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Deregulation of Education – What Does it Mean for Efficiency and Equality?

Raphaela Schlicht-Schmälzle
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Deregulation of Education – What Does it Mean for Efficiency and Equality?

ABSTRACT

This article analyses from a cross-national comparative perspective how deregulation of compulsory education affects two central educational outcomes: efficiency and equality. The conflict between public regulation on the one hand and the market model on the other hand describes one of the most fundamental political struggles. In several fields of societal life, such as compulsory education, the state traditionally holds a strong monopoly in almost all capitalist societies. However, using three waves of PISA school level data we show that the degree of public regulation varies cross-nationally. The central finding of our analyses is that deregulation of education increases educational achievement of individual students across all social classes and thereby fosters the educational efficiency of the national education systems. Nevertheless, it also becomes evident that higher social classes benefit more strongly from deregulation, which increases the degree of educational inequality. These results indeed confirm that deregulation of education provokes an efficiency-versus-equality trade-off in national education systems.

CONTENTS

Deregulation of Education – What Does it Mean for Efficiency and Equality?

INTRODUCTION

The conflict between public regulation on the one hand and the market model on the other hand describes one of the most fundamental political struggles. In this article we analyze how deregulation of education as opposed to public regulation affects two central educational outcomes: efficiency and equality. The core thesis is that deregulation of education – defined as a strong private school sector, a significant share of private educational expenditures and school autonomy as opposed to centralized regulation and standardization – increases the general educational achievement in national compulsory education systems. The level of educational achievement in a country is an indicator of its human capital and its potential productivity. Thus, we speak of “efficiency” if an educational system produces high levels of achievement. However, we also expect that deregulation increases social inequality in education since social classes benefit more from deregulation policies (efficiency vs. equality trade-off).

In several spheres of societal life, such as compulsory education, the state traditionally holds a strong monopoly in almost all capitalist societies, with private actors playing only a minor role. In all highly developed OECD countries the provision of compulsory education is strongly dominated by public institutions (or at least by public funding). Even though many national constitutions include the right of private education, the public monopoly in compulsory education remains amazingly unchallenged.[1] From a classical liberal perspective, centralized education systems are often criticized for being largely inefficient. Chubb and Moe (1988) published highly influential results for the scope of the United States of America (USA), showing that higher degrees of school autonomy lead to better school managerial outcomes than a highly centralized public education system. According to their results, the autonomy of private schools leads to better performance in terms of clearer goals and stricter requirements, greater stress on academic excellence and to more harmonious, interactive, and teaching-oriented relations between principals and teachers and among teachers themselves (Chubb and Moe 1988: 1084). As modern market economies generally suffer from far-reaching public debt (cf. Klitgaard 2007: 448) a retraction of the state’s responsibility for traditional public services such as education is – at least from a liberal perspective - considered to be a legitimate and necessary strategy.

[1] (cf. German constitution GG: Article 7, Section 4; Austrian constitution: Article 14, Section 7; South African Constitution: Chapter I, section 29(3)).

From a socialist perspective, however, a strong public education system is seen as a precondition for social equity. Deregulation in the form of privatization and institutional autonomy in education are considered as catalysts for social inequalities, while a centralized[2] education system is deemed to inhibit the inheritance of educational opportunity over generations. This is in line with Esping-Andersen's argument that there is always a trade-off between socio-economic efficiency and equality in the welfare state (Kolberg and Esping-Andersen 1992). This paper contributes to this debate by analyzing the consequences of deregulation of education from a cross-national comparative perspective. How does deregulation versus public regulation of education affect both efficiency and equality outcomes in education?

Using three waves of PISA data, we show that the degree of public regulation versus market dependence varies cross-nationally. The central finding of our multi-level analyses is that deregulation of education (measured as the degree of privatization and school autonomy), as opposed to central government regulation, increases the educational achievement of students from all social classes and thereby fosters educational efficiency in the OECD member states. Nevertheless, it also becomes evident that higher social classes benefit more strongly from deregulation which increases the degree of educational inequality. These results indeed confirm an efficiency-versus-equality trade-off in education.

THEORETICAL APPROACHES TO THE EFFECTS OF DEREGULATION OF EDUCATION

From a perspective of classical liberalism, deregulation of education is defined as the retraction of the state in the field of education and a shift of responsibility to private and decentralized actors (Mill 1984; Smith 2005; von Hayek 2005; Friedman 2008). Therefore, the shift of responsibility from the government to the schools (school autonomy), and the shift from public funding to private funding and from public school government to private school government can be described as proper indicators for deregulation. Chubb and Moe (1988) systematically compared public and private schools and showed that they distinctively differ in environment and organization. While public schools are ruled by a hierarchic centralized system of democratic politics, private schools are strongly autonomous and ruled by the market (Chubb and Moe 1988: 1067). In line with these arguments, we regard deregulation as a broader concept, which comprises liberali-

