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Article (Accepted version) (Refereed)

Original citation:
Heller-Sahlgren, Gabriel (2018) Smart but unhappy: independent-school competition and the wellbeing-efficiency trade-off in education. Economics of Education Review, 62. pp. 66-81. ISSN 0272-7757
DOI: 10.1016/j.econedurev.2017.10.005

Smart but Unhappy: Independent-school Competition and the Wellbeing-efficiency Trade-off in Education

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Published in the Economics of Education Review (2018, vol. 62, pp. 66-81)

Abstract

We study whether independent-school competition involves a trade-off between pupil wellbeing and academic performance. To test this hypothesis, we analyse data covering pupils across the OECD, exploiting historical Catholic opposition to state schooling for exogenous variation in independent-school enrolment shares. We find that independent-school competition decreases pupil wellbeing but raises achievement and lowers educational costs. Our analysis and balancing tests indicate these findings are causal. In addition, we find several mechanisms behind the trade-off, including more traditional teaching and stronger parental achievement pressure.

Keywords: Independent-school competition; Human capital; Wellbeing-efficiency trade-off

JEL codes: I20, L33, I31

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[‡] This work was supported by the Economic and Social Research Council [grant number ES/J500070/1] and the Jan Wallander and Tom Hedelius Foundation. The author thanks Sarah Cohodes, Susan Dynarski, Henrik Jordahl, Julian Le Grand, Olmo Silva, the editor Dinand Webbink, two anonymous referees, and participants at the conference 'Efficient provision of public services' hosted by the Research Institute of Industrial Economics in Vaxholm, Sweden for useful comments and discussions.

1. Introduction

The extent to which independently-operated schools improve pupil outcomes has become a fiercely debated topic in the economics of education. An important motive behind reforms designed to increase independent-school access, such as vouchers, is that such schools will increase competition and thus generate improvements in pupil performance at the system level (e.g. Friedman 1962; Le Grand 2007; Neal 2002). In the past decades, research has begun to evaluate whether or not this holds true in different contexts.

However, the existing literature focuses mostly on academic outcomes. Certainly, such outcomes are important given their links with labour-market success, non-pecuniary long-term outcomes, and economic development (e.g. Atherton et al., 2013; Brunello et al., 2016; Card, 1999; Hanushek et al., 2015; Hanushek and Woessmann, 2012, 2016; Oreopoulos and Salvanes, 2011). But there are also important non-cognitive outputs of schooling. These outputs include pupil wellbeing, which has become an increasingly emphasised policy goal in western countries, justified by the fact that wellbeing in childhood and adolescence is an important predictor of risky behaviour, adult wellbeing, and a range of other outcomes (e.g. Carneiro et al., 2007; Frijters et al., 2014; Jones, 2013; Layard et al., 2014; Lévy-Garboua et al., 2006; Takakura et al., 2010). As school is a key part of youngsters' lives, it is perhaps unsurprising that measures of wellbeing at school also predict a range of more general wellbeing and behavioural indicators (e.g. Gibbons and Silva, 2011; Huebner and Gilman, 2006; Huebner and Diener, 2008; Huebner et al. 2014; Locke and Newcomb, 2004). Furthermore, it may be easier to positively affect pupil wellbeing and other non-cognitive indicators at school, compared with cognitive performance (e.g. Heckman and Kautz, 2013; Payton et al., 2008).

Importantly, however, it is not clear that interventions improving academic efficiency, in terms of academic output per dollar spent, also have positive effects on wellbeing at school. Progressive pedagogical theory, characterised by child-centred ways of working, generally assumes the two go hand in hand (Christodoulou, 2014; Mintz, 2012), an idea that is often highlighted in policy debates. For example, Public Health England (2014:4) argues: '[P]romoting the health and wellbeing of pupils and students within schools and colleges has the potential to improve their educational

outcomes *and* their health and wellbeing outcomes'. Yet there is little rigorous empirical evidence supporting this assumption. In fact, research suggests that policies improving academic performance also often appear to make learning and school life less joyful (e.g. Falch and Rønning, 2012; Jürges and Schneider, 2010; Warton, 2001). If this is the case, policies that raise academic efficiency may also produce lower pupil wellbeing – thus generating a wellbeing-efficiency trade-off in education. We hypothesise that market incentives, which are likely to induce stronger focus on academic efficiency, involve such a trade-off. Given the widespread belief in pedagogical and policy circles that wellbeing and academic achievement are positively, and causally, related – as well as the considerable interest paid to the effects of market reforms in education in general – this is an important issue to investigate in its own right.

Utilising pupil-level data from the Programme for International Student Assessment (PISA) covering 15-year old pupils across 34 OECD countries, we test our hypothesis by analysing the system-level effects of independent-school competition on pupil wellbeing and academic efficiency.[1] We build on prior research – the most relevant of which is West and Woessmann's (2010) – and use an instrumental-variable (IV) strategy exploiting Catholic resistance to state schooling in the 19th and early 20th centuries to predict enrolment shares in independently-operated schools today. As school secularisation gained ground, Catholics tended to push for access to independent schools in countries without Catholicism as state religion. We thus use Catholic population shares in 1900, interacted with an indicator for whether or not Catholicism was the state religion, as instrument for contemporary independent-school enrolment shares. Controlling for detailed regional-fixed effects and a number of relevant pupil-, school-, and country-level controls, including the contemporary version of the instrument itself, it is plausible that this variation is exogenous. This is especially true since we account for a number of other important historical factors affecting the extent to which Catholic resistance did in fact generate higher independent-school competition, and, if it did, the extent to which this competition has survived to this day. If anything, other research and our analysis suggest the strategy may bias the results against our hypothesis.

[1] For a discussion about the advantages and disadvantages of using international data, see Hanushek and Woessmann (2011).

We find that independent-school competition has considerable negative effects on pupil wellbeing. The effects are just as conspicuous when restricting the sample to pupils in state schools, indicating that the impact depends on system-level competition rather than on the direct impact of independent-school attendance and/or pupil sorting. We further confirm positive effects of competition on PISA scores and a negative impact on education expenditures found in previous research (see West and Woessmann 2010), thus supporting the idea of a wellbeing-efficiency trade-off. Balancing tests on pupil-background variables support the causal interpretation of our findings.

Analysing potential mechanisms behind the trade-off, we find that competition induces more traditional teaching, instructional time, and homework, which prior research suggests raise achievement and lower wellbeing. Also, competition makes pupil-teacher relations more hierarchical and increases parental achievement pressure, two other relevant mechanisms behind the wellbeing-efficiency trade-off.

Finally, based on our findings and other research comparing the longer-term returns to cognitive achievement and wellbeing in adolescence, we carry out a basic back-of-the-envelope cost-benefit analysis. This indicates that the positive effects of independent-school competition on academic efficiency outweigh the negative impact on pupil wellbeing from an economic standpoint. However, using adult life satisfaction as the unit of measurement rather than money, the costs of competition appear to outweigh its benefits. While further research is necessary to draw strong conclusions in this respect, the analysis at least suggests a more general trade-off between the traditional goals of education policy and the wellbeing agenda to which policymakers should pay attention.

The paper proceeds as follows. Section 2 discusses the theoretical link between school competition and wellbeing as well as related research; Section 3 outlines the data analysed in detail; Section 4 describes the methodology; Section 5 presents the results and a tentative back-of-the-envelope cost-benefit analysis; and Section 6 concludes.

2. Theory and related literature

Theoretically, the system-level effects of independently-operated schools should depend on parental demand for different outcomes. If parents perceive the marginal utility of wellbeing at school to be high, we might expect independent-school competition to have positive effects in this respect. For example, increasing access to

independent schools expands school choice, which may allow for a better match between pupil and school (e.g. Adnett and Davies, 2002). Additionally, independent schools may be more responsive to pupil needs and have more capacity to innovate (e.g. Chubb and Moe, 1988). Finally, with more opportunities for choice, schools must compete to attract pupils (e.g. Hoxby, 2003). The competitive pressures, in turn, would force schools that produce low wellbeing to either improve or go out of business. Overall, the result would be higher pupil wellbeing on average throughout the system.

However, this story hinges on the assumption that parents value pupil wellbeing, and, if there are trade–offs between wellbeing and other types of school quality, that they value the former more than the latter. The research in this respect is admittedly scarce, but it does not support this assumption. In England, Gibbons and Silva (2011) find that peer quality and school value added dominate pupil wellbeing as predictors of parental satisfaction with schools. And whereas peer quality and school value added are capitalised into house prices, average pupil happiness is not. This indicates that parents prefer academic and peer quality over pupil wellbeing, thus generating stronger incentives for schools to focus on the former rather than the latter.

Certainly, progressive pedagogical theory, characterised by child-centred ways of working, highlights the importance of wellbeing for improving achievement (Christodoulou, 2014; Mintz, 2012). Yet there is little evidence in favour of this hypothesis. On the contrary, cognitive research suggests that memorisation, repetition, and teaching of facts – activities that are not necessarily fun or inspiring – are key to learning (Christodoulou, 2014; Ingvar and Eldh, 2014). Furthermore, research has found that educational methods and interventions promoting higher performance, including traditional teaching methods and central exit examinations, also often appear to make learning and school life less joyful (e.g. Algan et al., 2013; Bietenback, 2014; Jiang and McComas, 2015; Jürges and Schneider, 2010; Jürges et al., 2012; Kirschner et al., 2006; Regh, 2012; Schwerdt and Wuppermann, 2011; Sweller et al., 2007). Similar stories apply to time spent in school, instructional time, and time spent doing homework (Aucejo and Romano, 2014; Csikszentmihalyi and Hunter, 2003; Falch and Rønning, 2012; Gustafsson, 2013; Kuehn and Landeras, 2012; Lavy, 2015; Rivkin and Schiman, 2015; Warton, 2001). In other words, in contrast to the assumptions of

progressive pedagogical theory, practices that produce higher academic efficiency also often seem to generate lower pupil wellbeing.[2]

A potential reason explaining these results is that interventions with positive effects on achievement make pupils work harder, which may in turn increase their stress levels and thus decrease their wellbeing. Another possibility is that the interventions decrease wellbeing via raised stress levels that induce pupils to focus more on their schoolwork – which, in turn, raise achievement. Yet another possible reason is that achievement and wellbeing affect each other positively, but that the net effect of the interventions on wellbeing is still negative due to other mechanisms that operate independently of achievement. Regardless of the mechanism, the cause of the differential effects is in any case the interventions per se – which appear to involve a causal net trade-off between achievement and wellbeing.

