

Unraveling a secret: Vietnam's outstanding performance on the PISA tests

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Abstract

This paper presents an analysis of the factors that explain Vietnam's outstanding performance on the PISA assessment in 2012. The paper presents a comparative analytical perspective between Vietnam and Colombia, using an Oaxaca-Blinder decomposition of a test score production function. The findings reveal that a) b) and c).

Keywords: PISA; Vietnam; Colombia; Oaxaca-Blinder Decomposition; Economics of Education.

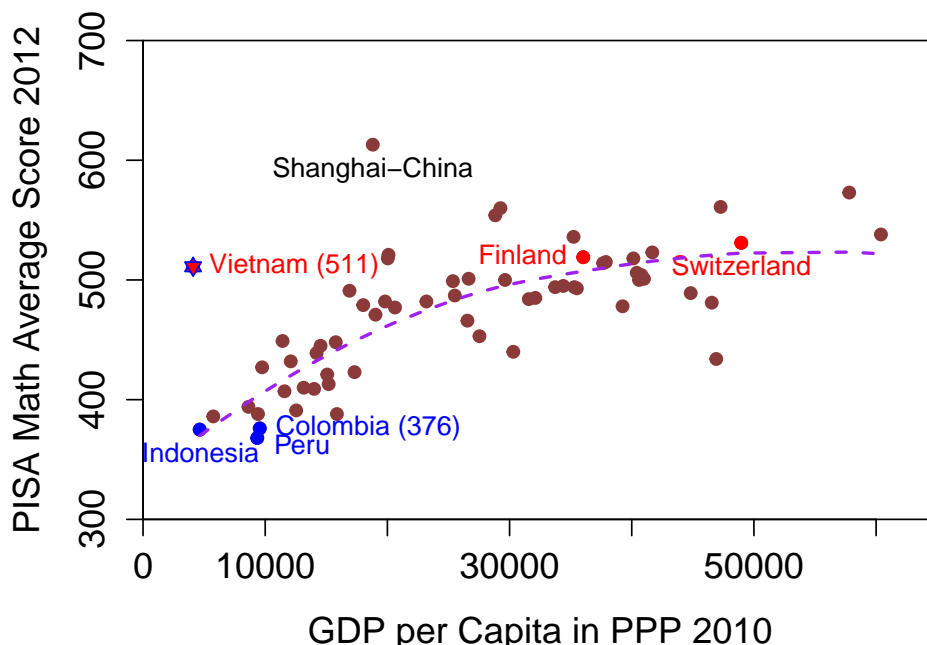
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*e-mail: sparandekar@worldbank.org. This paper has been written using open source software: R for the econometric analysis and graphics and LaTeX for typesetting. Thanks to all who make free software possible and to OECD for making the PISA data freely and easily available to anyone. The code used in writing this paper is freely available for download at <http://economist-at-work-and-play.blogspot.com/2015/02/pisa20121a.html>

1 Introduction

Vietnam participated in PISA for the first time in 2012 and its performance has been much higher than other developing countries that take part in this OECD led initiative. PISA scores are calibrated to an OECD mean of 500 and standard deviation of 100 points. Only a few developing countries take part in PISA, perhaps because most of them have results much lower than the OECD countries. As can be seen in Figure 1, there is a positive, albeit non-linear correlation between GDP per capita and PISA test scores that can be seen by the dashed line representing a loess regression. The figure shows that Vietnam's performance in PISA (mathematics mean score of 511) is closer to that of Finland and Switzerland rather than of Peru and Colombia. Vietnam, represented by a red star in Figure 1, lies much above the cluster of developing countries in the lower left hand corner of Figure 1.

Figure 1: PISA 2012 results compared with GDP per capita

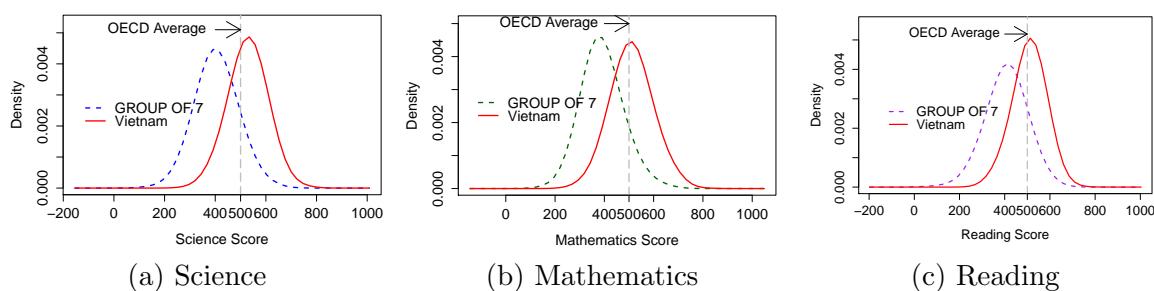


Source:OECD-PISA database

In the OECD-PISA database, there are seven countries other than Vietnam with a per capita GDP (in PPP dollars) below US\$ 10,000 - Albania, Colombia, Indonesia, Jordan, Peru, Thailand and Tunisia. Their collective weighted average performance in mathematics was a mean score of 383. It is helpful to understand the significance of the 128 point difference with Vietnam. According to a recent OECD publication ([OECD (2013a)]) *"An entire proficiency level in mathematics spans about 70 score points –a large difference in the skills and knowledge students at that level possess. Such a gap represents the equivalent of about two years of schooling in the typical OECD country."* Applying this heuristic would

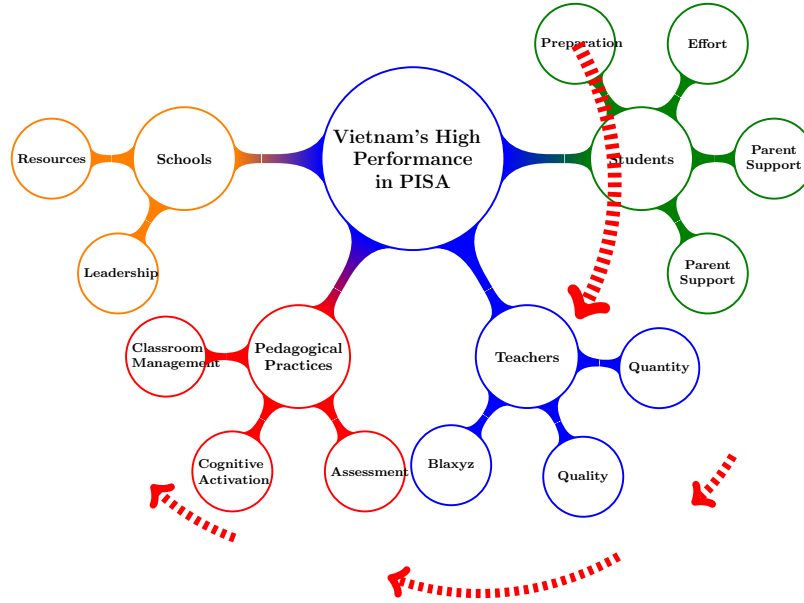
imply a nearly 3 year difference in attainment between Vietnam and the group of 7 developing countries in the PISA database. It should be noted at the outset that cross-section data from one instalment of PISA does not permit causal inference, but correlations can still provide useful insights. The difference is not only for mathematics and not just in the mean score, but spanning the entire test distribution, as can be seen in Figure 2.