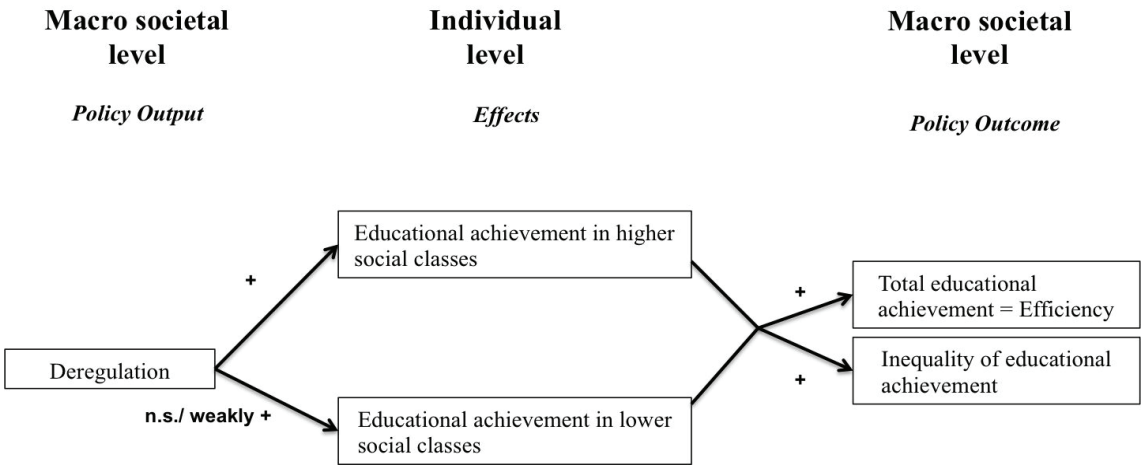
[2] We use the terms “centralization”, “standardization” or public / governmental regulation synonymously as a description of education systems that are predominantly controlled and run by national governments and institutions, with low private education expenditure.

zation, privatization and decentralization of authority as empirically measurable indicators.

The political discourse about deregulation versus centralization and standardization is divided. From a liberal perspective, a retreat of the state from interventions in societal life – including education – is valuable both for moral and for socio-economic outcomes. Von Hayek (1976: 379) challenges the centralized public dominance in education from a moral perspective: “The very magnitude of the power over men’s minds that a highly centralized and government-dominated system of education places in the hands of the authorities ought to make one hesitate before accepting it too readily.” Beyond these moral arguments, deregulation is assumed to be more efficient from a socio-economic point of view (cf. Chubb and Moe 1988).

By contrast, socialists prefer strong governmental regulation in education as a central part of the welfare state, both for moral as well as for socio-economic reasons. From a rather moral-related perspective, public education as a central part of the welfare state is not conceived as a good to acquire for a certain return but as a civil right (Marshall 1950). From a rather socio-economic perspective, socialists consider public education as an instrument to regulate societal stratification (Esping-Andersen 1999: 20). Depending on its structure, the public education system may inhibit the inheritance of social status over generations and thereby contributes to the production of equal opportunities. In this paper, we neglect the moral arguments of liberalism (deregulation) and socialism (de-commodification/education as a civil right) and focus exclusively on the effects on socio-economic outcomes: efficiency (liberal focus) and equality (socialist focus). Our main thesis is that educational deregulation affects individuals’ school success and thereby determines macro-societal educational outcomes. The rationales of our hypotheses mainly depend on classical liberal and socialist assumptions regarding standardized, governmental controlled versus deregulated, privatized education. Therefore, we expect deregulation of education to entail an efficiency-versus-equality trade-off. While less governmental control in education should increase educational efficiency, it is also expected to produce higher degrees of inequality in education (cf. figure 1). Below, we elaborate how educational deregulation affects individuals’ educational achievements and consequently the degrees of macro-societal efficiency and equality in education. The effects of educational deregulation are discussed extensively, but are scientifically unsettled. While some argue that deregulation is a catalyst of social inequality (Weiß 1986: 159; Meier, Polinard et al. 2000; Campbell 2005), others contend that it encourages overall educational efficiency (Coleman, Hoffer et al. 1982; Chubb and Moe 1988: 1070; Witte and Rigdon 1993).

Figure 1: Theoretical model



Deregulation of Education and Educational Efficiency

According to the Coleman-Hoffer thesis, private schools are more effective in education since pupils at private schools show higher achievement scores (Coleman, Hoffer et al. 1981; Coleman, Hoffer et al. 1982; Coleman, Kilgore et al. 1982; Chubb and Moe 1988: 1070; Witte and Rigdon 1993; 2006). This finding can mainly be attributed to different learning environments and cultures at public and private schools. Private schools are characterized by a strong principal-agent relationship between schools (agents) and parents and pupils (principals) (cf.. Weiß 1986; Chubb and Moe 1988: 1084; Manna 2002). The collection of tuition fees provides parents and pupils with stronger customer power and implements a service culture that is responsive to individuals' preferences. The higher school autonomy of private schools strengthens the influence and the demands of parents and pupils, since schools are able to cater these demands (Chubb and Moe 1988). Furthermore, private schools possess a higher financial budget than public schools due to the receipt of tuition fees and further private funding. These higher financial resources may lead to better teaching conditions and consequently to better educational achievements. Lubienski et al. (2008) show that higher educational achievements at private schools are mainly attributable to better teaching conditions, such as smaller class sizes, better qualified teaching staff, and higher parental participation.