However, whether or not such a trade-off applies to market incentives in education is an open question. The literature analysing the effects of school choice, autonomy, and competition is mixed, but often finds small-to-moderate positive effects on academic outcomes and overall efficiency (e.g. Böhlmark and Lindahl, 2015; Chakrabarti, 2008; Eyles and Machin, 2015; Lavy, 2010; Muralidharan and Sundararaman, 2015).[3] For this paper's purposes, the most relevant research is West and Woessmann's (2010) study, which uses similar data and instrument as we do. They find that larger independent-school enrolment shares improve academic efficiency by raising performance in PISA and lowering per-pupil expenditures.

Nevertheless, to the best of our knowledge, only one paper analyses effects on pupil wellbeing. Utilising Spanish high-school data, with an identification strategy based on independent-school availability, Green et al. (2014) find negative effects on pupil satisfaction of attending independently-operated schools. The authors speculate that this negative impact may be due to a stronger focus on academic achievement in such schools. However, they do not empirically investigate potential trade-offs directly or study the system-level effects of independent-school competition.

[2] In an interesting contribution less related to wellbeing, West et al. (2016) find that Boston charter schools that produce high cognitive achievement appear to have negative effects on various self-reported non-cognitive measures. However, the latter impact may be due to reference bias, since charter-school pupils report having considerably stricter and more hierarchical school environments characterised by high expectations. By studying competition at the country level, we minimise the potential for similar reference bias in pupil wellbeing.

[3] See Heller-Sahlgren (2013) for a comprehensive review and assessment of this literature.

Overall, therefore, while the theoretical impact of competition from independently-operated schools on pupil wellbeing is somewhat ambiguous, it appears more reasonable to predict a negative effect. However, it also appears reasonable to predict that this negative impact will be accompanied by a positive effect on academic efficiency. We therefore expect a trade-off in terms of how school competition affects pupil wellbeing and academic efficiency. The next section describes the data utilised to investigate these issues.

3. Data

To study how independent-school competition affects pupil wellbeing and academic efficiency, as well as mechanisms behind a potential trade-off, we exploit pupil-level data from the 2012 round of the OECD's PISA survey. PISA was created as a reliable metric of pupil knowledge, and has been carried out every three years since 2000. In the 2012 round, representative samples of pupils aged between 15 years and three months and 16 years and two months in 34 OECD countries – as well as in 31 other partner countries or economies – were tested in mathematical, reading, and scientific literacy.

In addition to sitting the tests, pupils complete questionnaires with rich details on their background characteristics and personal views, which we use to obtain indicators for pupil wellbeing. While the total sample across the 34 OECD countries covers about 295,000 pupils, the rotating design of the questionnaire means that the sample size when analysing wellbeing is about 190,000 pupils.[4] To obtain information on ownership structure and funding sources, we also make use of the school-level questionnaire, which enquired headteachers about school-background information. Table A1 outlines the descriptive statistics of the variables used in the analysis.

3.1. Pupil wellbeing

In PISA 2012, pupils were for the first time asked about their happiness at school, or more specifically to what extent they agree with the following statement: 'I feel happy at school'. Pupils were asked to choose one of the following options: (1) 'strongly agree', (2) 'agree', (3), 'disagree', or (4) 'strongly disagree', which we recode so that higher

[4] In PISA 2012, the questionnaire was divided into one common part, which covers background variables and was administered to all pupils, and one rotating part, which includes additional question sets that were randomly allocated to pupils within schools. The design, which follows the one for the cognitive test itself, means that about two thirds of pupils answered all questions in the rotating part (see OECD, 2014).

values indicate higher wellbeing. Research indicates that similar measures of subjective wellbeing are valid and reliable, both across and within countries, for children and adults alike (e.g. Alesina et al., 2004; Frey and Stutzer, 2002; Gilman and Huebner, 2003; Huebner, 2004; Krueger and Schkade, 2008; Veenhoven, 2012). While our preferred measure may to some extent also pick up general wellbeing, this is not necessarily a problem. This is because happiness at school is likely to affect wellbeing more generally. Indeed, previous research suggests similar measures predict general wellbeing indicators, such as depression, anxiety, life satisfaction, and suicidal ideation (Gibbons and Silva, 2011; Huebner and Diener, 2008; Huebner and Gilman, 2006; Huebner et al., 2014; Locke and Newcomb, 2004). For our purposes, it makes most conceptual sense to study wellbeing at school specifically since the independent variable of interest is likely to affect wellbeing primarily via the school environment, and because we are particularly interested in the potential trade-off between pupil wellbeing and academic achievement. By focusing on wellbeing at school specifically, we therefore study the parameter of wellbeing that is most relevant to education policy per se. As highlighted by the OECD (2013, p. 33): 'As schools are a, if not *the*, primary social environment for 15-year olds, these subjective evaluations [of pupil happiness] provide a good indication of whether education systems are able to foster or hinder overall student well-being.' We thus believe our principal wellbeing measure is highly relevant for the purpose of this paper. Nevertheless, in robustness tests, we also consider alternative wellbeing metrics that are less likely to pick up pupils' attitudes to the school itself, including peer relations.

3.2. Academic efficiency

While our principal focus is on pupil wellbeing, we also analyse PISA scores in all subjects as well as cumulative per-pupil expenditures between ages 6 and 15, which we obtain from the OECD (2016a).[5] This allows us to investigate whether or not the positive effects on academic achievement and negative impact on educational expenditures, found in previous research using a similar methodology (West and Woessmann, 2010), are detected also in our extended sample of countries in PISA 2012

[5] For this analysis, we use the expenditure data reported in the PISA 2009 report since the data for Greece is missing in the PISA 2012 report. However, results are essentially identical if we instead use the latter data and exclude Greece.

and with the methodological alterations described in Section 4.1 and Appendix B. This is important for ensuring that our interpretation of a potential trade-off is correct.

3.3. Potential mechanisms

In addition, we consider potential mechanisms through which independent-school competition may operate. One plausible mechanism could be the way teachers interact with children and specifically their teaching methods. As noted in Section 2, research finds that pupil-centred methods generate lower achievement, while at the same time making learning more enjoyable. If competition sharpens incentives to raise academic efficiency, teachers may thus use more traditional methods as a means to compete. To study this issue, we use pupils' views regarding the extent to which their mathematics teachers are student oriented, according to the OECD's (2014) taxonomy: 'The teacher gives different work to classmates who have difficulties learning and/or to those who can advance faster'; 'The teacher assigns projects that require at least one week to complete'; 'The teacher has us work in small groups to come up with a joint solution to a problem or task'; and 'The teacher asks us to help plan classroom activities or topics'. Pupils are asked to choose one of the following options: (1) 'Every lesson', (2) 'Most lessons', (3) 'Some lessons', or (4) 'Never or hardly ever'. We recode the responses so that higher values indicate more use of pupil-centred methods.

Furthermore, we also consider a related potential mechanism: hierarchical school environments. Research on Knowledge is Power Program (KIPP) schools indicates that school models predicated on hierarchical environments boost pupil performance (e.g. Abdulkadiroğlu et al., 2016; Angrist et al., 2013). However, more hierarchical school environments may lower pupil wellbeing via worsened pupil-teacher relations. To study these issues, we use responses to the statement 'Most of my teachers really listen to what I have to say' as a proxy for the degree of hierarchy in pupils' relationships with teachers, and responses to the statement 'Students get along well with most teachers' as a general measure of pupil-teacher relations. In these cases, pupils were asked to choose one of the following options: (1) 'strongly agree'; (2) 'agree'; (3) 'disagree'; or (4) 'strongly disagree', which we recode so that higher values indicate less hierarchical and better pupil-teacher relations.

In addition, we investigate the effects of competition on parental achievement pressure. Such pressure could be positively related to both competition and

performance, while also having negative effects on wellbeing. Thus, we consider headteachers' appraisals of the level of parental pressure to achieve high academic achievement: (1) 'There is constant pressure from many parents, who expect our school to set very high academic standards and to have our students achieve them; (2) 'Pressure on the school to achieve higher academic standards among students comes from a minority of parents'; or (3) 'Pressure from parents on the school to achieve higher academic standards among students is largely absent'. We recode the responses so that higher values indicate stronger parental achievement pressure.[6]

Finally, we analyse instructional time and time spent on homework. As noted in Section 2, these variables have been found to be positive for academic achievement, while also being associated with lower wellbeing. We thus analyse pupil responses to the question: 'In a normal, full week at school, how many class periods do you have in total?'. We further consider the number of class periods per week in each of the test subjects.[7] Unlike the previous statements, these are open questions and pupils are thus asked to write down the total number of class periods per week, instead of choosing from different sets of options. To analyse the total impact on time spent doing homework, we instead use the number of hours per week pupils report that they spend on 'Homework or other study set by your teachers'. Again, this question is open rather than closed.

3.4. Independent-school competition

In order to capture independent-school competition at the system level, we use the proportion of 15-year old pupils who attend independently-operated schools in each country, calculated from the PISA 2012 school questionnaire. In this questionnaire, headteachers were asked to report whether or not their school is a 'private school', defined as a school managed directly or indirectly by a non-government organisation, such as a church, trade union, business, or other private institution, or a 'public school', defined as a school managed directly or indirectly by a public education authority, government agency, or governing board appointed by government or elected by public

[6] Since the sampling procedure of schools was designed to optimise sampling of pupils rather than schools, the OECD recommends that researchers 'analyse school-level variables as attributes of students rather than as elements in their own right' (OECD, 2014, p. 398). This means that we analyse the effects of headteachers' responses at the pupil level rather than the school level.