Figure 2: Kernel Density comparison between Vietnam and other Developing Countries



A range of alternative classifications are possible to organize the possible explanatory factors available in the OECD-PISA database. Figure 3 presents four sets of factors, starting clockwise from the right.

Figure 3: Conceptual Scheme



The structure of the paper is as follows. Student related variables, including the student's home environment are considered first in Section 2. Teachers related factors, together with teaching/pedagogical practices are discussed in Section 3. Section 4 considers the last factors, school type and resources and school leadership. These sections of this paper presents a descriptive and analytical comparison of these factors in a comparative context, comparing

the 7 countries (henceforth, Dev7) with Vietnam. Section 5 presents some conclusions from the study, including directions for further research.

2 What student related factors explain the achievement gap of Vietnam ?

The OECD-PISA initiative includes questionnaires administered to students and to school authorities. These questionnaires are fairly detailed and are described in the OECD-PISA documentation. In addition to the questionnaire items, the OECD-PISA team has also generated a range of indices from the underlying questions. These indices are sometime simple numerical compilations and sometimes the result of analysis such as principal-components analysis to combine different items. The constructed indices are carefully checked for validity and reliability against the whole database, including OECD and non-OECD countries. The availability of the constructed variables greatly facilitates the analysis of OECD-PISA data. An example is the case of the measure of the student's household material well-being termed as WEALTH, which is comprised from student's reported family ownership of durables and the condition of the student's dwelling. Bath room room?

It is possible that Vietnamese students, raised under a culture with high values for discipline and respect for authority, are better performers. Dalton and Ong, 2005([Dalton and Ong (2005)]).

2.1 Student Characteristics and Background

Table 1: Summary statistics - student characteristics and background

Variable	Description	Dev7 countries		Vietnam	
		MS	Valid N	MS	Valid N
FEMALE	Sex of student	0.5265 (0.4993)	41394	0.5336 (0.4989)	4882
PRESCHOOL	Attend Preschool (ISCED 0)	0.7888 (0.4082)	40114	0.912 (0.2833)	4866
REPEAT	Grade repeating	0.1915 (0.3935)	40343	0.0679 (0.2516)	4860
ST08Q01	Times late for school	1.5131 (0.7648)	40663	1.1872 (0.4685)	4873
ST09Q01	Days unexcused absence	1.2192 (0.5276)	40650	1.0999 (0.3527)	4875
ST115Q01	Times skipped classes	1.2585 (0.545)	40632	1.0764 (0.3216)	4880
HISEI	Highest parental occupational status	40.4196 (22.5168)	32814	26.6023 (19.855)	4860
MISCED	Educational level of mother (ISCED)	3.1193 (1.9853)	40486	2.1744 (1.6059)	4844
WEALTH	Family wealth possessions	-1.4606 (1.2267)	40821	-2.1343 (1.1656)	4881
CULTPOS	Cultural possessions	-0.1424 (0.9678)	39905	-0.2361 (1.0173)	4809
HEDRES	Home educational resources	-0.7427 (1.1473)	40579	-1.0743 (0.9364)	4874
BOOK_N	Number of books in family home	53.6393 (94.5556)	39631	50.786 (75.4031)	4841

Notes: The variables relate to the questionnaires administered to students in the general (non-rotated) booklet. For a more detailed description of variables, please see Table xx. Items marked with (*r*) are taken from the rotated student questionnaire. The variable means of Dev7 and Vietnam are statistically different at the 5% significance level, except FEMALE.

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2.2 Student Effort

Table 2: Summary statistics - student effort

Variable	Description	Dev7 countries		Vietnam	
		MS	Valid N	MS	Valid N
MATWKETH (<i>r</i>)	Mathematics work ethic	0.4514 (0.9782)	26140	-0.0014 (0.6915)	3217
OUTMATH	weekly out-of-school lessons in math	1.828 (2.1539)	23603	3.1305 (2.3133)	3227
OUTREAD	weekly out-of-school lessons in 'test language'	1.2882 (1.9623)	23531	1.4483 (1.8837)	3223
OUTSCIE	weekly out-of-school lessons in science	1.5609 (2.0456)	23298	2.0927 (2.1776)	3205
ST57Q01 (<i>r</i>)	Out-of-school time homework	5.0953 (5.0319)	23696	5.8145 (5.7196)	3164
ST57Q02 (<i>r</i>)	Out-of-school time guided homework	2.551 (2.9296)	19355	2.8814 (3.2384)	2285
ST57Q03 (<i>r</i>)	Out-of-school time personal tutor	1.7276 (2.7884)	20367	1.5749 (2.938)	3049
ST57Q04 (<i>r</i>)	Out-of-school time classes by company	1.892 (3.3487)	19517	4.878 (4.8058)	3091
ST57Q05 (<i>r</i>)	Out-of-school time parent/family member	2.1354 (3.055)	21542	1.7646 (3.2442)	3092
ST57Q06 (<i>r</i>)	Out-of-school time learn on computer	2.588 (3.5519)	21338	1.8029 (3.0496)	3079

Notes: The variables relate to the questionnaires administered to students in the rotated booklet. For a more detailed description of variables, please see Table xx. Items marked with (*r*) are taken from the rotated student questionnaire. The variable means of Dev7 and Vietnam are statistically different at the 5% significance level.

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2.3 Student Attitude

Table 3: Summary statistics - student attitude

Variable	Description	Dev7 countries		Vietnam	
		MS	Valid N	MS	Valid N
INSTMOT (<i>r</i>)	Instrumental motivation for math	0.4253 (0.8558)	26566	0.3683 (0.7289)	3220
INTMAT (<i>r</i>)	Interest in mathematics	0.7212 (0.8533)	26634	0.6927 (0.6636)	3219
SUBNORM (<i>r</i>)	Subjective norms in mathematics	0.716 (1.165)	26509	-0.0923 (0.8395)	3220
MATHEFF (<i>r</i>)	Self-Efficacy in mathemtatics	-0.2269 (0.8516)	26457	-0.2655 (0.6363)	3217
FAILMAT (<i>r</i>)	Attributions to failure in math	0.083 (1.0312)	26155	0.0895 (0.6319)	3214
MATINTFC (<i>r</i>)	Mathematics intentions	0.092 (0.9837)	24827	0.3285 (1.0964)	3181
MATBEH (<i>r</i>)	Mathematics behaviour	0.8764 (0.9697)	25899	0.6757 (0.6408)	3211
PERSEV (<i>r</i>)	Perseverance in problem solving	0.3387 (0.9605)	25710	0.4475 (0.8767)	3211
OPENPS (<i>r</i>)	Openness to problem solving	0.1949 (0.9787)	25612	-0.6125 (0.8708)	3207
SCMAT (<i>r</i>)	Self-concept of own math skills	0.1673 (0.8101)	26222	-0.1896 (0.5903)	3249
ANXMAT (<i>r</i>)	Mathematics Anxiety	0.3995 (0.7724)	26275	0.2115 (0.6354)	3248
BELONG (<i>r</i>)	Sense of belonging to school	0.0511 (0.9428)	25785	-0.2574 (0.7032)	3253
ATSCHL (<i>r</i>)	Attitude - school learning is useful	0.1616 (0.9986)	25563	0.143 (0.8648)	3246
ATTLNACT (<i>r</i>)	Attitude - Trying hard at school pays off	0.1233 (0.964)	25368	-0.535 (0.8212)	3248
ATT_CONTROL (<i>r</i>)	Perceived control over grades	0.8507 (0.3564)	25106	0.6608 (0.4735)	3228

Notes: The variables relate to the questionnaires administered to students in the rotated booklet. For a more detailed description of variables, please see Table xx. Items marked with (*r*) are taken from the rotated student questionnaire. The variable means of Dev7 and Vietnam are statistically different at the 5% significance level, except FAILMAT and ATTSCHL.