Most of the studies regarding the effects of deregulation are case studies; large-n cross-national evidence of deregulation in education is rather rare. As an exception West and Woesmann (2009) show with a cross-national comparative approach that private school competition in a country improves pupils' school achievement.

Thus the central expectation in the hypotheses 1a, 1b, and 1c is that deregulation of education increases educational efficiency:

Hypothesis 1a: The higher the school autonomy in a country, the stronger the educational efficiency.

Hypothesis 1b: The higher the percentage of private schools in a country, the stronger the educational efficiency.

Hypothesis 1c: The higher the percentage of private funding of education in a country, the stronger the educational efficiency.

Deregulation of Education and Educational Inequality

From a socialist perspective, deregulation of education is often claimed to foster social inequality in education. Analyses of the social stratification at private schools show that private school pupils are far more likely to come from higher social classes than pupils at public schools (Weiß 1986: 159; Meier, Polinard et al. 2000; Campbell 2005). First and foremost, parents from higher social classes are more likely able and willed to pay tuition fees at private schools (Buddin, Cordes et al. 1998). According to rational choice institutionalism, the decision of parents for or against private school in turn depends on cost-benefit-risk analyses. For parents from higher social classes, the benefits of private school are higher since the higher education standards help to maintain or even increase social status (cf. Weiß 1986). Witte, (1992: 390) for example, shows that pupils from lower social classes have lower prospects of succeeding at private schools than pupils from higher social classes. For higher social classes, the expenditure of tuition fees is less daunting and the risk of loss of status is low due to the better prospects of success. As a result, there is a tendency toward segregation along the lines of social class at public and private schools. (Ambler 1994; Buddin, Cordes et al. 1998; Levin 1998; Wrinkle, Stewart et al. 1999; Fairlie and Resch 2002). In countries with a strong privatization of education, higher social classes will move to the private schools, while lower social classes will remain on public schools (Levin 1998; Campbell 2005). Moreover, “(e)ducational choice tends to intensify class segregation … throughout the effects of different preferences and information costs” (Ambler 1994: 454). Campbell (2005) attributes the migration of the middle classes from public (schools) to private schools mainly to the low participation and influence of parents and pupils on public schools and the neglect of parents’ duties toward public schools (Weiß 1986: 163).

Studies that analyzed the effects of school autonomy have shown that autonomy increases the influence of social origin (Wößmann 2007, 2009).Consequently, it is likely that only higher social classes will benefit from better learning conditions at private schools. A deregulation of education should thus lead to stronger social inequality of education.

Hypothesis 2a: The higher the school autonomy in a country, the more pronounced the degree of social inequality in education.

Hypothesis 2b: The higher the percentage of private schools in a country, the more pronounced the degree of social inequality in education.

Hypothesis 2c: The higher the percentage of private funding of education in a country, the more pronounced the degree of social inequality in education.

METHODS[3]

In the remainder of this article, the hypotheses will be empirically tested via multi-level analyses, which can be seen as a direct empirical implementation of our theoretical model. We calculate models with individual educational performance as the dependent variable. This outcome will be explained by relevant individual parameters, such as social background, migration status, and gender, as well as macro-political indicators of deregulation on the national levels and cross-level interactions between individual social background and indicators of deregulation. The fundamental principle of multi-level analysis is the modeling of contextual variance which enables an account of the dependence of observations that are nested in clusters (Jones 1997; Steenbergen and Jones 2002; Windzio 2008):

To widen our analytical scope and to gain robust indicators of deregulation policies in the OECD countries, we used the pooled data of three waves (2000, 2003, and 2006) of the OECD PISA study (OECD 2001, 2004, 2007). This means that most of the countries are represented three times in our data set depending on their participation in the study. By using the country level as contextual level, the observations at the country level thus are not completely independent. Therefore, our contextual level units are not defined as countries as such but as country-years (countries A in a specific year X) (Windzio 2006).

At first sight, country-year clusters do not account for the clustering of country-years with countries. But this is unproblematic since ignoring the clustering of years (“situations”) within countries would lead to underestimated standard errors of time-constant effects at the country-level, whereas standard errors at the country-year-level remain rather unaffected.

Therefore, we deal with 98 country-years as contextual units: 31 countries in 2000[4] , 31 countries in 2003[5] and 36 countries in 2006[6]. This leads to a sample of 488,344 15-

[3] The following part describes a methodological approach very similar to the one applied by Schlicht et al. (2010). Accordingly, the method descriptions partly correspond with those of the earlier article.

