undergraduate SAT > 1210 or ACT>25

Table S4. Impacts on Elite versus Non-Elite US Universities by Undergraduate Institution Quality

Neg. Binomial Regressions	1	2	3	4
Dep. Var.: Publication Counts	Elite	Non-Elite	Elite	Non-Elite
All Regs. Use Foreign IV, univ&field trends				
US student count, high-rank BA inst	0.0124*** (0.0036)	0.0141*** (0.0034)	0.0032 (0.0036)	0.0108*** (0.0033)
US student count, low-rank BA inst	0.0053** (0.0021)	0.0161*** (0.0017)	0.0092*** (0.0021)	0.0194*** (0.0016)
Foreign student count, high-rank BA inst	-0.0067** (0.0027)	0.0047** (0.0023)	-0.0049* (0.0027)	0.0065*** (0.0024)
Foreign student count, low-rank BA inst	0.0080*** (0.0010)	0.0003 (0.0008)	0.0070*** (0.0010)	-0.0011 (0.0008)
Real non-equipment R&D expenditures, 5 yr MA			0.0068*** (0.0010)	0.0033*** (0.0008)
Real equip & phys. plant exp, 5 yr MA (\$ millions)			0.0060*** (0.0017)	0.0244*** (0.0018)
Constant	- 66.4400*** (1.7858)	- 9.0949*** (3.1454)	- 64.4003*** (1.8638)	- 15.1559*** (3.2438)
Observations	16675	40800	14464	33478
Number of group(univ field)	667	1632	648	1557

Standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Elite universities defined as having 25th percentile of undergraduate SAT > 1210 or ACT>25
29 out of 100 universities in sample are "elite"

Table S5. Impacts on US Universities by Size and Period

Neg. Binomial Regressions	1	2	3	4	5	6	7	8
Dep. Var.: Publication Counts	Large	Small	Large	Small	Early	Late	Early	Late
All Regs. Use Foreign IV, univ&field trends								
Total Students, Predicted	0.0092*** (0.0004)	0.0089*** (0.0006)	0.0082*** (0.0004)	0.0086*** (0.0007)	0.0071*** (0.0006)	0.0043*** (0.0005)	0.0053*** (0.0006)	0.0040*** (0.0005)
Share Foreign (missing = 0)	-0.5287*** (0.0338)	-0.4370*** (0.0475)	-0.5092*** (0.0346)	-0.4366*** (0.0508)	-0.1894*** (0.0506)	0.1742*** (0.0437)	0.3586*** (0.0531)	0.1715*** (0.0452)
Real non-equipment R&D expenditures, 5 yr MA			0.0058*** (0.0006)	0.0162*** (0.0018)			0.0049*** (0.0011)	0.0053*** (0.0009)
Real equip & phys. plant exp, 5 yr MA (\$ millions)			0.0051*** (0.0014)	0.0281*** (0.0039)			0.0015 (0.0017)	0.0081*** (0.0017)
Constant	14.9721*** (1.3540)	90.6598*** (1.7994)	12.4754*** (1.3572)	84.6467*** (1.9480)	-15.6642*** (1.9185)	6.3608*** (1.4212)	5.7370*** (2.0364)	5.1979*** (1.4643)
Observations	29325	28150	25513	22429	32130	25278	25544	22345
Number of group(univ field)	1173	1126	1146	1059	2295	2298	2139	2124

Standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Large defined as above-median total Phd enrollment

Early Sample defined as 1973-1986

Late Sample defined as 1987-1998

Table S6. Instrument Sets: Affects versus Does Not Affect Ability to Pay

Negative Binomial Regression Dep. Var.: Publication Counts All with univ&field trends	1 IV - All	2 IV-Set 1	3 IV-Set 2	4 IV - All	5 IV - Set 1	6 IV - Set 2
Total Students, Predicted	0.0088*** (0.0003)	0.0083*** (0.0000)	0.0101*** (0.0004)	0.0086*** (0.0003)	0.0065*** (0.0005)	0.0094*** (0.0004)
Share Foreign (missing = 0)	-0.5079*** (0.0274)	-0.3197 (0.0000)	-0.6980*** (0.0321)	-0.5057*** (0.0283)	-0.2480*** (0.0452)	-0.6693*** (0.0333)
Real non-equipment R&D expenditures, 5 yr MA				0.0049*** (0.0005)	0.0054*** (0.0005)	0.0058*** (0.0005)
Real equip & phys. plant exp, 5 yr MA ()				0.0113*** (0.0013)	0.0125*** (0.0013)	0.0094*** (0.0013)
Constant	-14.0275*** (1.1095)	-22.5477 (0.0000)	-14.3595*** (1.2973)	-14.0238*** (1.1097)	17.5114*** (1.6418)	-12.6070*** (1.3246)
Observations	57475	57475	59774	47942	47942	49987
Number of group(univ field)	2299	2299	2299	2205	2205	2211

Standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

IV - Set 1: Exchange Rates, # students elsewhere, restriction policy dummy

IV - Set 2: GDP, OECD dummy, GDP*OECD and Oil Revenue/GDP

Hypothesis is that Set 2 has distributional consequences, so an increase in GDP is associated with an increase in students, but decrease in avg. quality

Table S7. Effects of Instrument Sets by Undergraduate Institution Quality

Negative Binomial Regression	1	2	2	4	5	6
Dep. Var.: Publication Counts	All-IV	IV - Set 1	IV - Set 2	All - IV	IV - Set 1	IV - Set 2
All with univ&field trends						
US student count, low-rank BA inst	0.0203*** (0.0018)	0.0212*** (0.0023)	0.0155*** (0.0014)	0.0191*** (0.0013)	0.0238*** (0.0023)	0.0175*** (0.0014)
US student count, high-rank BA inst	0.0041 (0.0000)	-0.0314*** (0.0038)	0.0160*** (0.0025)	0.0019 (0.0024)	-0.0351*** (0.0038)	0.0095*** (0.0026)
Foreign student count, low-rank BA inst	0.0033*** (0.0002)	0.0092*** (0.0008)	0.0025*** (0.0006)	0.0017*** (0.0006)	0.0073*** (0.0008)	0.0018*** (0.0006)
Foreign student count, high-rank BA inst	-0.0093 (0.0000)	-0.0055** (0.0022)	-0.0028 (0.0019)	0.0003 (0.0018)	-0.0027 (0.0023)	-0.0027 (0.0019)
Real non-equipment R&D expenditures, 5 yr MA				0.0048*** (0.0005)	0.0053*** (0.0006)	0.0058*** (0.0005)
Real equip & phys. plant exp, 5 yr MA (\$ millions)				0.0133*** (0.0013)	0.0129*** (0.0013)	0.0119*** (0.0013)
Constant	3.6070 (0.0000)	-20.7493*** (2.9054)	6.1264** (2.8343)	4.9154** (2.4684)	-16.4972*** (2.8958)	7.1059** (2.8355)
Observations	57475	57475	59774	47942	47942	49987
Number of group(univ field)	2299	2299	2299	2205	2205	2211
Standard errors in parentheses						
* significant at 10%; ** significant at 5%; *** significant at 1%						

IV - Set 1: Exchange Rates, # students elsewhere, restriction policy dummy

IV - Set 2: GDP, OECD dummy, GDP*OECD and Oil Revenue/GDP

Hypothesis is that Set 2 has distributional consequences, so an increase in GDP is associated with an increase in students, but decrease in avg. quality