[7] Since class periods vary in length, we also analysed the average period length in each of the test subjects in robustness tests. The results are briefly discussed in footnote 31.

franchise. The aggregate share of pupils attending independently-operated schools is a useful measure to capture the level of independent-school competition in an education system and has been used in similar research (see Hanushek and Woessmann, 2011).

3.5. Control variables

We obtain relevant control variables from the school and pupil questionnaires. First, we include controls for a range of pupil-background characteristics: gender, age, immigrant background (first and second generation), an index of home possessions, the highest occupational status of parents, and the highest educational level of parents, expressed in years of schooling.[8] We also include indicators for whether or not schools are located in a village, small town, town, city, or large city.[9] In addition, we control for pupils' school starting age and grade attended. Since sampling is based on pupils' age at test, these variables may reflect important institutional characteristics of different education systems, which could potentially correlate with both our outcome variables and the instrument discussed in Section 4.1 through mechanisms other than competition.[10]

Finally, we also control for a number of country-level variables, including (log) GDP per capita in 2011, obtained from the OECD (2016b), and regional dummies for Oceania, East Asia, Europe, Middle East, Latin America, and North America in the baseline estimates. In most models, however, we further include dummies for Anglo-Saxon Europe, Northern Europe, Western Continental Europe, Eastern Europe, and Southern Europe. This allows us to control for fine-grained regional-fixed effects to ensure that cross-national cultural differences associated with both the instrument discussed in

[8] Foreign-born pupils with two foreign-born parents are classified as first-generation immigrants, whereas native-born pupils with at least one foreign-born parent and foreign-born pupils with one native-born parent are classified as second-generation immigrants. Thus, pupils with two native-born parents are classified as natives. The index of home possessions, the highest occupational status of parents, and the highest years of schooling of parents compose the broader ESCS index (see OECD, 2014).

[9] The average socio-economic and ethnic background of school peers may also affect the outcomes. However, since independent-school competition may increase school segregation (e.g. Hsieh and Urquiola, 2006; Böhlmark, Holmlund, and Lindahl, 2016), peer background is a potential mechanism through which competition may affect wellbeing as well as academic efficiency and is thus a 'bad control' (Angrist and Pischke, 2009). However, as displayed in Table A5, the results are robust to controlling for the school-level mean of all pupil-level variables.

[10] As in most surveys, the PISA dataset contains some missing values for pupil- and school-level variables, although this problem is minor for any single control in our analysis. Nevertheless, we impute values for missing control variables using the weighted mean at the school or country level, always using the lowest level available. For dummy variables, we assign a value of 1 or 0 depending on which category the mean is closest to. In order to ensure that the results are not biased by this procedure, we also include dummies for missing values and interactions between them and the imputed values. Similar techniques are used widely in previous research analysing PISA data (see Hanushek and Woessmann, 2011). Results are essentially identical if we instead drop observations with any control containing missing values.

Section 4.1 and the outcomes are less likely to bias the findings.[11] In addition, we control for other relevant country-level variables discussed in Section 4 and Appendix B to strengthen our instrumental-variable strategy.

4. Empirical set-up

To study the impact of independent-school competition on the outcomes discussed in Section 3, our starting point is the following OLS model:

$$o_{psc} = \alpha + \beta_1 sp_c + \beta_2 x_{psc} + \beta_3 y_{sc} + \beta_4 z_c + \varepsilon_{psc} \quad (1)$$

where o_{psc} is the outcome of pupil p in school s in country c; sp_c denotes the share of pupils attending independently-operated schools in each country; x_{psc} is a vector of pupil-level predictors; y_{sc} is a vector of school-level predictors; and z_c is a vector of country-level predictors.

The model's assumption is that $Cov(sp_c, \varepsilon_{psc} | x_{psc}, y_{sc}, z_c) = 0$. However, if x_{psc}, y_{sc}, and z_c together do not include all variables that impact both o_{psc} and sp_c, or if o_{psc} affects sp_c directly, it would mean that $Cov(sp_c, \varepsilon_{psc} | x_{psc}, y_{sc}, z_c) \neq 0$ and the results will suffer from endogeneity bias (Angrist and Pischke, 2009). That is, the level of independent-school competition may in itself be affected by the outcomes, generating reverse causality, and/or omitted variables may affect both the level of independent-school competition and the outcomes. The direction of bias arising from these issues is theoretically unclear, and partly depends on relative parental demand for different types of school quality per the discussion in Section 2.

4.1. Obtaining exogenous variation in independent-school competition

To address potential endogeneity, we seek to obtain exogenous variation in independent-school competition by exploiting historical resistance to state schooling among Catholics. This strategy has previously been used to predict independent-school enrolment shares within and between countries (Allen and Vignoles, 2015; Cohen-Zada, 2009; Cohen-Zada and Elder, 2009; Falck and Woessmann, 2013; West and Woessmann, 2010). The idea is that in countries where Catholicism was not the de facto state religion

[11] Note, however, that we refrain from controlling for input variables, such as education spending and class size, which are 'bad controls' and should be left out of the equation.

in the late 19th and early 20th centuries, Catholics fiercely resisted the growing state monopolisation of education.

This is because in countries where Catholics could not ensure that teaching in state schools was consistent with their doctrine, such as Belgium, they worked to establish independent schools and pushed governments to obtain public funding for them. In some countries, Catholics joined forces with other groups that sought access to independently-operated schools. For example, in the Netherlands, Catholics teamed up with Calvinists against secular forces in the *Schoolstrijd*, which only ended in 1917 when equal funding for independent and state schools was enshrined in the Dutch constitution. As a general rule, however, Protestants were more accepting of state monopolisation of education and rarely engaged in the same struggles. Nevertheless, when Catholics were successful, the laws implemented often supported funding for other independent schools as well (see Glenn, 1989, 2011). We discuss the intuition, and historical features that interfere with its logic, in more detail in Appendix B.

Thus, Catholic population shares in the early 20th century in countries where Catholicism was not the de facto state religion should be a useful instrument for enrolment shares in independently-operated schools today, once controlling for other relevant predictors discussed below. We obtain Catholic population shares in 1900 and 2010 from Brown and James (2015) and indicators for whether or not Catholicism was the state religion in 1900, 1970, and 2000 from Barrett et al. (2001).[12] Our instrument is then constructed from the interaction between Catholic population shares in 1900 and a dummy variable taking the value of 0 for countries in which Catholicism was the de facto state religion in 1900 as well as immediately before World War II and 1 otherwise.[13] The latter restriction is applied because the political dynamic in the education sphere in countries that permanently disestablished the Catholic Church early in the 20th century was often similar to those that had done so by 1900.[14] This

[12] The only adjustments we make to the data obtained from Barrett et al. (2001) are: (1) Ireland is treated as not having Catholicism as state religion in 1900, since it was then part of the non-Catholic United Kingdom (see Barro and McCleary, 2005), and (2) Austria is treated as having Catholicism as its de facto state religion in 1900. Although the region that became Austria in 1918 did not officially have any state religion since the Austro-Hungarian Compromise of 1867, the state provided an essential Catholic monopoly in the public education system, also after the formation of the state in 1918 until Nazi Germany's annexation of the country in 1938 (Glenn, 2011; Kaiser and Wohnout, 2004).

[13] For Slovakia, we use Catholic population shares in 1910 since this is the first year for which data are available for the country in Brown and James's (2015) data series.

[14] For example, while Chile only abolished Catholicism as state religion in 1925, the public education system had become secularised and centralised already in the mid-to-late 1800s, much to the denigration

historical instrument allows us to control directly for its contemporary version: Catholic population shares in 2010 interacted with an indicator taking the value of 0 if Catholicism was the state religion in 1900, 1970, and 2000, and 1 otherwise.[15] This means that we control for any direct impact on the dependent variable that our instrument may pick up, and that the exogenous variation we exploit stems only from interactions in historical Catholic population shares and state religion that are unrelated to the contemporary interaction between these variables – that is, the change in the interaction – when holding constant the other variables in the model.

Also, in addition to the controls discussed in Section 3.5, we take further precautions by adjusting for the following variables: Calvinist population shares in 1900; population size in 1900; Communist and post-Soviet backgrounds; indicators for early defeat of the Catholic Church in countries where Catholicism was not the state religion; national bans on Jesuits in the late 19th and early 20th centuries; indicators for countries or regions that were de facto annexed into Nazi Germany during World War II; indicators for pro-Catholic allies or client states of Nazi Germany; and indicators for countries or regions that recently implemented voucher programmes in which for-profit operators participate on an equal basis, or carried out reforms that encouraged mass conversions of state schools to independently-operated status.

The general idea behind the inclusion of these variables is to control for sources of current independent-school enrolment shares that cannot be attributed to the instrument and thus maximise its relevance and increase confidence in its validity. To save space, we discuss the complete rationales for each variable in Appendix B and only provide a few short illustrations here. One example concerns Calvinists, who in some countries joined the Catholics' more general resistance to secular state schooling, giving the latter a probability of success that was disproportionate to the relative size of their community. We take this into account by controlling for the share of Calvinists in 1900. Another example is the role of the Society of Jesus in the establishment of independent schools, as the first teaching order of the Catholic Church. During the struggle between secular and religious forces in the 19th century, Jesuits and their associate orders were

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of the country's Catholics who consequently began pushing for access to independent schools (Barr-Melej, 2001; Collier, 1997; Gauri, 1998). As discussed in Appendix B, a similar story applies to France prior to the abrogation of Napoleon's Concordat of 1801 in 1905.