[4] Australia (AUS), Austria (AUT), Belgium (BEL), Canada (CAN), Switzerland (CHE), Chile (CHL), Czech Republic (CZE), Germany (DEU), Denmark (DNK), Spain (ESP), Finland (FIN), France (FRA), Great Britain (GBR), Greece (GRC), Hungary (HUN), Ireland (IRL), Island (ISL), Italy (ITA), Japan (JPN), Korea (KOR), Luxembourg (LUX), Latvia (LVA), Mexico (MEX), Netherlands (NLD), Norway (NOR), New Zealand (NZL), Poland (POL), Portugal (PRT), Romania (ROU), Sweden (SWE), and United States of America (USA).

year-old pupils in 36 OECD member states. The macro-political measures of deregulation policies are measured on the country-year level instead of on the raw country level, meaning that deregulation of education is measured in most of the countries for three different years (2000, 2003, and 2006).

$$y_{ij} = \beta_{0j} + \beta_1 x_{ij} + e_{ij} \quad (1)$$

$$\beta_{0j} = \beta_0 + u_{0j} \quad (u_{0j} \text{ stands for the residuals at the contextual level}) \quad (2)$$

In such a model, it is reflected that the behavior of individual *i* can vary between contextual units *j*. In contrast to standard regression analysis, this model does not presuppose individual educational performance to be the same in all country-years (constant β_0); rather, it can vary between contexts. Furthermore, multi-level models are able to model macro-level characteristics (deregulation policies) that explain the variance between country-years.

An extension of the approach reveals whether social inequality varies between contexts by allowing the effects of individual social background to vary between country years – i.e. random slopes (cf. Schlicht et al. 2010). Furthermore, cross-level interactions of country-year-specific characteristics (deregulation policy) W_j and individuals' social background (X) elucidate whether the effect of the micro relation between social background and educational performance (Y) is moderated by macro-political factors. Beyond the explanation of the raw efficiency of the education systems, we are particularly interested in these cross-level interactions since they show how social inequality in education is affected by deregulation policy. The model including these cross-level interactions is shown in equation 3.

$$Y_{ij} = \beta_0 + \beta_1 \cdot X_{1ij} + \ldots + \beta_{kj} \cdot X_{kij} + \ldots + \beta_n \cdot X_{nij} + \alpha_1 \cdot W_{1j} + \ldots$$
$$+ \alpha_m \cdot W_{mj} + \ldots + \alpha_n \cdot W_{nj} + \ldots + \gamma \cdot W_{mj} \cdot X_{kij} + \mu_{oj} + \mu_{mj} \cdot X_{kij} + \varepsilon_{ij} \quad (3)$$

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[5] Australia (AUS), Austria (AUT), Belgium (BEL), Canada (CAN), Switzerland (CHE), Czech Republic (CZE), Germany (DEU), Denmark (DNK), Spain (ESP), Finland (FIN), France (FRA), Great Britain (GBR), Greece (GRC), Hungary (HUN), Ireland (IRL), Island (ISL), Italy (ITA), Japan (JPN), Korea (KOR), Luxembourg (LUX), Latvia (LVA), Mexico (MEX), Netherlands (NLD), Norway (NOR), New Zealand (NZL), Poland (POL), Portugal (PRT), Slovakia (SVK), Sweden (SWE), Turkey (TUR), and United States of America (USA)

[6] Australia (AUS), Austria (AUT), Belgium (BEL), Canada (CAN), Switzerland (CHE), Chile (CHL), Czech Republic (CZE), Germany (DEU), Denmark (DNK), Spain (ESP), Estonia (EST), Finland (FIN), France (FRA), Great Britain (GBR), Greece (GRC), Hungary (HUN), Ireland (IRL), Island (ISL), Italy (ITA), Japan (JPN), Korea (KOR), Lithuania (LTU), Luxembourg (LUX), Latvia (LVA), Mexico (MEX), Netherlands (NLD), Norway (NOR), New Zealand (NZL), Poland (POL), Portugal (PRT), Romania (ROU), Slovakia (SVK), Slovenia (SVN), Sweden (SWE), Turkey (TUR), and United States of America (USA)

Y_{ij} indicates the educational performance of a pupil *i* in country-year *j*. This variable is explained by the overall mean (β_0), individual level variables (X_1 to X_n and their estimates β_1 to β_n, respectively) and characteristics of the country-year (W_1 to W_n and their estimates α_1 to α_n, respectively). As only one cross-level interaction is represented in each model, the subscripts *k* and *m* refer to the k^{th} individual variable that is randomized and interacts with the m^{th} contextual variable (X*W and their estimate γ, respectively). $\gamma \cdot W_{mj} \cdot X_{kij} + \mu_{mj} \cdot X_{kij}$, thus, stands for the effect the contextual variable W_k (changes of deregulation policy) has on the influence of the individual variable X_m (social background). Moreover, our models include an additional random intercept for the school level since pupils are not only nested within country-years but also within different schools (not shown in the equation).