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2.4 Student Experience in Mathematics

These are all student self-reported items, asked in rotational part 2.

Table 4: Summary statistics - student experience in mathematics

Variable	Description	Dev7 countries		Vietnam	
		MS	Valid N	MS	Valid N
EXAPPLM (<i>r</i>)	Experience with applied math tasks	0.1111 (1.06)	26133	-0.2418 (0.7624)	3243
EXPUREM (<i>r</i>)	Experience with pure math tasks	-0.1384 (0.9809)	25973	0.1587 (0.8076)	3244
FAMCONC (<i>r</i>)	Familiarity with math concepts	-0.5441 (0.8768)	25832	0.4297 (0.9057)	3231

Notes: The variables relate to the questionnaires administered to students in the rotated booklet. For a more detailed description of variables, please see Table xx. Items marked with (*r*) are taken from the rotated student questionnaire. The variable means of Dev7 and Vietnam are statistically different at the 5% significance level.

2.5 Home Support

Table 5: Summary statistics - student experience in mathematics

Variable	Description	Dev7 countries		Vietnam	
		MS	Valid N	MS	Valid N
PARPRESSURE	Parental achievement pressure	0.2665 (0.4421)	40372	0.3837 (0.4863)	4866
TIGERMOM	Parent initiates - progress discussion	52.4472 (38.097)	41394	62.4183 (41.3743)	4882
VOLUMOM	Parent Participation - Volunteering	35.2134 (38.8428)	41394	38.3623 (39.9773)	4882
TEACHMOM	Parent Participation - Teaching Assistance	12.1764 (23.4241)	41394	38.2821 (41.5357)	4882
FUNDMOM	Parent Participation - Fundraising	23.0784 (35.2134)	41394	59.6022 (44.0376)	4882
COUNCILMOM	Parent Participation - School government	36.4546 (37.2252)	41394	23.1174 (36.4406)	4882
BKGR_FAMPROB (<i>r</i>)	Home problems - deter effort in school	0.4705 (0.4991)	25038	0.264 (0.4409)	3231

Notes: The variables relate to the questionnaires administered to students in the rotated booklet and the general (non-rotated) booklet. For a more detailed description of variables, please see Table xx. Items marked with (*r*) are taken from the rotated student questionnaire. The variable means of Dev7 and Vietnam are statistically different at the 5% significance level.

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3 What teacher and teaching/pedagogical practices related factors explains the achivevement gap of Vietnam ?

3.1 Teachers - Characteristics and Quantitative Measures

Table 6: Summary statistics - teacher characteristics and quantitative measures

Variable	Description	Dev7 countries		Vietnam	
		MS	Valid N	MS	Valid N
STRATIO	Student-teacher ratio	19.715 (9.4135)	33742	18.9656 (5.5255)	4743
PROPCERT	Proportion of certified teacher	0.6757 (0.4042)	35130	0.7961 (0.3978)	4586
PROPQUAL	Proportion of teachers with ISCED 5A	0.8756 (0.2181)	36319	0.8775 (0.2758)	4708
SMRATIO	Mathematics teacher-student ratio	188.1791 (158.6256)	33985	120.9773 (43.6092)	4777
TCSHORT	Shortage of teaching staff	0.4846 (1.2627)	41077	0.4249 (1.1636)	4882
LHRS (<i>r</i>)	Taught hours of 'test language'	3.599 (1.9887)	22177	3.2207 (1.1576)	2870
SHRS (<i>r</i>)	Taught hours of science	3.7566 (2.5078)	21701	3.9597 (2.5484)	2473
MHRS (<i>r</i>)	Taught hours of mathematics	3.896 (2.0335)	21913	3.7878 (1.3764)	2850

Notes: The variables relate to the questionnaires administered to principals (schools) and students in the rotated booklet. For a more detailed description of variables, please see Table xx. Items marked with (*r*) are taken from the rotated student questionnaire. The variable means of Dev7 and Vietnam are statistically different at the 5% significance level, except PROPQUAL.

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3.2 Teachers - Quality

Table 7: Summary statistics - teacher quality

Variable	Description	Dev7 countries		Vietnam	
		MS	Valid N	MS	Valid N
TCFOCST	Teacher focus	0.4975 (1.0056)	41370	0.1402 (0.8377)	4882
SC35Q02	Professional development in math in last 3 months	40.5068 (40.8546)	39550	49.0086 (45.1706)	4762
TCH.MENT	Teacher mentoring as quality assurance	0.8566 (0.3505)	40734	0.9859 (0.1181)	4882
MTSUP (<i>r</i>)	Mathematics supportive teaching style	0.4778 (0.9613)	25918	0.3685 (0.774)	3247
STUDREL (<i>r</i>)	Teacher student relations	0.3794 (1.0178)	25870	0.0186 (0.8883)	3253
TCHQUAL.DIFF (<i>r</i>)	with different teacher student would work harder	0.5249 (0.4994)	24986	0.363 (0.481)	3231
TCH.INCENTV	teacher appraisal led to gratification	-0.0317 (1.0301)	41394	0.2687 (0.6336)	4882
<i>Quality assurance of mathematics teachers through ...</i>					
TCM.STUASS	test or assessment of student achievement	0.8762 (0.3293)	41110	0.9818 (0.1338)	4882
TCM.PEER	teacher peer review of lectures, methods etc	0.7916 (0.4061)	41095	0.8382 (0.3683)	4882
TCM.OBSER	principal or senior staff observations	0.8015 (0.3989)	41170	0.9785 (0.1451)	4882
TCM.INSPE	obsersavtion of classes external inspector	0.5882 (0.4922)	41020	0.8664 (0.3402)	4882

Notes: The variables relate to the questionnaires administered to principals (schools) and students in the rotated booklet. For a more detailed description of variables, please see Table xx. Items marked with (*r*) are taken from the rotated student questionnaire. The variable means of Dev7 and Vietnam are statistically different at the 5% significance level, except PROPQUAL.