[15] The overall results are similar if we instead simply control for Catholic population shares in 2010 in all countries, by itself or together with a separate indicator for whether or not Catholicism was the de facto state religion in 1900, 1970, and 2000.

often banned from certain territories for longer periods of time, often specifically because of their educational influence. We thus control for these bans in our set-up. A third example relates to the impact of Nazi Germany during World War II. Being part of, or de facto annexed into (but not occupied by), the Greater German Reich meant severe persecution of the Catholic Church and closure of all independent schools. We take this into account by controlling for an indicator of Nazi takeover and de facto annexation. Again, detailed accounts of all additional adjustments are provided in Appendix B.[16]

4.2. IV specification

Thus, to obtain plausibly exogenous variation in independent-school enrolment shares across OECD countries, we then estimate the following 2SLS model:

$$sp_c = \alpha + \beta_1 1900cs_c + \beta_2 x_{psc} + \beta_3 y_{sc} + \beta_4 z_c + \varepsilon_{psc} \quad (2)$$

$$o_{psc} = \alpha + \beta_1 \overline{sp}_c + \beta_2 x_{psc} + \beta_3 y_{sc} + \beta_4 z_c + \varepsilon_{psc} \quad (3)$$

where $\overline{sp}_c$ is the predicted values of sp_c from the first stage, while $1900cs_c$ represents the excluded instrument, outlined in Section 4.1. The vectors x_{psc}, y_{sc}, and z_c denote the pupil-, school-, and country-level controls discussed in Sections 3.5 and 4.1, including $2010cs_c$, which denotes the contemporary version of the instrument. The variation in the first stage is thus driven by the interaction between historical Catholic population shares and the state religion indicator when holding constant the contemporary interaction between these variables – thus obtaining identification from the change in the interaction over time – and only comparing countries within the regions controlled for by the regional-fixed effects. We cluster the standard errors at the country level, weight all regressions by pupils' inverse sampling probability, and give each country equal aggregate weight in the regressions.[17]

[16] Without the inclusion of at least some of these variables, the F statistics drops radically, suggesting the instrument becomes too weak. For example, if we only include broader-regional fixed effects together with the pupil-level and school-location controls, the F statistic in the first stage drops from about 46 to 3. Adding (log) GDP per capita and the Communist indicator only increases the F statistics to 5, but adding indicators for post-Soviet background and national Jesuit bans raises the F statistics to 22. Adding the other variables then strengthens the instrument further. Excluding the additional controls also makes the data less balanced. Specifically, the instrument then significantly predicts the index of home possessions, which is the best pupil-level predictor of pupil happiness and a key predictor of test scores. Overall, the controls thus add considerable value by increasing the relevance and validity of the instrument.

[17] When analysing PISA scores, we follow the OECD's (2014) recommendation and account for the fact that scores are estimated from five separate 'plausible values', created via an item response theory model.

Of course, it is impossible to prove conclusively whether or not the above model captures the effects of competition on pupil wellbeing and academic efficiency, rather than the instrument's effects through a different channel. This may seem especially important since we study several outcomes, which as discussed in Section 2 might affect each other, but the assumptions are the same. Indeed, if our strategy does ensure bona fide exogenous variation in school competition, the fundamental cause of the effects on the separate outcomes is independent-school competition rather than the instrument itself – irrespectively of whether the outcome variables then affect each other as a result of this competition. The crucial aspect is thus to investigate, as far as possible, whether the instrument affects the outcome variables apart from via school competition or any mechanism through which school competition operates. We explain how we seek to do so below.

4.3. Catholicism and wellbeing

The specification above hinges on that historical Catholic population shares are conditionally unrelated to contemporary pupil wellbeing, in countries where Catholicism was not the state religion, apart from via contemporary independent-school competition. We believe this is a tenable assumption. If anything, the strategy may bias results against supporting our hypothesis that competition decreases pupil wellbeing. This is because research finds Catholic population shares to have positive spill-over effects on the wellbeing of Catholics and most non-Catholics, including Protestants (Clark and Lelkes, 2009).[18] It is thus more likely that our research strategy would bias results in the opposite direction compared with what our hypothesis predicts. We can also indirectly test whether or not this is correct. If the assumption holds true, the contemporary version of the instrument, which is controlled for in equation (3), should be positively associated with pupil wellbeing. If the contemporary version's relationship with pupil wellbeing is positive, the instrument is likely to be only *negatively* related to

[18] This does not necessarily mean that Catholics have higher wellbeing than other people. Controlling for a range of background characteristics, Clark and Lelkes (2009) find that Catholics have equally high wellbeing as Protestants, but that both Catholics and Protestants have higher wellbeing than adherents of other religions and non-religious people. Other research finds similar albeit slightly different results (see Graham and Crown, 2014). On the other hand, Becker and Woessmann (2015) find that Protestants are more likely to commit suicide than Catholics, which they argue is due to Catholics' stronger levels of social cohesion. Regardless, for our purposes, the direct association between religious affiliation and wellbeing is less important since our instrument is based on historical Catholic population shares – which, if anything, appear to be positively related to wellbeing.

pupil wellbeing via its impact on the level of independent-school competition today, once we adjust for the control variables in the model.

4.4. Catholicism and academic efficiency

Our analysis of a wellbeing-efficiency trade-off hinges upon a causal interpretation also of the effects of independent-school competition on academic efficiency. Again, the strategy is more likely to work against finding evidence for our hypothesis. This is because Catholics historically emphasised cognitive achievement less compared with other groups, as indicated by the direct negative correlation between Catholic population shares and literacy rates in the early 20th century (see West and Woessmann, 2010). This makes it likely that our estimates for academic outcomes will be negatively biased. Since the instrument's logic partly hinges on that Catholics historically lobbied governments to increase public funding for independent schools, our strategy is also more likely to bias effects upward in the analysis of per-pupil educational expenditures (and thus against our hypothesis). Again, we can indirectly test whether or not these intuitions are correct. If so, we expect the contemporary version of our instrument, which is controlled for in equation (3), to be negatively (positively) related to achievement (expenditures) today. If this holds true, it suggests that our historical instrument is only positively (negatively) related to contemporary PISA scores (expenditures) through independent-school competition. If anything, the results should then be biased against finding evidence supporting our hypothesis.

4.5. Balancing tests

Another way to explore whether or not the instrument is exogenous, once controlling for the other relevant country- and school-level variables, is to carry out balancing tests on the pupil-background characteristics that are included in the models analysing the effects of independent-school competition on pupil wellbeing and academic efficiency. We do so by swapping these indicators as dependent variables for each of the pupil-background variables included in the main regressions, while simultaneously excluding all other pupil-level variables on the right-hand side of the equation.[19] If the variation in independent-school competition predicted by the instrument is not significantly related

[19] Note that we do not use any imputed data in these analyses. In the models analysing immigrant background, we also exclude pupils from the other immigrant category to ensure that we compare each category with natives only.

to the pupil-background indicators, once adjusting for the other country- and school-level variables included in the model, it indicates that the instrument is indeed likely to be exogenous.

5. Results

5.1. Pupil happiness

As a starting point, Columns 1 and 2 in Table 1 show the results from the OLS model when analysing our measure of pupil wellbeing: happiness at school. The estimates indicate that independent-school competition is negatively associated with pupil happiness, regardless of whether we control only for broader regional-fixed effects or also include controls for regions within Europe. Thus, there is a negative correlation between competition and pupil wellbeing across OECD countries.

Turning to the IV model, the first-stage results suggest our instrument is strong, with the F statistics displaying values of about 46. Meanwhile, the second stage displays that the coefficient for independent-school competition increases in size compared with the OLS estimates, indicating that the latter are biased downwards. Our preferred specification, which includes within-European regional-fixed effects, indicates that a 10 percentage-point increase in independent-school enrolment shares lowers pupil happiness by 0.13 points on the ordinal 1-4 scale, which corresponds to 0.17 standard deviations (SD). The estimate is not very precise, but we can rule out an effect size lower than 0.09 SD. The reduced-form estimates in the lower-left panel further support the results.

One potential reason why the OLS models underestimate the causal impact of independent-school competition on pupil wellbeing may be that competition emerges as a response to low test scores (see Hoxby, 1994; West and Woessmann, 2010). This, in turn, may be due to lower focus on academic achievement and higher focus on wellbeing, as suggested by the trade-off hypothesis discussed in Section 2 and analysed further in Section 5.4. If so, one would expect OLS estimates to bias the effects of competition toward zero both when analysing pupil wellbeing and test scores, albeit from different directions.

Thus, our analysis shows that independent-school competition has an important negative impact on pupil wellbeing. In contrast, we note that the association between the contemporary version of the instrument and pupil happiness is positive. This

supports the idea that our strategy if anything may bias the estimates against finding evidence in favour of our hypothesis.[20]

Table 1: The impact of independent-school competition on pupil happiness

	(1)	(2)		(3)	(4)
	OLS	OLS	*Second stage*	IV	IV
Independent-school share	-0.52**	-0.69***	Independent-school share	-0.79***	-1.28***
	(0.24)	(0.17)		(0.22)	(0.32)
Catholic share 2010 *no state religion	0.22**	0.36***	Catholic share 2010 *no state religion	0.33***	0.49***
	(0.11)	(0.10)		(0.08)	(0.10)
Within-European regional-fixed effects	NO	YES		NO	YES
	(5)	**(6)**			
Reduced form	OLS	OLS	*First stage*		
Catholic share 1900 *no state religion	-0.24***	-0.29***	Catholic share 1900 *no state religion	0.31***	0.23***
	(0.06)	(0.08)		(0.05)	(0.03)
Catholic share 2010 *no state religion	0.15***	0.21*	Catholic share 2010 *no state religion	0.22***	0.21***
	(0.06)	(0.11)		(0.05)	(0.08)
			F statistic on the excluded instrument	46.33	45.87
n	190,348	190,348		190,348	190,348
Countries	34	34		34	34

Note: Significance levels: *p<0.10; **p<0.05; ***p<0.01. Standard errors clustered at the country level in parentheses. All regressions include the controls described in Sections 3.5 and 4.1.

5.2. Robustness tests

In Table 2, we display results from several robustness tests.[21] Column 1 only includes pupils in government-operated schools. Note that these results reflect both competition effects and the impact of potential differential pupil sorting into the independent and state sectors. It is plausible that state schools could be especially sensitive to independent-school competition, since independent schools themselves may to some extent always face competition from the government sector. We find that the effect on pupils in state schools is in fact very similar compared to the overall impact, suggesting that the main results primarily reflect system-level effects of independent-school competition rather than the impact of attending an independent school per se.