Following these principles of hierarchical modeling, we present a series of models. In order to demonstrate the variation of the dependent variable at the contextual level, we begin by estimating the impact of the individual-level characteristics (table 1, models 1 and 2) (cf. Schlicht, Stadelmann-Steffen et al. 2010). In a second step, we progress by separately testing the deregulation variables (table 2, model 3-16) to estimate direct effects on educational achievement (table 2, column 2) and cross-level interactions with pupils' social background (table 2, column 3)[7]. Positive effects of deregulation variables on pupils' educational achievement would support our hypothesis that deregulation strengthens educational efficiency. Cross-level interactions of deregulation variables and social-background would support our expectation that deregulation policy has different effects on pupils from different social classes and thereby increases inequality. According to Brambor et al. (2005), raw interaction effects of the individual social background and a deregulation variable on educational performance do not, however, suffice to prove a significant interaction between deregulation policy and social background. It is in fact necessary to compare the marginal effects of deregulation policies on pupils from different social backgrounds (cf. Schlicht, Stadelmann-Steffen et al. 2010). With respect to our hypotheses, we assume the effects of deregulation policies on educational achievement to vary across several social backgrounds, thereby increasing the social inequality of education. More precisely, hypotheses 1 a-c would be confirmed given the following situation:

(A) Deregulation on the country-level significantly increases the achievement of pupils (efficiency of education).

[7] We thus calculate 14 models, each containing one of the deregulation variables. It is not reasonable to *simultaneously* include all context variables in one model for two reasons: first because due to the small number of units at the country-year level, it is not possible to integrate 14 contextual variables plus cross-level interactions and controls into one model. Second, the policy variables are related to one another to some extent. Especially the variables on school autonomy are in part perfectly correlated.

Hypotheses 2a-c would be confirmed given the following situations:

(B) The marginal positive effects of deregulation policy *significantly increase* according to higher social background.

(C) The marginal positive effect of deregulation policy *gains statistical significance* for higher social backgrounds.

At the *individual-level*, we have to include variables that indicate the individual social background, the migration status, gender and – as dependant variable - educational performance. Following Levels and Dronkers (2008), we measure *individual educational performance* using the mathematical test scores in PISA (PV1MATH, PV2MATH, PV3MATH, PV4MATH, PV5MATH). To receive robust effects of deregulation on mathematical achievement, we calculate all our models in tables 1 and 2 for each of the five mathematical test scores (in each of the five models, one of the five test scores serves as the dependent variable). The averaged coefficients and their adjusted standard errors (OECD 2009: 100) are used as the actual robust effects on mathematical achievement. It can be assumed that mathematics is the most suitable subject to compare since it is the most “universal” one and tends to be independent of country-specific characteristics, such as linguistic heterogeneity. As discussed above, pupils’ *social background* is measured by the International Socio-Economic Index of Occupational Status (ISEI) on a scale from 16 (lowest social background) to 90 (highest social background) (Ganzeboom, De Graaf et al. 1992). This index builds on the standard classification of occupations (ISCO) and assumes that a respective occupation requires a certain degree of education and yields a typical income. The combination of education, income and occupation allows a hierarchical and metric differentiation of socio-economic background. The variable indicates the highest occupational status, depending on whether the mother or the father has the higher status. Migration status is measured by a dummy variable coded 1 when at least one of the two parents was born abroad. Gender is also measured by a dummy with females coded 1 and males coded 0.

At the *macro level* we use the *deregulation policies* in the field of education as explanatory variables. The PISA studies provide school-level measures regarding whether a school is publicly or privately run, the percentage to which it is government-funded or by privately funded (tuition fees, donations, and other resources), and the autonomy of the schools in different dimensions (courses that are offered, course contents, textbook selection, student admission policies, student assessment, student disciplinary policies, general budgeting, budget allocation, general setting of teacher salaries, setting of teacher salary increases, recruiting and dismissal of teachers). In order to obtain a country-specific measure of these indicators of deregulation, we aggregated the school-level variables at the country-year level. *Institutional privatization* is thus measured by the percentage of private schools in each country and PISA wave. We also account for the

actual *funding of schools by public (governmental) or non-governmental resources* - which is not equal to having a school run by a public or a private authority. In order to measure non-public (*financial privatization*) funding on the country- and PISA wave-level, we calculated the average of non-governmental school funding per country and PISA wave. Further aspects of deregulation comprise the *autonomy of schools* with regard to decision making in the teaching process, the recruitment of students and teachers, and in budgeting. To receive country and PISA wave data on school autonomy, we aggregated these school-level data by their country and PISA wave specific means.