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3.3 Pedagogical/Teaching practices

Table 8: Summary statistics - pedagogical/teaching practices

		Dev7 countries		Vietnam	
Variable	Description	MS	Valid N	MS	Valid N
<i>Practices in Mathematics</i>					
COMP_USE	Math policy - use of computers in class	0.4345 (0.4957)	40800	0.6447 (0.4787)	4815
TXT_BOOK	Math policy - same textbook	0.7905 (0.4069)	40557	0.7855 (0.4105)	4882
STD_CUR	Maths policy - standardized curriculum	0.8705 (0.3358)	40595	0.949 (0.22)	4882
TCHBEHTD (<i>r</i>)	Teacher oriented instruction method	0.4973 (1.0798)	26433	0.2964 (0.8099)	3254
TCHBEHSO (<i>r</i>)	Student oriented instruction method	0.7921 (0.9545)	26358	0.2969 (0.819)	3248
<i>Formative assessment used to</i>					
ASS_PROG	inform parents about child's progress	0.9695 (0.172)	40708	0.9928 (0.0844)	4882
ASS_PROM	decide on students retention or promotion	0.8988 (0.3016)	40483	0.9508 (0.2162)	4882
ASS_INSTR	group students for instructional purposes	0.6648 (0.4721)	40316	0.7378 (0.4399)	4882
ASS_NAT	compare school to national performance	0.7008 (0.4579)	40493	0.8785 (0.3267)	4882
ASS_SCH	monitor the schools yearly progress	0.9111 (0.2846)	40555	0.9799 (0.1403)	4882
ASS_TCH	make judgements on teachers' effectiveness	0.7764 (0.4166)	40400	0.9912 (0.0934)	4882
ASS_CUR	identify improvements in the curriculum	0.9017 (0.2977)	40586	0.9127 (0.2822)	4882
ASS_OTH	compare school with other schools	0.661 (0.4734)	40386	0.866 (0.3406)	4882
TCHBEHFA (<i>r</i>)	help students perform better	0.4634 (0.9934)	26245	0.005 (0.79)	3246
<i>Cognitive Activation in Mathematics</i>					
COGACT (<i>r</i>)	Cognitive activation in mathematics lessons	0.2998 (0.975)	26217	-0.3278 (0.6647)	3249
<i>Classroom Management</i>					
STU_FEEDB	Seeking written feedback from students	0.7105 (0.4536)	40788	0.8419 (0.3649)	4882
CLSMAN (<i>r</i>)	Teacher classroom management (in math)	0.2394 (0.905)	25753	0.2163 (0.7761)	3252
DISCLIMA (<i>r</i>)	Disciplinary climate in class (in math)	-0.0243 (0.9055)	26242	0.3747 (0.6926)	3254

Notes: The variables relate to the questionnaires administered to principals (schools) and students in the rotated booklet. For a more detailed description of variables, please see Table xx. Items marked with (*r*) are taken from the rotated student questionnaire. The variable means of Dev7 and Vietnam are statistically different at the 5% significance level, except TXT_BOOK.

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4 What school related factors explains the achievement gap of Vietnam ?

4.1 School Characteristics

Table 9: Summary statistics - school characteristics

Variable	Description	Dev7 countries		Vietnam	
		MS	Valid N	MS	Valid N
PRIVATESCL	Private school dummy variable	0.1714 (0.3768)	41182	0.0832 (0.2762)	4882
SC02Q02	Funding for school from student fees	25.7233 (36.0117)	34621	16.6104 (26.3564)	4848
DUM_VILLAGE	School located in a village	0.1403 (0.3473)	41347	0.4584 (0.4983)	4882
TOWN	School located in a town	0.4508 (0.4976)	41347	0.3101 (0.4626)	4882
CITY	School located in a city	0.4089 (0.4916)	41347	0.2315 (0.4218)	4882
CLSIZE	Average class size	35.013 (9.764)	40771	42.5043 (8.7236)	4882
SCHSIZE	Number of enrolled students at school	1057.0332 (924.2422)	35062	1302.9009 (648.6821)	4882
PCGIRLS	Proportion of girls at school	0.49 (0.2597)	36342	0.5282 (0.0801)	4882
ST72Q01 (<i>r</i>)	Class size in 'test language'	31.0133 (9.3337)	23946	41.0018 (5.4001)	2735
SCHSEL	School selectivity/ student admission policies	2.3061 (0.7991)	41286	2.8454 (0.4044)	4882

Notes: The variables relate to the questionnaires administered to principals (schools). ST72Q01 is taken from the rotated questionnaire administered to students. For a more detailed description of variables, please see Table xx. The variable means of Dev7 and Vietnam are statistically different at the 5% significance level.

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4.2 School Resources

Table 10: Summary statistics - school resources

Variable	Description	Dev7 countries		Vietnam	
		MS	Valid N	MS	Valid N
RATCMP15	Available computers for 15-year-olds	0.3909 (0.5476)	39490	0.2216 (0.3411)	4875
COMPWEB	Ratio of computers connected to internet	0.7556 (0.3578)	37446	0.7795 (0.3109)	3634
SCMATEDU	Quality of school educational resources	-0.8145 (1.1538)	41373	-0.4941 (0.9718)	4882
SCMATBUI	Quality of physical infrastructure	-0.6322 (1.1113)	41221	-0.3988 (1.0161)	4882
EXC1.BAND	School offers Band, orchestra or choir	0.471 (0.4992)	40044	0.1678 (0.3737)	4882
EXC2.PLAY	School offers schoo play/musical	0.5928 (0.4913)	40122	0.8509 (0.3562)	4882
EXC3.NEWS	School offers yearbook/newspaper	0.5373 (0.4986)	39617	0.5088 (0.5)	4882
EXC4.VOLU	School offers volunteering/service activ.	0.827 (0.3782)	40240	0.83 (0.3757)	4882
EXC5.MCLUB	School offers mathematics club	0.453 (0.4978)	40154	0.2687 (0.4434)	4882
EXC6.MATHCOMP	School offers Mathematics competition	0.6268 (0.4837)	40215	0.8032 (0.3977)	4882
EXC7.CHESS	School offers chess club	0.3437 (0.475)	39969	0.2302 (0.421)	4882
EXC8.ICTCB	School offers IT focused club	0.4899 (0.4999)	39752	0.1749 (0.3799)	4882
EXC9.ARTCB	School offers art club/activities	0.6774 (0.4675)	40017	0.4585 (0.4983)	4848
EXC10.SPORT	School offers sporting activities	0.9321 (0.2516)	40581	0.992 (0.089)	4882
EXC11.UNICORN	School offers 'country specific item'	0.7152 (0.4513)	40002	0.9629 (0.189)	4882
SCL.EXTR.CL	School offers additional math classes	0.6538 (0.4757)	40869	0.9584 (0.1997)	4882

Notes: The variables relate to the questionnaires administered to principals (schools). For a more detailed description of variables, please see Table xx. Items marked with (*r*) are taken from the rotated student questionnaire. The variable means of Dev7 and Vietnam are statistically different at the 5% significance level, except EXC4.VOLU.

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4.3 School Leadership

Table 11: Summary statistics - school leadership

Variable	Description	Dev7 countries		Vietnam	
		MS	Valid N	MS	Valid N
SCORE_PUBLIC	Achievement data posted publicly	0.345 (0.4754)	40965	0.7567 (0.4291)	4882
SCORE_AUTHRITS	Achievement data tracked by authority	0.8003 (0.3998)	41139	0.8282 (0.3773)	4778
SCHAUTON	School Autonomy in admin. decisions	-0.2542 (1.1328)	41394	-1.0419 (0.9378)	4882
TCHPARTI	Teacher participation in admin. decisions	-0.2169 (1.4457)	41394	-1.6445 (0.5188)	4882
LEADCOM	Communicating and acting on defined school goals	0.2387 (1.1105)	41252	0.0894 (0.6744)	4882
LEADINST	Promotion of instructional leadership	0.0899 (1.0724)	41219	-0.0549 (0.946)	4882
LEADPD	Promotion of solving classroom problems	0.244 (1.0851)	41219	-0.0587 (0.861)	4882
LEADTCH	Teacher participation in leadership	0.3233 (1.1356)	41125	-0.2914 (0.9077)	4882
QUAL_RECORD	Systematic recording of data for quality assurance	0.8865 (0.3172)	40941	0.9818 (0.1338)	4882

Notes: The variables relate to the questionnaires administered to principals (schools). For a more detailed description of variables, please see Table xx. Items marked with (*r*) are taken from the rotated student questionnaire. The variable means of Dev7 and Vietnam are statistically different at the 5% significance level.