[20] As displayed in Table A2, we find similar effects on alternative measures of pupil wellbeing, such as school satisfaction and peer relations.

[21] In unreported robustness tests, we also included additional country-level controls, including the Gini coefficient, the share of population in urban areas, and the relative size of the immigrant population. The results were very similar compared to the baseline models.

Next, in Column 2, we exclude all non-European countries in the equation, dropping ten countries and 36 per cent of the total pupil sample. The results are robust to this exercise, despite controlling for within-European regional-fixed effects. In Column 3, we instead exclude Belgium and the Netherlands, which are perhaps the most canonical examples of successful Catholic struggles for independent-school access, to ensure these countries do not drive the results. The findings are essentially identical when excluding these countries.[22] We thus conclude that the results are robust to excluding a considerable and important part of the sample.[23]

Table 2: Robustness tests

	(1)	(2)	(3)	(4)
	Only pupils in state schools	Only Europe	Excluding Belgium and the Netherlands	Excluding pupil-background variables
Independent-school share	-1.37***	-1.27***	-1.30***	-1.24***
	(0.38)	(0.43)	(0.32)	(0.33)
Catholic share 2010 *no state religion	0.46***	0.54***	0.47***	0.52***
	(0.09)	(0.13)	(0.08)	(0.10)
F statistic	48.62	42.27	42.5	45.23
n	150,231	121,050	182,146	190,348
Countries	34	24	32	34

Note: Significance levels: *p<0.10; **p<0.05; ***p<0.01. Standard errors clustered at the country level in parentheses. All regressions include the controls outlined in Sections 3.5 and 4.1, including within-European regional-fixed effects. The exception is Column 4, which excludes pupil-background variables.

Finally, in Column 4, we exclude all pupil-background controls and find that the coefficient is essentially identical to the baseline, although it becomes slightly less precise. This is expected if some or all of the excluded background characteristics both affect the outcome variable, which unreported estimates show is indeed the case, and are uncorrelated with our instrument (Angrist and Pischke, 2009). Overall, these results thus support the idea that the instrument is not significantly correlated with the pupil-background characteristics, once controlling for the other variables.[24]

[22] When dropping Ireland, another example of successful Catholic resistance, the coefficient increased in size somewhat and remained significant at the 1 per cent level, while the F statistics drops just under 20. Similarly, excluding Ireland together with Belgium or the Netherlands – or excluding all three countries at the same time – generated similar results. The same holds true when excluding the within-European regional-fixed effects and the F statistic never fell under 25 in these instances.

[23] In unreported regressions, we also dropped all countries one by one – and various combinations of countries – and the estimates were always robust to this exercise.

[24] We also tested the idea that our instrument isolates similar types of independent-school competition across countries by adding relevant variables that may affect the type of competition. The results are reported in Table A3. All estimates are basically identical compared to the relevant baseline models.

5.3. Balancing tests

As discussed in Section 4.5, to further explore the exogeneity of the instrument, we analyse the pupil-background characteristics as dependent variables instead of controls, while simultaneously excluding all other pupil-level variables on the right-hand side of the equation. We do not expect the variation in independent-school competition that is explained by our instrument to be significantly related to these variables, once other country-level factors are held constant, at least not in a direction that would bias the estimates in favour of finding evidence of our hypothesis.[25] The results from the IV models in Table 3 display that this is indeed the case. We are unable to predict any of the background variables using the variation in independent-school enrolment shares that is explained by our instrument. In other words, there is little evidence that the instrument is significantly correlated with potentially important predictors of wellbeing in a direction that would bias the estimates in favour of our hypothesis.[26]

Table 3: Balancing tests

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
	Gender	Age	Index of home possessions	Parental occupational status	Parental education	Immigrant (1st gen)	Immigrant (2nd gen)
Independent-school share	0.02	0.06	0.01	-1.41	3.07	-0.07	-0.16
	(0.04)	(0.10)	(0.49)	(9.69)	(2.36)	(0.12)	(0.11)
Catholic share 2010*no state religion	-0.02	0.00	0.38***	1.81	-0.95	-0.05	-0.05
	(0.02)	(0.03)	(0.13)	(2.15)	(0.62)	(0.05)	(0.04)
F statistic	47.19	47.18	46.99	46.71	46.54	46.27	44.73
n	295,416	295,330	291,731	280,796	285,877	244,043	269,794
Countries	34	34	34	34	34	34	34

Note: Significance levels: *p<0.10; **p<0.05; ***p<0.01. Standard errors clustered at the country level in parentheses. All regressions include the controls described in Sections 3.5 and 4.1, including within-European regional-fixed effects, apart from pupil-level variables.

[25] The validity of our results hinges on the instrument being exogenous once the country-level variables are held constant, which we test by studying the pupil-background characteristics as dependent variables. Nevertheless, in unreported robustness tests, we also analysed the correlation between the instrument and relevant country-level variables, such as (log) GDP per capita, income inequality, the share of the population who live in urban areas, and the relative size of the immigrant population, including and excluding the contemporary version of the instrument and regional-fixed effects. The results did not indicate consistently significant correlations.

[26] In contrast, we note that the contemporary version of the instrument is positively correlated with the index of home possessions, which is the pupil-level variable that has the strongest positive association with the wellbeing measures of all pupil-level controls in the regressions in Tables 1-2.

5.4. The trade-off with academic efficiency

Thus far, we have shown that independent-school competition has a negative causal impact on pupil wellbeing. Since previous research using a similar strategy finds positive effects on pupil performance in PISA and a negative impact on educational expenditures (West and Woessmann, 2010), this is sufficient to provide general support for our hypothesis of a wellbeing-efficiency trade-off. Still, since we analyse data from PISA 2012 rather than from PISA 2003, and use a modified IV set-up, we also explore the effects of competition on PISA test scores and per-pupil expenditure, using our preferred specification for the analysis of pupil-wellbeing.

The upper panel in Table 4 shows OLS estimates, which indicate that independent-school competition does not have a statistically significant relationship with pupil performance, apart from being marginally correlated with reading literacy, but that it is negatively associated with educational expenditures. However, turning to the preferred IV estimates in the lower panel, the coefficients increase in size and become strongly significant in all models: a 10 percentage-point increase in independent-school enrolment shares raises mathematical literacy by 21 PISA points (0.23 SD), reading literacy by 26 PISA points (0.28 SD), and scientific literacy by 18 PISA points (0.19 SD). Simultaneously, it lowers expenditures by $13,155 (0.48 SD). These effects are larger than those found by West and Woessmann (2010), which is mainly due to our inclusion of within-European regional-fixed effects. Indeed, when excluding these dummies, the effects are very similar to their results.[27] We also note that the contemporary version of the instrument is positively associated with expenditures, while its association with achievement is negative but not statistically significant.[28] Overall, the results are in line with West and Woessmann's (2010) findings and thus support our hypothesis that school competition involves a causal wellbeing-efficiency trade-off.[29]

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[27] They obtain point estimates of 58.99-121.69 and -45,736 for PISA scores and expenditures respectively in their equivalent analyses (see Column 2 in their Tables 2 and 5 and Columns 2 and 5 in their Table 4), whereas we obtain 68.96–126.65 and -74,201 respectively when excluding within-European regional effects. None of the differences are statistically significant.

[28] Again, Table A4 shows that the results comfortably survive the other robustness tests conducted in regard to pupil wellbeing in Table 2. Unreported regressions also showed that the findings were robust to adding the additional variables in Table A3. In contrast, the coefficient of the contemporary instrument changes wildly depending on the specification and sample (see Tables A4 and A5). This further supports the idea that the historical instrument is exogenous, while its contemporary version is not.

[29] We also carried out a basic placebo test on per-capita military expenditures in 2011, obtained from SIPRI (2016) and adjusted for different price levels using 2011 GDP per capita PPPs. Military

Table 4: The impact of independent-school competition on academic efficiency

	Mathematics	Reading	Science	Educational expenditures/pupil
	(1)	**(2)**	**(3)**	**(4)**
	OLS	OLS	OLS	OLS
Independent-school share	46.86	56.70*	41.84	-37,214***
	(33.30)	(31.24)	(32.82)	(13,064)
Catholic share 2010 *no state religion	21.97	9.04	23.43	14,466
	(20.71)	(24.51)	(17.01)	(12,918)
	(5)	**(6)**	**(7)**	**(8)**
	IV	IV	IV	IV
Independent-school share	209.57***	262.10***	177.03***	-131,546***
	(51.62)	(69.56)	(50.14)	(28,377)
Catholic share 2010 *no state religion	-12.13	-34.01	-4.90	34,235***
	(20.59)	(27.97)	(18.94)	(10,801)
n	295,416	295,416	295,416	295,416
Countries	34	34	34	34

Note: Significance levels: *p<0.10; **p<0.05; ***p<0.01. Standard errors clustered at the country level in parentheses. The regressions include the controls described in Sections 3.5 and 4.1, including within-European regional-fixed effects. F statistics in Columns 5-8: 46.54.

5.5. Potential mechanisms behind the trade-off

Finally, we turn to the potential mechanisms discussed in Section 3.3. The results in Table 5 indicate that a 10 percentage-point increase in independent-school enrolment shares induces less individualisation of teaching, corresponding to 0.16 points on the 1-4 ordinal scale (0.15 SD); less project work, corresponding to 0.09 points (0.10 SD); and less group work, corresponding to 0.08 points (0.08 SD). However, there is no impact on the extent to which teachers ask pupils to help plan classroom activities. Also, a 10 percentage-point increase in independent-school enrolment shares decreases perceptions that pupils get along with teachers by 0.08 steps on the 1-4 ordinal scale (0.12 SD) and perceptions that teachers listen to what pupils have to say by 0.07 steps (0.09 SD).[30] Meanwhile, it raises parental achievement pressure by 0.19 steps on the 1-3 ordinal scale (0.26 SD). This indicates that competition makes teaching more traditional and pupil-teacher relations more hierarchical, while sharpening parents' focus on achievement – which are clear mechanisms behind the wellbeing-efficiency trade-off.

expenditures are unlikely to be related to educational expenditures and appear to be an appropriate placebo outcome. We found no evidence indicating that the variation in independent-school competition that is explained by our instrument was related to military expenditures.