A COMPARATIVE MAP OF EDUCATIONAL DEREGULATION

How do democratic nations differ with regard to governmental control versus deregulation in the field of education? The comparative research on the constitution of national education systems and, in particular, on the deregulation of education is still in its fledgling stages. Windzio et al. (2005) as well as Iversen and Stephens (2008) made an initial step of transferring classical welfare regime types – social democratic, conservative, and liberal welfare states (Esping-Andersen 1993) - to the field of education. With regard to deregulation of education, Iversen and Stephens (2008) show that liberal market economies possess higher degrees of private education expenditures than conservative or social democratic market economies. Klitgaard (2007; 2008) particularly focused on deregulation of education by comparing three welfare state regimes (USA, Sweden, and Germany) with regard to the implementation of school vouchers and school choice. Klitgaard (2007: 446) sees the introduction of parental choice and school vouchers as a re-arrangement of the public sector into quasi-markets (cf. also Friedman 1997; Hanushek, Sarpça et al. 2011). These quasi-markets provide a stronger reliance on private entrepreneurs in school education and stronger freedom of choice for citizens; this in turn should lead to an increase of public sector efficiency and a stronger responsiveness to individual preferences (Klitgaard 2007: 449). School vouchers should represent these ideas of parental choice and competition between public and private education. Surprisingly, he found that school choice and the system of school vouchers are equally distributed in social-democratic and liberal welfare states (USA and Sweden) but almost non-existent in conservative welfare states (Germany). Thus the welfare patterns of education policy are not clearly distinct in the three worlds of the welfare state.

In the previous section we described how we derived our measures of deregulation; the next paragraphs illustrate how these measures are distributed across countries and groups of countries. According to appendix 1, the mean *share of private schools (institutional privatization)* in the OECD countries is about 14% (in all three PISA waves). However, the variation between the countries is quite strong. The share of private schools varies from less than 1% in Finland, Iceland, Luxembourg, Norway, and Swe-

den to more than 50% in Mexico and South Korea. We also have to consider within country changes over time from PISA 2000 to PISA 2006. The maximum decrease of private school share occurred in Mexico in the amount of -11 percentage points from 2000 to 2006, and the maximum increase – of 6 percentage points – occurred in Italy. With regard to institutional privatization we can partly identify welfare regime clusters. While conservative and social-democratic welfare state regimes provide rather low levels of deregulation (Germany and Sweden), liberal welfare states rank on a medium level of privatization.

A further indicator of deregulation beyond institutional privatization is the *privatization of funding (financial privatization)*. Appendix 2 shows that the mean share of private funding varies between less than 1% (Iceland, Latvia, Romania) and about 70% (Belgium and Netherlands). The OECD average of the private funding is about 18% (all three PISA waves). The strongest decrease of private funding from 2000 to 2006 occurred in South Korea (about 6 percentage points) and the strongest increase in Chile of about 11 percentage points. Can we identify welfare clusters regarding financial privatization? The prototypes of the three worlds of welfare capitalism Germany, the United States and Sweden all rank low on private funding of schools. Most surprisingly, Denmark as a social democratic welfare state exhibits a large share of private funding (about 24% of the total funding is received from private resources, cf. appendix 3). Thus we can again not identify clear welfare state patterns.

When correlating the degrees of financial privatization and the degrees of institutional privatization, it becomes obvious that we have to deal with two different and rather independent concepts of deregulation. The two concepts are only weakly correlated in all three PISA waves (Pearson’s r is about 0.2).

Our third measure of deregulation in the field of education is the *autonomy of schools* regarding the teaching process, budgeting, selection of pupils, and recruitment of teachers. At the country level, the autonomy varies from 0% (none of the schools are autonomous in the respective dimension) to 100% (all of the schools in the respective country are autonomous) (cf. appendices 3-5). The countries where more than 90% of schools are autonomous are Belgium, the Czech Republic, Hungary, Iceland, Latvia, New Zealand, USA, the Netherlands, and Great Britain. In this regard, the strong degree of deregulation in the former communist OECD countries is especially remarkable. Countries with autonomy in less than 10% of schools are Luxembourg and France. In those countries, governmental regulation is rather dominant. The average percentage of autonomous schools across the OECD is 60% in 2000, 74% in 2003, and 68% in 2006. Considering the welfare state tradition, Germany as a conservative welfare state exhibits low degrees of autonomy. By contrast, the USA (liberal welfare state) features high degrees of autonomy. In Sweden as a social democratic welfare state schools are rather moderately autonomous (cf. Appendices 3-5). Thus we can tentatively conclude that

liberal and social democratic welfare states feature remarkable degrees of school autonomy, while education systems in conservative welfare states are rather centralized. These patterns are in line with Klitgaard's (2007) findings regarding the implementation of school vouchers.

RESULTS

How does deregulation of the school education system affect the educational efficiency and equality of education in the OECD member states? Model 1 in table 1 preliminarily shows that a hierarchical model is appropriate. Pupils' mathematical achievement varies not only between individuals but also between schools and countries. About 14.6% of the variance is due to the country-year level.[8] Thus macro-societal conditions indeed mold individual achievement. Therefore, we can assume different degrees of educational efficiency between our countries. Furthermore, model 1 shows that a privileged social background has a positive effect on mathematical achievement while migration status and female gender have negative effects.

Model 2 builds on model 1, adding a random slope for social background. Indeed, the effect of social background on mathematical achievement varies between countries. Consequently, there are different degrees of social inequality in education. Model 2 also elucidates that there is a negative co-variation between the random social background effect and the random intercept of mathematical achievement. Thus countries with higher efficiency also provide a lower degree of inequality in education. There is therefore no genuine equality-versus-efficiency trade-off in education (Kolberg and Esping-Andersen 1992; Schlicht 2010). By contrast, equality and efficiency of education are rather interdependent.