Aenean malesuada nisi nunc, rhoncus auctor neque molestie porta. Sed eget placerat ipsum, in finibus velit. Integer hendrerit augue at est elementum pulvinar.

4.4 School Climate

Table 12: Summary statistics - school climate

Variable	Description	Dev7 countries		Vietnam	
		MS	Valid N	MS	Valid N
STUDCLIM	Student-related aspects of school climate	0.0485 (1.1642)	40973	0.0418 (0.6849)	4874
TEACCLIM	Teacher-related aspects of school climate	-0.1997 (1.1474)	40973	-0.0873 (0.7125)	4874
TCMORALE	Teacher morale and enthusiasm	0.0376 (1.0541)	41336	-0.2941 (0.8579)	4882

Notes: The variables relate to the questionnaires administered to principals (schools). For a more detailed description of variables, please see Table xx. Items marked with (*r*) are taken from the rotated student questionnaire. The variable means of Dev7 and Vietnam are statistically different at the 5% significance level, except STUDCLIM.

Aenean fermentum ut turpis in varius. Mauris dapibus sapien sed ante fermentum, ut fringilla purus mattis. Ut bibendum ex non orci ullamcorper, vitae elementum lacus tristique.

5 Estimating the Vietnamese Test Score differential for a set of eight developing countries

Table 13, 14 and 15 present a series of estimates of the 'Vietnam' test score differential for the PISA test taken in 2012 by Vietnam and seven other developing countries with a GDP per capita below \$10,000. The specifications estimated are of the form

$$PISATESTSCORE_i = VIETNAM_i + X_i + \epsilon_i$$

where i indexes students. VIETNAM captures the differential between Vietnam and the other seven developing countries score, given the vector of other covariates, denoted X . This vector varies across columns in Tables 13, 14 and 15, following our estimation of student, teacher/pedagogical practices and school related factors. In addition, columns (5), (6) and (7) contain additional specifications from the three rotated student questionnaires. Due to the restrictive nature of the rotated design of the PISA student questionnaire, we could only combine each one of the three rotated questionnaire individually with the non-rotated questions to still maintain a meaningfully large sample. All specified variables were tested in single sequential regressions to decrease the Vietnam differential. In all instances, the estimation is done using student weight (W_FSTUW), provided in the data set.

...

5.1 The estimated impact of 'Vietnam' on Mathematics PISA test scores

Table 13: The estimated impact of 'Vietnam' on Mathematics PISA test scores

Variables	Mathematics											
	(1)		(2)		(3)		(4)		(5)		(6)	
VIETNAM	128.05	(5.65)	90.35	(6.38)	85.06	(7.07)	71.91	(7.64)	59.88	(6.91)	46.2	(7.30)
PRENSCHOOL	-	-	37.57	(4.44)	34.47	(4.26)	26.96	(4.07)	22.54	(3.48)	20.03	(4.27)
REPEAT	-	-	-47.50	(4.36)	-47.06	(4.46)	-39.43	(3.68)	-30.6	(3.67)	-24.41	(3.26)
ST08Q01	-	-	-8.65	(1.63)	-8.19	(1.54)	-7.77	(1.38)	-5.87	(1.59)	-7.44	(1.69)
ST115Q01	-	-	-4.66	(2.00)	-4.13	(2.05)	-4.54	(2.03)	-4.26	(1.90)	-3.97	(2.37)
BOOK_N	-	-	0.09	(0.01)	0.09	(0.01)	0.07	(0.01)	0.05	(0.01)	0.05	(0.01)
PARPRESSURE	-	-	13.83	(4.75)	12.06	(4.69)	10.93	(4.72)	9.16	(3.96)	9.58	(4.32)
PCGIRLS	-	-	31.55	(20.97)	31.22	(18.70)	19.91	(18.41)	7.62	(13.08)	-5.12	(15.09)
FUNDMOM	-	-	0.24	(0.06)	0.22	(0.06)	0.17	(0.06)	0.16	(0.06)	0.15	(0.07)
COUNCILMOM	-	-	-0.27	(0.06)	-0.25	(0.06)	-0.17	(0.06)	-0.14	(0.05)	-0.15	(0.06)
PROPCERT	-	-	-	-	17.57	(6.90)	15.8	(6.75)	16.28	(6.19)	10.75	(6.92)
SMRATIO	-	-	-	-	-0.02	(0.01)	-0.03	(0.01)	-0.02	(0.01)	-0.01	(0.01)
TCSHORT	-	-	-	-	1.16	(1.89)	5.77	(2.01)	2.12	(1.63)	2.57	(1.68)
TCFOCST	-	-	-	-	-1.42	(2.59)	-2.8	(2.17)	-0.35	(1.72)	-0.5	(2.05)
TCM_STUASS	-	-	-	-	3.2	(7.89)	-6.04	(7.36)	-1.26	(7.33)	-4.61	(9.17)
TCM_PEER	-	-	-	-	-0.16	(6.54)	-5.44	(5.88)	-4.97	(5.26)	-6.57	(5.31)
TCH_INCENTV	-	-	-	-	-0.43	(2.45)	-1.5	(2.20)	-2.95	(2.24)	-3.23	(2.64)
ASS_PROG	-	-	-	-	-21.77	(9.91)	-31.95	(10.15)	-16.17	(7.75)	-31.19	(8.45)
ASS_PROM	-	-	-	-	9.52	(6.17)	8.75	(6.15)	10.42	(5.48)	8.77	(6.01)
ASS_SCH	-	-	-	-	0.65	(9.94)	-12.41	(10.17)	1.35	(7.62)	-3.12	(8.10)
STU_FEEDB	-	-	-	-	-0.55	(6.01)	0.07	(5.86)	2.03	(4.50)	4.43	(5.51)
COMP_USE	-	-	-	-	5.93	(5.53)	1.08	(5.21)	-0.64	(5.04)	1.24	(5.17)
TXT_BOOK	-	-	-	-	-19.49	(8.28)	-18.3	(8.53)	-7.18	(6.31)	-6.57	(7.41)
TOWN	-	-	-	-	-	-	-5.3	(4.31)	-5.97	(3.18)	-6.3	(3.46)
CLSIZE	-	-	-	-	-	-	0.74	(0.23)	0.69	(0.21)	0.67	(0.24)
COMPWEB	-	-	-	-	-	-	12.01	(6.88)	12.93	(5.71)	12.84	(6.37)
SCMATEDU	-	-	-	-	-	-	6.47	(3.18)	4.75	(2.72)	4.25	(2.93)
SCMATBUI	-	-	-	-	-	-	2.24	(2.70)	3.16	(2.26)	3.08	(2.47)
EXC2_PLAY	-	-	-	-	-	-	6.14	(4.82)	5.88	(3.72)	8.2	(4.25)
EXC6_MATHCOMP	-	-	-	-	-	-	2.65	(5.79)	-0.85	(4.81)	-0.61	(5.25)
EXC10_SPORT	-	-	-	-	-	-	-1.87	(10.23)	-4.71	(9.12)	-7.65	(8.19)
EXC11_UNICORN	-	-	-	-	-	-	7.43	(5.80)	7.04	(4.81)	6.06	(5.78)
SCL_EXTR_CL	-	-	-	-	-	-	13.84	(5.28)	11.23	(4.98)	8.26	(5.10)
SCORE_PUBLIC	-	-	-	-	-	-	9.65	(5.65)	10.71	(4.37)	9.08	(4.93)
QUAL_RECORD	-	-	-	-	-	-	7.45	(7.87)	11.71	(6.24)	10.13	(7.70)
SCHSEL	-	-	-	-	-	-	1.63	(3.27)	1.67	(2.88)	2.37	(3.23)
MATWKETH	-	-	-	-	-	-	-	-	-9.87	(1.58)	-	-
INSTMOT	-	-	-	-	-	-	-	-	5.76	(1.28)	-	-
INTMAT	-	-	-	-	-	-	-	-	-3.39	(1.88)	-	-
SUBNORM	-	-	-	-	-	-	-	-	-12.14	(0.90)	-	-
MATHEFF	-	-	-	-	-	-	-	-	29.9	(2.05)	-	-
MATINTFC	-	-	-	-	-	-	-	-	8.43	(0.85)	-	-
PERSEV	-	-	-	-	-	-	-	-	4.37	(1.10)	-	-
OUTMATH	-	-	-	-	-	-	-	-	-	-	1.55	(0.47)
EXPUREM	-	-	-	-	-	-	-	-	-	-	12.5	(0.99)
FAMCONC	-	-	-	-	-	-	-	-	-	-	24.6	(1.59)
BKGR_FAMPROB	-	-	-	-	-	-	-	-	-	-	-	-
ANXMAT	-	-	-	-	-	-	-	-	-	-	-	-
ATSCHL	-	-	-	-	-	-	-	-	-	-	-	-
ATTLNACT	-	-	-	-	-	-	-	-	-	-	-	-
MTSUP	-	-	-	-	-	-	-	-	-	-	-	-
STUDREL	-	-	-	-	-	-	-	-	-	-	-	-
TCHQUAL_DIFF	-	-	-	-	-	-	-	-	-	-	-	-
TCHBEHTD	-	-	-	-	-	-	-	-	-	-	-	-
TCHBEHSO	-	-	-	-	-	-	-	-	-	-	-	-
TCHBEHFA	-	-	-	-	-	-	-	-	-	-	-	-
DISCLIMA	-	-	-	-	-	-	-	-	-	-	-	-
R ²	27.18		41.14		42.61		45.37		49.6		46.93	
N	48483		17492		17492		17492		15660		11944	