[30] In unreported regressions, we found very similar effects on the overall index of pupil-teacher relationships and headteachers' perceptions of such relationships.

Table 5: The impact on potential mechanisms behind the trade-off

Teaching practices				
	(1)	**(2)**	**(3)**	**(4)**
	Individualisation of teaching	Project work	Group work	Pupils help to plan
Independent-school share	-1.57***	-0.90**	-0.81***	1.10
	(0.37)	(0.43)	(0.28)	(1.04)
Catholic share 2010 *no state religion	-0.05	-0.17	0.07	-0.60
	(0.10)	(0.13)	(0.10)	(0.36)
n	191,806	191,799	191,865	191,832
Countries	34	34	34	34
Pupil-teacher relations, parental achievement pressure, and homework				
	(5)	**(6)**	**(7)**	**(8)**
	Pupils get along with teachers	Teachers listen to pupils	Parental achievement pressure	Hours of homework
Independent-school share	-0.84***	-0.68***	1.86***	8.18**
	(0.17)	(0.16)	(0.46)	(3.30)
Catholic share 2010 *no state religion	-0.02	-0.01	-0.47**	1.95
	(0.08)	(0.06)	(0.23)	(1.24)
n	187,146	191,320	282,606	187,146
Countries	34	34	34	34
Instructional time				
	(9)	**(10)**	**(11)**	**(12)**
	Class periods (total)	Class periods (mathematics)	Class periods (test language)	Class periods (science)
Independent-school share	23.43***	4.53***	5.00**	-2.83***
	(6.75)	(1.47)	(1.94)	(0.98)
Catholic share 2010 *no state religion	2.32	-1.12*	-0.71	-1.31***
	(2.09)	(0.59)	(0.73)	(0.40)
n	162,430	184,354	183,030	179,223
Countries	34	34	34	34

Note: Significance levels: *p<0.10; **p<0.05; ***p<0.01. Standard errors clustered at the country level in parentheses. The regressions include the controls described in Sections 3.5 and 4.1, including within-European regional-fixed effects. The F statistic ranges between 40.46 and 46.06 in all regressions.

We also find that competition increases instructional time and homework. An increase in independent-school enrolment shares by 10 percentage points increases the total number of class periods by 2.43 periods per week (0.30 SD), while inducing pupils to complete 0.82 hours (0.16 SD) more homework per week. However, there is heterogeneity in terms of the effects on the number of class periods in the subjects tested in PISA. While the number of periods in mathematics and test language increases by 0.45 periods (0.32 SD) and 0.50 periods (0.34 SD) per week respectively, the number of class periods decreases in science by 0.28 periods (0.13 SD). This indicates that competition increases instructional time in mathematics and test language, but

decreases it in science.[31] This could suggest that competition increases schools' focus on core subjects to the detriment of other subjects. Still, instruction in the test language and mathematics (and other subjects) may improve performance also in science.[32] Overall, we thus conclude that competition has positive effects on instructional time and homework, two plausible mechanisms behind the wellbeing-efficiency trade-off.

5.6. A tentative cost-benefit analysis

Ultimately, the study's findings demand the question: should policymakers increase independent-school competition and thus raise academic efficiency or should they ignore such reforms and instead prioritise pupil wellbeing? The answer depends on the relative long-term societal and economic value of pupil wellbeing versus cognitive achievement in adolescence. In this section, we thus provide a basic back-of-the-envelope calculation to analyse whether the benefits of competition in terms of academic efficiency outweigh its costs in terms of pupil wellbeing.

Recent research indicates that cognitive achievement in childhood and adolescence is a much better predictor than wellbeing in childhood and adolescence of adult income. According to Layard et al.'s (2014) estimates, one standard deviation higher cognitive achievement in childhood and adolescence predicts 0.14 SD higher income at the age of 34, while such an increase in youth wellbeing is associated with 0.07 SD higher income at the same age. Our estimates indicate that a 10 percentage-point increase in independent-school competition raises average test scores by 0.23 SD and decreases pupil wellbeing by 0.17 SD. One would thus expect a benefit in terms of adult income by 0.03 SD via higher test scores and a cost of 0.01 SD via lower pupil wellbeing. Since we also find that independent-school competition decreases per-pupil cumulative education expenditures between ages 6-15, such competition thus appears to make sense from an economic perspective.

At the same time, Layard et al. (2014) also find that youth wellbeing is considerably more important than cognitive achievement for adult life satisfaction. A cost-benefit analysis using adult subjective wellbeing rather than money as unit of measurement would suggest that a 10 percentage-point increase in independent-school competition

[31] In unreported regressions, we found no effects on average minutes per period in any of the test subjects, supporting the idea that our estimates capture the impact of competition on total learning time.
[32] However, note that the point estimate in Table 4 is smaller when analysing science scores. The negative impact we find on instructional time in science may thus lower the positive effects of competition.

should generate 0.01 SD higher life satisfaction via higher cognitive achievement – but this is outweighed by the cost of 0.03 SD via lower pupil wellbeing.[33] In other words, if we hold subjective wellbeing as the primary goal of policy, the costs of independent-school competition may outweigh its benefits.

Certainly, given the tentative nature of the above cost-benefit analysis, it is important to pursue further research before drawing strong conclusions regarding the potential longer-term effects of independent-school competition on adult wellbeing and labour-market outcomes.[34] Yet the analysis at least indicates that the attractiveness of school competition as an education-reform strategy may depend on which goals policymakers seek to advance, which is beyond this paper to determine.

6. Conclusion

As governments worldwide have sought to inject competition from independent providers into their countries' education systems, an expanding literature has begun to evaluate the effects of such competition. Yet existing research focuses on academic outcomes and no one has thus far analysed how independent-school competition affects pupil wellbeing, which has become an increasingly important policy goal recently. Since effective learning involves many activities that are not necessarily fun or inspiring, and since market incentives are likely to sharpen schools' focus on academic achievement, it is plausible that competition involves a trade-off between wellbeing and education performance.

Analysing pupil-level PISA data across 34 OECD countries, this paper has sought to investigate the existence of such a trade-off and potential mechanisms behind it. It utilised an IV strategy based on Catholic resistance to state schooling in the 19th and early 20th centuries to predict enrolment shares in independently-operated schools today, while simultaneously controlling for the contemporary version of the instrument itself and other important variables that threaten its validity. We found that independent-school competition has a sizeable negative impact on pupil wellbeing,

[33] Note that the calculation is based on the direct correlation between youth wellbeing/cognitive achievement and adult life satisfaction, which means that any effects that operate via higher income in adulthood are incorporated in the calculation automatically. Similarly, the calculation regarding the impact of independent-school competition on adult income incorporates the latter's effect on life satisfaction automatically.

[34] For example, the cost-benefit analysis treats wellbeing in school as equal to the more general child wellbeing metrics employed by Layard et al. (2014). Further research is necessary to establish to what extent this matters for the results.

which survives a number of robustness tests. The paper further confirmed a positive effect on PISA scores and a negative impact on education spending found in previous research, thus providing clear evidence of a trade-off.

We also showed that balancing tests on pupil-background variables support the causal interpretation of our findings. In fact, if anything, there are more indications that our strategy may bias estimates against finding evidence in favour of our hypothesis. Nevertheless, future research should investigate whether or not alternative data and identification strategies generate similar results.

Analysing relevant mechanisms behind the wellbeing-efficiency trade-off, we found that independent-school competition makes teaching more traditional and pupil-teacher relationships more hierarchical, while also increasing parental achievement pressure. In addition, we found positive effects on instructional time and time spent on homework. These are all features that previous research suggests generate higher achievement and lower wellbeing. Future research should investigate other mechanisms linking competition to lower wellbeing and higher academic efficiency – and to what extent similar trade-offs apply to other education-reform strategies.

A tentative back-of-the-envelope calculation indicated that the economic benefits of independent-school competition via its positive impact on cognitive achievement appear to outweigh its cost via lower pupil wellbeing. At the same time, the calculation also indicates that the costs of competition may outweigh its benefits when using adult life satisfaction as the unit of measurement. While more research into this issue is necessary, justifying the higher direct and indirect costs of a non-competitive education system may hinge on upholding subjective wellbeing as a primary goal for public policy. While we refrain from drawing strong conclusions in this respect, our results highlight the potential for a more general trade-off between the traditional goals of education policy and the wellbeing agenda to which policymakers should pay attention – regardless of what goals they ultimately choose to pursue.

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Appendix A: Additional tables

Table A1: Descriptive statistics

Wellbeing and academic efficiency					
	Mean	SD		Mean	SD
Happiness at school	3.00	0.76	PISA science	501.14	93.78
PISA mathematics	494.03	93.93	Educational expenditure/pupil	69,130	28,217
PISA reading	496.45	93.91			
Country- and regional-level variables			*Pupil-background variables*		
	Mean	SD		Mean	SD
Independent-school share	0.19	0.21	Girl	0.50	0.50
Catholic share 1900 (no state religion)	0.29	0.36	Age	15.77	0.29
Catholic share 2010 (no state religion)	0.27	0.30	Index of home possessions	0.00	1.00
(log) GDP/capita 2011	10.43	0.35	Parental occupational status	50.66	21.61
Population 1900	13,800,000	18,200,000	Parental education	13.49	3.04
Calvinist share 1900	0.06	0.13	Immigrant (1st generation)	0.05	0.21
Early Catholic defeat (soft)	0.08	0.27	Immigrant (2nd generation)	0.15	0.36
Early Catholic defeat (hard)	0.06	0.24	*Pupil-level variables (institutional characteristics)*		
			Grade	9.62	0.73
Nazi annexation	0.18	0.38	School starting age	6.10	0.85
Pro-Catholic Nazi ally	0.10	0.29	*School location*		
			Village	0.09	0.29
Jesuit ban	0.16	0.36	Small town	0.21	0.41
Communist	0.18	0.38	Town	0.35	0.48
Post-Soviet	0.03	0.17	City	0.24	0.43
For-profit voucher/ mass conversion	0.08	0.28	Large city	0.11	0.31
Mechanisms					
	Mean	SD		Mean	SD
Individualisation of teaching	1.94	1.06	Achievement pressure (headteacher)	1.88	0.73
Project work	1.65	0.89	Class periods (total)	31.03	7.82
Group work	1.84	0.96	Class periods (language)	4.13	1.48
Help planning	1.66	0.88	Class periods (mathematics)	4.16	1.40
Get along with teachers	3.01	0.67	Class periods (science)	3.76	2.13
Teachers listen to pupils	2.89	0.74	Hours of homework	4.89	4.69

Note: The descriptive statistics display each variable's international mean and standard deviation (weighted by sampling probabilities with all countries given equal weight) without any imputed values.