[8] 23.8% of the variation in mathematical achievement is due to the school and 61.6% is due to the individual level.

Table 1: Cross-national variation of education efficiency and equity

	Model 1 (random intercept)	**Model 2 (random slope)**
Constant	435.082*** (0.448)	427.850*** (0.461)
Individual Effects		
Social background (ISEI)	1.391*** (0.007)	1.5592*** (0.007)
Migration background	-6.790*** (0.360)	-6.414*** (0.358)
Females	-11.853*** (0.263)	-12.013*** (0.262)
Random Effects		
Social background (ISEI)		
variance		1.902*** (0.040)
Co-variance		-86.056*** (2.148)
Individual Variance	5525.442*** (70.233)	5132.180*** (65.225)
School Variance	1815.751*** (71.904)	1663.735*** (68.749)
Country-year Variance	1499.687*** (20.589)	5262.305*** (121.096)
N	579038	579038
Number of country-years	98	98
-2loglikelihood	6891225.068	6885501.15 (MW 5 Modelle)

Note: The effects display the mean effects on all 5 plausible values and the adjusted standard errors (cf. OECD 2009: 100). All models calculated using MLWin and RIGLS. The effects display the mean effects on all 5 plausible values and the adjusted standard errors (cf. OECD 2009: 100). Bold effects are significant (***=p>0.01; **=p<0.05).

As a next step, we extended model 2 by introducing measures of deregulation policies – institutional privatization, financial privatization, and school autonomy – at the country-year level (models 3-16 in table 2)[9]. In these models, we respectively added a country-year-level effect of deregulation and a cross-level interaction of this variable with individual social background to assess the degrees of efficiency and equality of education.

[9] Controlling for the degree of liberalization in 2000 to evaluate the effect of change.

Table 2: Effects of liberalization in education on efficiency and equality of education

Model	Measure of deregulation	Effect on mathematical achievement (efficiency)	Interaction of Deregulation and social background of pupils (equality)
	Institutional Privatization		
Model 3	Institutional Privatization	**25.9102*** (2.261)**	**0.1622*** (0.044)**
	Budgeting		
Model 4	Financial Privatization	**-1.2652*** (0.021)**	**-0.001*** (0)**
Model 5	School Autonomy regarding allocation of budget	**0.2946*** (0.019)**	**0.0028*** (0.001)**
Model 6	School Autonomy regarding the budget in general	**0.0524** (0.017)**	**0.004*** (0)**
	School Autonomy Characteristics (Teaching process)		
Model 7	Autonomy regarding the courses offered	**0.6056*** (0.014)**	**0.001*** (0)**
Model 8	Autonomy regarding the course contents	**0.554*** (0.015)**	**0.001*** (0)**
Model 9	Autonomy regarding textbook selection	**0.3386*** (0.016)**	**0.001*** (0)**
Model 10	Autonomy regarding admissions of pupils	**0.1548*** (0.019)**	**0.004*** (0)**
Model 11	Autonomy regarding assessment of pupils	**0.23*** (0.017)**	**0.003*** (0)**
Model 12	Autonomy regarding disciplinary policies	*-0.0206 (n.s.) (0.019)*	**0.004*** (0)**
	School Autonomy Characteristics (Teacher selection and payment)		
Model 13	Autonomy regarding the salaries	**0.0394** (0.013)**	**0.001*** (0)**
Model 14	Autonomy regarding the salary increases	**0.0822*** (0.013)**	0 (0)
Model 15	Autonomy regarding hiring teachers	**0.2276*** (0.012)**	**0.0022*** (0.001)**
Model 16	Autonomy regarding firing teachers	*0.1582 (n.s.) (0.013)*	**0.002*** (0)**

Note: All Models are controlled for ISEI, migration status and gender, effects are not shown here.

Deregulation of Education and Efficiency

According to table 2, deregulation indeed affects the degree of efficiency (in terms of the total achievement) in the OECD member states. All except two measures of deregulation show significant effects on individual achievement. Moreover, all measures of deregulation except financial privatization show positive impacts on achievement. Australia for instance shows high levels of institutional privatization and school autonomy as well as very high levels of educational efficiency (mean of competences per country-

year). Luxembourg on the other hand exhibits low levels of institutional privatization and school autonomy and ranks low on efficiency measures. With regard to financial privatization, the mechanism is vice versa. Australia with low levels of financial privatization ranks high on efficiency, and Luxembourg with moderate to high levels of financial privatization features low levels of efficiency. We can thus conclude that institutional privatization and measures of school autonomy foster educational efficiency in the OECD countries.