Just notes: 'strong' ie 'largely' increasing variables are:

5.2 The estimated impact of 'Vietnam' on Reading PISA test scores

Table 14: The estimated impact of 'Vietnam' on Reading PISA test scores

Variables	Reading													
	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
VIETNAM	105.16	(5.03)	68.54	(5.22)	65.75	(5.53)	52.61	(6.08)	58.43	(5.97)	52.04	(6.10)	52.72	(6.12)
FEMALE	-	-	23.53	(1.96)	23.53	(1.85)	22.88	(1.83)	24.38	(1.94)	21.33	(2.04)	21.72	(1.91)
PRESCHOOL	-	-	34.59	(4.57)	33.63	(4.56)	25.9	(4.02)	25.25	(3.41)	21.72	(4.21)	21.7	(3.91)
REPEAT	-	-	-55.5	(5.25)	-53.92	(5.52)	-45.81	(3.89)	-40.03	(3.48)	-42.04	(4.75)	-39.73	(3.75)
ST08Q01	-	-	-9.43	(1.74)	-9.14	(1.74)	-8.57	(1.64)	-5.83	(1.56)	-6.28	(2.18)	-6.06	(1.60)
ST115Q01	-	-	-9.06	(2.07)	-9.35	(2.08)	-9.16	(1.92)	-7.69	(1.87)	-10.99	(2.44)	-7.11	(2.09)
BOOK_N	-	-	0.08	(0.01)	0.07	(0.01)	0.06	(0.01)	0.05	(0.01)	0.04	(0.01)	0.05	(0.01)
PARPRESSURE	-	-	8.34	(4.57)	6.32	(4.77)	1.98	(4.54)	2.5	(4.15)	2.69	(4.65)	3.18	(4.28)
PCGIRLS	-	-	50.94	(17.61)	49.39	(18.22)	32.15	(18.44)	18.62	(11.35)	19.59	(13.32)	23.68	(12.34)
VOLUMOM	-	-	0.04	(0.07)	0.01	(0.06)	0.02	(0.06)	-0.03	(0.06)	-0.01	(0.07)	-0.02	(0.06)
FUNDMOM	-	-	0.14	(0.06)	0.15	(0.06)	0.1	(0.06)	0.1	(0.06)	0.05	(0.07)	0.09	(0.06)
COUNCILMOM	-	-	-0.28	(0.06)	-0.28	(0.06)	-0.2	(0.06)	-0.12	(0.06)	-0.09	(0.07)	-0.15	(0.06)
PROPCERT	-	-	-	-	5.66	(6.32)	4.35	(6.28)	2.52	(5.52)	-3.75	(6.76)	5.24	(5.75)
TCSHORT	-	-	-	-	-1.92	(2.22)	2.82	(2.24)	0.82	(1.87)	0.68	(2.02)	0.06	(1.76)
TCM_STUASS	-	-	-	-	10.58	(8.55)	3.95	(8.63)	8.8	(9.11)	7.33	(10.60)	8.88	(8.73)
ASS_PROG	-	-	-	-	-14.89	(10.80)	-33.18	(12.25)	-9.31	(13.19)	-26.84	(11.87)	-8.41	(11.76)
ASS_PROM	-	-	-	-	12.81	(5.79)	11.05	(6.17)	13	(5.79)	9.37	(5.98)	10.31	(5.72)
ASS_NAT	-	-	-	-	4.43	(7.52)	-0.52	(7.20)	0.8	(5.78)	-1.36	(7.16)	0.62	(6.22)
ASS_CUR	-	-	-	-	-3.26	(9.95)	-7.5	(10.48)	-4.56	(9.05)	-2.52	(8.76)	-2.16	(8.79)
STU_FEEDB	-	-	-	-	6.35	(5.28)	3.09	(5.20)	7.22	(4.24)	6.08	(4.82)	5.1	(4.29)
TOWN	-	-	-	-	-	-	-6.31	(4.21)	-5.47	(3.61)	-7.44	(4.04)	-5.75	(3.81)
CLSIZE	-	-	-	-	-	-	0.86	(0.24)	1.02	(0.24)	0.75	(0.30)	0.89	(0.23)
COMPWEB	-	-	-	-	-	-	12.94	(6.52)	14.49	(5.51)	18.02	(6.16)	15.38	(5.95)
SCMATEDU	-	-	-	-	-	-	6.18	(3.24)	4.56	(2.68)	4.39	(2.85)	5.2	(2.62)
SCMATBUI	-	-	-	-	-	-	1.21	(2.61)	1.44	(2.47)	1.92	(2.65)	0.88	(2.37)
EXC2_PLAY	-	-	-	-	-	-	13.37	(5.00)	12.72	(4.00)	10.41	(4.43)	12.82	(3.93)
EXC6_MATHCOMP	-	-	-	-	-	-	11.57	(5.28)	8.48	(4.94)	11.32	(5.37)	6.71	(5.05)
EXC10_SPORT	-	-	-	-	-	-	1.81	(15.17)	-3.33	(11.81)	-8.39	(11.23)	-8.98	(11.41)
EXC11_UNICORN	-	-	-	-	-	-	9.37	(6.20)	11.66	(5.02)	13.58	(5.91)	10.15	(5.61)
SCORE_PUBLIC	-	-	-	-	-	-	4.93	(5.65)	4.1	(4.15)	4.98	(5.06)	4.93	(4.34)
LEADINST	-	-	-	-	-	-	1.62	(2.57)	1.16	(2.00)	1.85	(2.11)	2.18	(2.07)
QUAL_RECORD	-	-	-	-	-	-	3.25	(8.56)	-7.26	(6.90)	-10.28	(8.20)	-6.29	(6.97)
SCHSEL	-	-	-	-	-	-	2.08	(3.31)	0.78	(2.87)	-0.37	(3.21)	0.96	(3.19)
TEACCLIM	-	-	-	-	-	-	-1.97	(2.92)	-1.94	(2.71)	-1.28	(2.84)	-1.68	(2.71)
PERSEV	-	-	-	-	-	-	-	-	7.84	(1.16)	-	-	-	-
LHRS	-	-	-	-	-	-	-	-	-	-	0.34	(0.71)	-	-
ST72Q01	-	-	-	-	-	-	-	-	-	-	0.84	(0.22)	-	-
BKGR_FAMPROB	-	-	-	-	-	-	-	-	-	-	-	-	-6.96	(1.89)
ATSCHL	-	-	-	-	-	-	-	-	-	-	-	-	10.17	(1.11)
ATTLNACT	-	-	-	-	-	-	-	-	-	-	-	-	-0.46	(1.13)
STUDREL	-	-	-	-	-	-	-	-	-	-	-	-	-6.75	(1.07)
TCHQUAL_DIFF	-	-	-	-	-	-	-	-	-	-	-	-	-13.31	(1.94)
R ²	19.61		38.72		39.26		43.09		42.69		39.82		43.62	
N	48483		18474		18474		18474		17506		11843		16829	