Table A2: Alternative measures of pupil wellbeing

	General pupil wellbeing				
	Pupil happiness	Satisfaction with school	Things are ideal at school	Belong at school	Overall wellbeing index
Independent-school share	-1.28***	-1.31***	-1.93***	-1.69***	-2.22***
	(0.32)	(0.22)	(0.52)	(0.48)	(0.60)
Catholic share 2010*no state religion	0.49***	0.40***	-0.07	0.30	0.55**
	(0.10)	(0.11)	(0.25)	(0.19)	(0.24)
F statistic	45.87	45.88	45.92	45.83	45.97
n	190,348	190,616	190,585	190,639	191,913
Countries	34	34	34	34	34
	Peer relations/specific reasons for general pupil wellbeing				
	Outsider at school	Make friends easily at school	Feel awkward at school	Liked by other pupils	Lonely at school
Independent-school share	0.81***	-0.69***	0.36	-0.76***	0.53**
	(0.28)	(0.18)	(0.29)	(0.24)	(0.24)
Catholic share 2010*no state religion	-0.40***	0.23***	-0.23**	0.12	-0.22***
	(0.11)	(0.06)	(0.10)	(0.09)	(0.08)
F statistic	45.64	45.94	45.92	45.77	45.95
n	191,058	191,282	190,762	190,521	190,905
Countries	34	34	34	34	34

Note: Significance levels: *p<0.10; **p<0.05; ***p<0.01. Standard errors clustered at the country level in parentheses. All regressions include the controls described in Sections 3.5 and 4.1, including within-European regional-fixed effects. Items analysed: (1) 'I am happy at school'; (2) 'I am satisfied with my school'; (3) 'Things are ideal in my school'; (4) 'I feel like I belong at school'; and (5) the overall wellbeing index. The overall wellbeing index is constructed from responses to all statements in Columns 1-4 as well as those in Columns 6-10, which tap into specific reasons behind the level of wellbeing, such as peer relations: 'I feel like an outsider (or left out of things) at school'; 'I make friends easily at school'; 'Other students seem to like me'; 'I feel awkward and out of place in my school'; and 'I feel lonely at school'.

Table A3: Further robustness tests for pupil happiness

	Control added for			
	Enrolment share of privately-funded independent schools	Share of state funding in independent schools	Average level of independent-school autonomy	Exit exams
Independent-school share	-1.29***	-1.02***	-1.20***	-1.25***
	(0.36)	(0.32)	(0.28)	(0.35)
Catholic share 2010 *no state religion	0.50***	0.40***	0.31***	0.47***
	(0.12)	(0.09)	(0.11)	(0.10)
Added control	-0.31	0.04	-0.18**	-0.03
	(1.57)	(0.22)	(0.09)	(0.08)
F statistic	33.09	39.10	23.27	25.63
n	190,348	184,292	187,217	190,348
Countries	34	32	33	34

Note: Significance levels: *p<0.10; **p<0.05; ***p<0.01. Standard errors clustered at the country level in parentheses. All regressions include the controls described in Sections 3.5 and 4.1, including within-European regional-fixed effects. Data on centralised exit examinations are obtained from Bol and Van de Werfhorst (2013). This source lacks data on Chile and Mexico, which we obtain from Brandt (2010) and the OECD (2009) respectively. The other variables are obtained from OECD (2016a).

Table A4: Robustness tests for academic efficiency

	Mathematics	Reading	Science	Educational expenditures/pupil
		Only state schools		
Independent-school share	214.24***	255.56***	162.70**	-130,083***
	(67.01)	(85.30)	(63.43)	(28,477)
Catholic share 2010 *no state religion	-14.70	-39.18	-6.35	35,867***
	(25.13)	(32.71)	(22.56)	(9,998)
F statistic	49.73	49.73	49.73	49.73
n	233,309	233,309	233,309	233,309
Countries	34	34	34	34
		Only Europe		
Independent-school share	249.64***	285.28***	184.02***	-141,424***
	(49.06)	(57.99)	(48.29)	(27,638)
Catholic share 2010 *no state religion	-48.42**	-74.75***	-28.99	53,427***
	(22.24)	(24.12)	(20.45)	(10,285)
F statistic	42.52	42.52	42.52	42.52
n	188,173	188,173	188,173	188,173
Countries	24	24	24	24
		Belgium and the Netherlands excluded		
Independent-school share	252.03***	329.56***	230.67***	-157,986***
	(79.18)	(92.01)	(63.02)	(29,633)
Catholic share 2010 *no state religion	-3.44	-25.64	1.66	32,225***
	(26.81)	(34.08)	(22.72)	(11,545)
F statistic	42.87	42.87	42.87	42.87
n	282,359	282,359	282,359	282,359
Countries	32	32	32	32
		Excluding pupil-background characteristics		
Independent-school share	260.22***	321.27***	233.39***	-132,297***
	(58.22)	(76.71)	(53.85)	(28,644)
Catholic share 2010 *no state religion	-9.69	-33.75	-2.88	34,861***
	(22.42)	(31.19)	(20.72)	(10,927)
F statistic	45.88	45.88	45.88	45.88
n	295,416	295,416	295,416	295,416
Countries	34	34	34	34
		Reduced form		
	(17)	**(18)**	**(19)**	**(20)**
Catholic share 1900 *no state religion	47.77***	59.74***	40.35***	-29,984***
	(10.24)	(14.45)	(10.61)	(3,929)
Catholic share 2010 *no state religion	33.08**	22.52	33.29**	5,862
	(16.39)	(18.49)	(15.51)	(4,545)
n	295,416	295,416	295,416	295,416
Countries	34	34	34	34

Note: Significance levels: *p<0.10; **p<0.05; ***p<0.01. Standard errors clustered at the country level in parentheses. All regressions include pupil-, school-, and country-level controls described in Sections 3.5 and 4.1, including within-European regional-fixed effects.

Table A5: Including the school average of all pupil-level variables

	Pupil happiness	Mathematics	Reading	Science	Educational expenditures/pupil
Independent-school share	-1.26***	127.33***	187.35***	104.97***	-118,247***
	(0.32)	(37.23)	(54.44)	(38.92)	(24,941)
Catholic share 2010 *no state religion	0.43***	-14.75	-36.32*	-9.29	31,192***
	(0.10)	(14.71)	(21.80)	(13.72)	(9,143)
F statistic	46.04	45.96	45.96	45.96	45.96
n	190,348	295,416	295,416	295,416	295,416
Countries	34	34	34	34	34

Note: Significance levels: *p<0.10; **p<0.05; ***p<0.01. Standard errors clustered at the country level in parentheses. All regressions include indicators for the school- and country-level variables described in Sections 3.5 and 4.1, including within-European regional-fixed effects. They also include the school-level shares of girls, first-generation immigrants, and second-generation immigrants, age, parental education, parental occupational status, the index of home possessions, grade attended, and school starting age.

Appendix B: Ensuring relevance and validity of the instrument

In order to maximise the relevance and validity of the instrument, it is important to control for other historical factors, which have determined the extent to which Catholic resistance in the late 19th and early 20th centuries generated higher independent-school competition – and, if it did, the extent to which this competition has survived to this day. This problem is generally ignored in previous research, with the sole exception being the most obvious example: the rise of Communist regimes from the October Revolution in 1917 onwards, which undid most progress made by Catholics in the late 19th and early 20th centuries. We take this into account by controlling for countries' Communist background, obtained from Barro and McCleary (2005), and post-Soviet background.[1] The former applies Czech Republic, East Germany, Estonia, Hungary, Poland, Slovakia, and Slovenia, whereas the latter applies to Estonia only.[2]

But there are more nuanced historical issues, which are important to consider for the purpose of generating a relevant and valid instrument for independent-school competition based on the basic intuition described in Section 4.1. To begin with, we control for the share of Calvinists (reformed Protestants) in 1900, obtained from Brown and James (2015). This is to account for the fact that Calvinists in some countries, such as the Netherlands, joined the Catholics' more general resistance to secular state schooling (Glenn, 2011, 1989). In those countries, with such reinforcements, Catholics could obtain successes in the educational sphere that were disproportionate to the relative size of their own community.

We also control for population size in 1900, obtained from Brown and James (2015), to account for the fact that Catholics in larger countries often faced more formidable coordination problems and higher transaction costs to mobilise successfully (e.g. Wilkinson et al., 2006). Further building on this intuition, we note that the success of Catholics in defending their interests in countries with strong anticlerical currents

[1] The post-Soviet indicator is included to account for the fact that Soviet annexation throughout the latter part of the 20th century ensured an especially extreme form of centralisation and makeover of the education system, while also ensuring mass migration and a new parallel education system along linguistic lines (e.g. Krull and Trasberg, 2006; Stevick, 2006). Today, this may affect both demand and supply for independent schooling as well as pupil outcomes in ways that do not apply to post-Communist countries more generally.