Notes: The sample consists of the 'Developing 7' countries and Vietnam. *Additional info to be added here..*

See Science for decreasing/increasing, will be repeated here.

5.3 The estimated impact of 'Vietnam' on Science PISA test scores

Table 15: The estimated impact of 'Vietnam' on Science PISA test scores

Variables	Science													
	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
VIETNAM	134.56	(4.91)	94.84	(5.23)	92.98	(5.42)	80.09	(5.75)	84.54	(5.76)	83.51	(5.98)	81.08	(6.13)
FEMALE	-	-	-4.88	(1.72)	-4.75	(1.61)	-5.33	(1.54)	-5.13	(1.69)	-4.59	(2.17)	-4.99	(2.01)
PRESCHOOL	-	-	37.24	(4.47)	36.17	(4.56)	27.5	(4.24)	25.48	(3.54)	22.07	(3.91)	22.15	(4.06)
REPEAT	-	-	-54.16	(4.59)	-52.69	(4.70)	-45.4	(3.54)	-37.67	(3.44)	-36.6	(4.44)	-38.45	(3.69)
ST08Q01	-	-	-9.27	(1.55)	-9.17	(1.54)	-8.95	(1.36)	-7.42	(1.31)	-8.08	(1.96)	-6.9	(1.55)
ST115Q01	-	-	-5.85	(2.21)	-6.08	(2.22)	-6.07	(2.07)	-5.86	(1.63)	-8.46	(2.91)	-5.14	(2.20)
BOOK_N	-	-	0.08	(0.01)	0.08	(0.01)	0.06	(0.01)	0.06	(0.01)	0.04	(0.02)	0.06	(0.01)
PARPRESSURE	-	-	5.74	(4.41)	3.53	(4.45)	-0.73	(4.41)	-1.69	(3.68)	-0.41	(4.03)	-0.58	(3.86)
PCGIRLS	-	-	39.84	(17.98)	38.3	(18.72)	25.6	(18.14)	16.82	(10.71)	19.57	(12.12)	19.9	(12.11)
TCM_PEER	-	-	0.22	(0.06)	0.21	(0.06)	-4.41	(5.87)	-4.49	(5.67)	-7.82	(6.39)	-3.67	(5.65)
FUNDMOM	-	-	-0.31	(0.06)	-0.30	(0.06)	0.15	(0.06)	0.16	(0.05)	0.14	(0.06)	0.16	(0.06)
COUNCILMOM	-	-	-	-	7.53	(6.42)	-0.2	(0.06)	-0.15	(0.05)	-0.15	(0.06)	-0.15	(0.06)
PROPCERT	-	-	-	-	1.66	(2.17)	4.28	(5.98)	4.58	(5.43)	0.57	(6.52)	7.4	(5.61)
TCSHORT	-	-	-	-	11.69	(7.86)	5.12	(2.13)	3.07	(1.78)	3.26	(2.06)	2.12	(1.73)
TCM_STUASS	-	-	-	-	-0.79	(6.51)	6.82	(8.38)	10.85	(8.07)	7.99	(8.64)	11.29	(8.22)
ASS_PROG	-	-	-	-	-24.74	(11.44)	-40.32	(11.86)	-19.8	(10.69)	-29.87	(9.15)	-16.77	(11.25)
ASS_PROM	-	-	-	-	10.99	(6.54)	9.59	(7.01)	12.24	(6.79)	10.05	(6.93)	11.51	(7.14)
ASS_NAT	-	-	-	-	5.27	(6.53)	-0.69	(6.19)	1.41	(4.80)	-1.48	(5.68)	1.08	(5.31)
ASS_SCH	-	-	-	-	1.97	(9.58)	-5.7	(10.87)	1.00	(6.86)	-4.18	(8.66)	1.23	(7.45)
ASS_CUR	-	-	-	-	-5.24	(9.19)	-4.54	(9.40)	-4.24	(8.32)	1.84	(9.05)	-4.39	(8.13)
STU_FEEDB	-	-	-	-	4.21	(5.46)	2.42	(5.37)	6.00	(4.54)	6.07	(5.26)	5.21	(4.80)
PRIVATE_SCL	-	-	-	-	-	-	-5.13	(6.39)	-1.54	(5.29)	-2.97	(6.00)	-0.55	(5.65)
TOWN	-	-	-	-	-	-	-7.58	(3.40)	-7.03	(3.15)	-8.45	(3.19)	-7.85	(3.36)
CLSIZE	-	-	-	-	-	-	0.73	(0.22)	0.90	(0.21)	0.88	(0.22)	0.75	(0.20)
COMPWEB	-	-	-	-	-	-	15.5	(6.67)	15.57	(5.53)	18.09	(5.78)	16.01	(6.09)
SCMATEDU	-	-	-	-	-	-	7.22	(2.13)	5.57	(1.85)	4.87	(1.76)	5.54	(1.96)
EXC2_PLAY	-	-	-	-	-	-	8.64	(4.37)	8.47	(3.27)	8.5	(3.93)	8.99	(3.48)
EXC6_MATHCOMP	-	-	-	-	-	-	5.27	(5.08)	2.65	(4.47)	2.66	(5.05)	-0.23	(4.86)
EXC10_SPORT	-	-	-	-	-	-	-0.07	(11.82)	-1.53	(9.94)	-5.57	(9.31)	-4.36	(10.30)
EXC11_UNICORN	-	-	-	-	-	-	6.67	(6.61)	8.59	(5.07)	11.94	(5.74)	8.36	(5.65)
SCORE_PUBLIC	-	-	-	-	-	-	12.72	(4.96)	10.25	(3.78)	11.45	(4.60)	10.77	(3.97)
LEADINST	-	-	-	-	-	-	1.80	(2.40)	1.32	(1.91)	1.96	(2.03)	1.91	(1.97)
QUAL_RECORD	-	-	-	-	-	-	6.26	(7.00)	-1.50	(5.56)	-1.97	(6.08)	-1.18	(5.77)
SCHSEL	-	-	-	-	-	-	1.93	(3.51)	1.39	(2.94)	1.54	(3.34)	0.64	(3.19)
TEACCLIM	-	-	-	-	-	-	-1.4	(2.79)	-2.11	(2.46)	-2.03	(2.75)	-2.84	(2.50)
PERSEV	-	-	-	-	-	-	-	-	7.85	(1.03)	-	-	-	-
OUTSCIE	-	-	-	-	-	-	-	-	-	-	2.74	(0.60)	-	-
BKGR_FAMPROB	-	-	-	-	-	-	-	-	-	-	-	-	-7.57	(1.61)
ATSCHL	-	-	-	-	-	-	-	-	-	-	-	-	6.73	(1.03)
ATTLNACT	-	-	-	-	-	-	-	-	-	-	-	-	-0.32	(1.21)
STUDREL	-	-	-	-	-	-	-	-	-	-	-	-	-6.12	(0.95)
TCHQUAL_DIFF	-	-	-	-	-	-	-	-	-	-	-	-	-16.33	(1.86)
R ²	30.75		44.59		45.04		48.32		47.61		45.52		49.19	
N	48483		18474		18474		18474		17441		12670		16764	

Notes: The sample consists of the 'Developing 7' countries and Vietnam. *Additional info to be added here..*

Just notes: 'strong' ie 'largely' increasing variables are:

(2): FEMALE, PRESCHOOL, REPEAT, ST08Q01, FUNDMOM, COUNCILMOM

(3): none

(4): CLSIZE, SCMATDU, (EXC2_PLAY + EXC6_MATHCOMP + EXC10_SPORT + EXC11_UNICORN), SCORE_PUBLIC,

(5): none

(6): none

(7): BKGR_FAMPROB, ATTLNACT

Repeat for 'strongly increase' the gap ...

6 Conclusion

Nullam quis elit ac lacus cursus pulvinar quis sed urna. Morbi vel enim finibus, pellentesque elit sed, varius odio. Ut non pellentesque urna, eget iaculis eros.

7 Resources

7.1 Blax

7.2 Other resources for other uses

- Rtf2LaTeX2e - free software to convert from rtf (MS-Word) file to LaTeX. It saves a lot of work when converting existent papers written in Word like programs, but it is not perfect (tables, graphs, equations, and formats may not convert well).

- LaTeX.org - information and free programs for lots of uses

- Ctan.org - information and free programs for lots of uses (Boston College) Economics' resources - information and links for LaTeX typesetting (includes an introduction manual)

- Sourceforge - free open source LaTeX programs for lots of uses (look for LaTeX in the software search)

7.3 Links for publication of economics reseach

Search for these useful links on the web (I'll add the links to this document later).

- JEL Classification Numbers

- How to publish in Economics by Prof. Kwan Choi (Editor, Review of International Economics)

- <http://econpapers.repec.org/> or <http://www.ssrn.com/> - to share working papers
1.5=one and half, 2=double, 3=triple, etc.).

7.4 New line or paragraph

To start a new line **with indent** like for a new paragraph, skip one line in your .tex file.

To start a new line **without indent** add `\\` at the point where you want the new line to start.

7.5 Indent

To eliminate the indent in a given paragraph (useful when preparing presentation slides), start the paragraph with `\noindent`

To increase the indent, add a `\quad` or `\hspace{Xcm}`, where **X** is the number of centimeters to skip (you can use `in=inch` too).

7.6 Margins

To change page layout margins, alter the parameters in

```
\geometry{left=1.0in,right=1.0in,top=1.0in,bottom=1.0in}
```

Instead of inches (in), you could use centimeters (cm). You must be using the geometry package, i.e., make sure the following is in the preamble of your .tex file:

```
\usepackage[nohead]{geometry}
```

7.7 Hyphenation

To avoid excessive hyphenation (i.e., word-breaks between lines), add the following to where you want the command to start having effect (usually before the beginning of your text):

```
\sloppy
```

This command does not completely eliminate hyphenation, but makes it very rare. LaTeX was created to generate a nice looking output, so the compiler tries the best it can to avoid hyphenation, but sometimes it would create large spaces between words, so the compiler prefers to hyphenate the last word of the line.

7.8 Justification

Justification is generally not needed for working papers, but here it is. To have text justified to the left, use `\flushright` at the point you want justification to start. To have text justified to the right, use `\flushleft` at the point you want justification to start. To have text centered, use

```
\begin{center}
```

Text that you want to be centered

```
\end{center}
```

to call the label by writing

Smith \ref{labelforSmith}. For references with year, like Smith (1996), using labels is not that useful because it is faster to just write the year yourself. But if you want to get the year automatically using the label, write Smith\cite{labelforSmith} or, if the reference is already within parentheses, write (Smith, \citeyear{labelforSmith}).

7.9 Figures and pictures

and then to crop it, you can try to use an eps version of the figure. I won't explain this here because I think it's too much work and confusing. Add the figure (where you want it to be) with:

```
\begin{figure}[htbp]
```

```
\caption{Title}
```

```
\centering \includegraphics[width=0.75\textwidth]{filename.pdf} \\\
```

A note you want to add here (like the source of the data for a graph).

```
\label{your_key}
```

```
\end{figure}
```

where **htbp** is for the location on the page: here, top of the page, bottom, of floating in an exclusive page, **Title** is the title that appears at the top of the figure (automatically precedes with “Figure X:”, where X is the number of the figure), **0.75\textwidth** gives the width as a proportion of the text width (you can use a measure in inches or cm instead), **filename.pdf** is the name of the file of the figure, which should be in the same folder of your .tex file, and **your_key** is the key that you can use to refer to the figure in the text (you have to write \ref{your_key} in order to have the reference (the number of the figure) shown in the text). Notice that you can add a note at the bottom of the figure for sources or other remarks. The example above should give something like the following figure (using the option “h”, i.e., print it here).

T

8 Concluding remarks

Good luck! Yes, luck is helpful during this learning process (avoiding silly mistakes will save you a lot of time).

This is an open-source document. Feel free to write and distribute your own improved version based on this one (just don't forget to cite this document). The original .tex file of this document is available at <http://faculty.gvsu.edu/ogural/>

Future topics to be covered here include how to use Bibtex ...

References

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