[2] Whenever an indicator only affected parts of a country, we assign the share of the population affected. This strategy follows Barro and McClearly (2005) who assign a value of 0.204 for Germany in terms of its Communist background, representing the East German population share. The only exception is when the PISA data allow us to identify the relevant within-country regions, such as England in the UK, in which case we assign a value of 1 for all pupils in the region for which the indicator applies and 0 for the rest.

depended on their actual success of early political mobilisation (see Kaiser and Wohnout, 2004). In countries where Catholics failed to effectively mobilise politically against anti-clerical forces early on, and thus faced defeat, state monopolisation of schooling was more successful than in countries where Catholics mobilised more effectively at an early stage.

For example, whereas Belgian and Dutch Catholics were able to successfully lobby for access to and public funding for independent schools in the latter part of the 19th century – and German and Swiss Catholics ensured access to mostly public, but also independent, religious schools following decades of setbacks – due to the success of Catholic political mobilisation (e.g. Evans, 1999; Glenn, 1989, 2011; Kaiser and Wohnout. 2004), French Catholics struggled to develop a coherent political strategy and were consequently less successful in this endeavour. Indeed, as the concept of *laïcité* came to dominate education policy in France in the latter part of the 19th century, French Catholics suffered consecutive defeats due to their inability to mount a successful political defence (Boyer, 2004). Consecutive decrees in the 1880s decreased the role of the Church in state schooling considerably, and the 1904 law pushed through by Prime Minister Émile Combes sought to end it entirely in both the public and independent sectors. Many publicly-funded schools that had been maintained by congregations were thus reopened as fee-based schools that hired lay teachers but still maintained a 'Catholic character'. Overall, however, the 1904 law led to a considerable decrease in de facto independently-operated school enrolment shares. In 1902, 21.6 per cent of boys and 42 per cent of girls attended such schools; in 1912, these figures had declined to 12.8 per cent and 24.8 per cent respectively, not far from the situation at the end of the 20th century (Judge, 2001). Furthermore, the abrogation of Napoleon's concordat with the Vatican in 1905, which finally marked the de jure separation of church and state in France, meant that a system of public funding for independent schools similar to those in Belgium and the Netherlands was never developed in the Third Republic (Teese, 1986). Consequently, despite the fact that France had similar Catholic population shares as Belgium in the late 19th century, and considerably higher shares than the Netherlands, the inability of French Catholics to successfully mobilise politically at an early stage of state centralisation appears to be an important reason why independent-school competition never reached similar levels in France.

A similar, but more radical, story applies to Mexico, where Catholic political mobilisation only really took shape following the Mexican Revolution in 1910. However, this ended abruptly after the ouster of pro-Catholic Victoriano Huerta in 1914. In the 1917 constitution, religious institutions were banned from running independent schools, and the strict enforcement of this ban in the latter part of the 1920s – when Catholic schools were forcibly closed – was an important contributory factor to the Cristero War (see Curley, 2008; Hamnet. 2006; Schell, 2003). In 1929, the Church finally caved on the issue of religious education in schools and agreed to carry it out in churches only (Fernández, 2007). The ban on religious independent schools was not revoked until 1992, although its enforcement varied over the decades, and there is still essentially no public funding available (Blancarte, 1993; OECD, 2016). The early Catholic defeat and the inability to successfully mount a political defence later on thus had similar, albeit more severe, consequences for independent schooling in Mexico as in France. We thus control for an indicator of these significant early Catholic political defeats in France and Mexico in the late 19th and early 20th centuries, which appear important for today's levels of independent-school competition.

In other countries, early Catholic pressure for access to independent schools suffered less draconian defeats. Instead, laws were passed to ensure that independent confessional schools would simply not be eligible for public funding, precisely to decrease the alternative schooling opportunities for Catholics. For example, anti-Catholic sentiments in the US during the 1800s led to increased political pressure to legislate against public funding for parochial schools, while still maintaining essentially Protestant state schools. Thus, from the mid-1800s onwards, most US states began passing amendments to their constitutions, or joined the Union with such amendments, which banned government funding for independent religious schools. In the end, 41 states and the District of Columbia incorporated such measures in their constitutions at some point in time (Duncan, 2003; Katz, 2011), covering 86 per cent of the relevant population in the US. Similar developments occurred throughout Australia and New Zealand, albeit these changes were not constitutionally enshrined (Buckley et al., 2011; Wilkinson et al., 2006). Thus, we control for indicators for areas that experienced these less radical early Catholic defeats in the political realm separately.[3]

[3] That is, Australia, New Zealand, and the relevant part of the US. Note, however, that results are very similar if we merely include one indicator for all countries where Catholics suffered early political defeats.

Similarly, we also control for indicators of 19th century national bans on the Society of Jesus and its associate orders, as long as they remained in the early 20th century.[4] The Society of Jesus was the first teaching order of the Catholic Church and has been especially devoted to education from its inception, having founded hundreds of independent schools worldwide, while also inspiring other orders in this direction (Duminuco, 2000). During the struggle between secular and religious forces in the 19th century, several countries banned Jesuits and their associate orders from their territories for longer periods of time, often specifically because of their educational influence (e.g. Chadwick, 1998; Healy, 2003). Due to the importance of the Jesuits and their associate orders in opening and maintaining independent schools, we control for these bans in our set-up to ensure maximum instrument relevance.

Furthermore, we take into account the unique impact of World War II on the independent-education systems in many countries. First, we control for indicators of Nazi takeover and de facto annexation of regions into the Greater German Reich. Nazi ideologues strongly emphasised the importance of education in socialising young people into their worldview, thus opposing independent or denominational schools and, indeed, any religious elements in education whatsoever. Inevitably, this led to a radical persecution of the Catholic Church in Germany as well as all territories that were either de jure or de facto annexed into the Reich. Indeed, in these areas, the Nazis closed down all denominational schools, public and independent (see Mariaux, 1940; Pine, 2010). For example, just months after the *Anschluss*, all independent schools in Austria were closed and taken over by the Nazi Party. *Reichskommissar* Josef Bürckel explained: 'We must take care of the preservation of our nation in this world. This only is possible if care is total care, therefore the school must belong to the state, upon which devolves the responsibility for the future' (Chicago Daily Tribune, 1938, p. 1). Similarly, following the annexation of Alsace-Lorraine, the Vatican complained: 'There are no longer any Catholic private schools in Alsace. All Catholic educational institutions run by members of the Holy Order, priests or laymen, have been dissolved' (The Tablet, 1941, p. 290). Similar fates afflicted other de facto annexed regions, including Eupen-Malmedy in Belgium, Luxembourg, Czech lands, most of Slovenia, and the whole of Poland, including

[4] More specifically, this applies to regions that belonged to the German Empire, France, Mexico, Norway, and Switzerland.

the quasi-colony in the eastern parts that became known as the General Government (see Lapomarda, 2005; NCWC, 1942; OUSSCCPAC, 1946).[5]

However, the same story does not apply to areas that were solely under military or civil administrative control. For example, in Belgium and the Netherlands, 'the churches were given a degree of leeway that allowed them to maintain their influence and preserve confessional institutions' (Bank and Gevers, 2016, p. 182). While the Nazis threatened to close Catholic schools in the Netherlands, due to anti-Nazi activities of the episcopacy, they refrained from doing so, leaving most schools operating normally during the occupation (Warmbrunn, 1963). The fates of independently-operated schools in Belgium and the Netherlands nicely display the differences in regions and countries that were merely occupied by, compared with regions and countries that were de facto annexed into, the Greater German Reich.

At the same time, in pro-Catholic fascist and quasi-fascist countries allied to Nazi Germany, or acting as client states to Nazi Germany, the reverse situation occurred during and right before World War II: the Catholic Church again reached privileged status in public life, which meant that pressure for independent schools decreased for quite some time in countries that turned away from fascist and quasi-fascist ideology following World War II. The canonical example here is the clericofascist Slovak Republic, led by the Catholic priest Josef Tiso, who restored Church privileges in the public education system between 1938 and 1945 (Conway, 1974; Ward, 2013). Similar stories apply to Vichy France, Hungary, and Italy following the Lateran Treaty of 1929 (see Fazekas, 2004; Sweets, 1994; Wolff, 1980).[6] Thus, whereas territories annexed into Nazi Germany experienced Catholic persecution, pro-Catholic regimes allied with the country rather defused such pressure for independent schools for quite some time. This often had implications for Catholic influence in education also after the war (e.g. Wolff, 1992). We thus also include an indicator for pro-Catholic Nazi client states or allies,

[5] A small part of north-eastern Slovenia, covering about 6 per cent of today's population, was never de facto annexed by Nazi Germany, but was instead part of Hungary, a country we code as being pro Catholic. Nevertheless, the Hungarians were hardly pro Catholic in this annexed region: they closed all Slovenian schools, imprisoned Slovenian Catholic leaders, and made Protestants the new elite, since the latter were perceived to be more amenable to forced Magyarisation (Kranjc, 2013). We thus do not code this small part of Slovenia as being pro Catholic, although results are unsurprisingly almost identical if we do.

[6] The Vichy regime did authorise communes to support independent schools financially, but this happened only rarely and, when it did, the subsidies were very small. Consequently, there was no increase in independent-school enrolment in France during the Vichy regime's tenure (Sweets, 1994).

before and during World War II, which abandoned fascist and quasi-fascist ideology after the war.

Finally, we also include indicators for countries or regions that in the latter part of the 20th century implemented voucher programmes in which for-profit operators participate on an equal basis, or very recent reforms that enabled mass conversions of state schools to independently-operated status essentially overnight. There are two countries that allow for-profit operators on an equal basis – Chile and Sweden – and only one nation in one country that has allowed mass conversions of publicly-operated schools to independently-operated status: England. As a direct result of the 2010 Academies Act, which allowed essentially all English schools to become autonomous 'academies', the share of 15-year old pupils attending independently-operated schools in the United Kingdom increased from 6.31 per cent in 2009 to 45.16 per cent in 2012 (OECD, 2016). Neither the enrolment growth in for-profit independently-operated schools nor such mass conversions has much to do with the independent-school competition that we aim to capture with the instrument based on historical Catholic resistance to state schooling in the 19th century.

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