Regarding (in-)equality, we found that the higher the degree of deregulation, the higher are the achievement scores of pupils in a country. This strongly confirms our hypothesis (1) that deregulation of school education increases the effectiveness of the learning process. It moreover confirms the finding of Chubb and Moe (1988) that marketization of education not only makes the school managerial output more efficient but also the educational outcomes in terms of pupils' achievements. However, it is striking that financial privatization shows quite contrary effects. The higher the share of private funding is, the lower are pupils' achievement scores. This is particularly remarkable since two other school autonomy measures regarding budgeting actually increase educational achievement (cf. table 2). Indeed, the degrees of institutional and financial privatization in OECD countries in a specific year are only weakly correlated (Pearson's r=0.22). This means that schools should be institutionally private and have great autonomy as regards the teaching process, budgeting, and teacher selection and payments, but that they should still receive their budget from public sources. However, it is possible that the effect of financial privatization interacts with the general degree of institutional privatization and school autonomy. More precisely, it may be that private funding is only harmful when the state holds a strong monopoly on education in general – mainly in the form of public schools – and only weak autonomy regarding budgeting. Interactions between the effects of private funding and the strength of the private school sector or the autonomy regarding budgeting indeed show that the negative effect of private funding is far stronger when institutional privatization and budget autonomy are weak (cf. appendix 6 and 7). This is the case in Luxembourg (low level of efficiency) where a centralized school autonomy controls private funding. By contrast, South Korea possesses a high level of efficiency even though both, institutional and financial privatization, are high. In summary, raw financial privatization (e.g. to disburden public households) will lead to a less efficient education system. Only in combination with strong institutional privatization where budget autonomy rests with the schools will the negative effects of financial privatization on efficiency decrease. Governmental control over private money will lead to a strongly inefficient school system. Thus, deregulation of school education can definitely be recommended with regard to institutional privatization and school autonomy.

Deregulation and Social Inequality of Education

So far, we have focused on the relationship between deregulation and educational efficiency. But how does deregulation of education affect the degree of social inequality in education? In a next step, we analyze whether the positive effects of deregulation on individual's educational achievement varies according to social status. The models in appendices 8-21 confirm the results of models 3-16 (table 2, column 3) and show that all but one deregulation policies mold the degree of social inequality in education. According to Brambor (2005), only the marginal effects of deregulation on the mathematic achievement in different social classes identify the actual interaction between these two factors. Primarily, the figures show that all pupils are positively affected by most of the deregulation policies. Only financial privatization (figure 9) and the autonomy regarding the courses offered at school (figure 10) negatively affect educational achievement. This shows that deregulation policies do not have contradictory effects on educational achievement for students with different social backgrounds.

However, the figures also show that the strength of the effects varies according to social status. Only autonomy regarding the increase of teachers' salaries raises educational achievement equally for all students. With respect to institutional privatization and the measures of autonomy regarding budgeting, course contents, textbook selection, admission fees, student assessment, disciplinary policies, teachers' salaries, as well as hiring and firing of teachers, students with higher social status benefit more strongly from these policies than lower status students. Therefore, in Australia (strong institutional privatization), Belgium (strong financial privatization), and the Netherlands (strong school autonomy), students with higher status benefit stronger from deregulation than students with lower status. However, considering the degrees of social inequality in specific countries, the picture is not as clear since countries as Australia, Belgium, and the Netherlands show very different degrees of inequality. There are also several countries with low degrees of institutional privatization and autonomy and high degrees of inequality (Germany). Furthermore countries like Japan, South Korea, or Australia rank low on social inequality but high on institutional privatization. This confirms that the actual level of inequality does not tell us anything about whether higher social classes benefit stronger from deregulation than lower social classes. This confirms our hypotheses 2a-c that deregulation increases the degree of social inequality in education. Although all students benefit from deregulation, higher status students benefit to a remarkably higher degree. With regard to financial privatization and autonomy regarding the course supply, we can conclude that these deregulation policies may even cushion the degree of inequality. The negative effect of financial privatization on educational achievement is less strong for pupils with lower social status. Financial privatization is much more disadvantageous for students with higher status. Thus financial privatization may decrease inequality by impeding the achievement of the higher social classes. Fur-

thermore, the positive effect of autonomy regarding the course supply more strongly affects the lower social classes, thereby causing a reduction of social inequality in education.

To sum up, most of the deregulation policies foster inequality of education since students with higher social status benefit significantly more than lower status students. Only the school autonomy regarding the course supply is more advantageous for lower status groups than for students with higher status. Furthermore, financial privatization may reduce inequality by adversely affecting pupils from higher status groups.

CONCLUSION

The central question of this article was how deregulation of compulsory education affects efficiency and equality of education. The conflict between centralized regulation on the one hand and the market model on the other hand describes one of the most fundamental political struggles. Liberals and socialists have genuinely different expectations regarding the outcomes of a retreat of the state in the field of education. From a liberal perspective, deregulation of education is assumed to be socio-economically more efficient (cf. Chubb and Moe 1988). By contrast, according to socialist ideas, deregulation of education and the retreat of public education is often claimed to foster social inequality in education (Weiß 1986: 159; Meier, Polinard et al. 2000; Campbell 2005). The rationales of our hypotheses mainly depend on these expectations. Therefore, we expect a deregulation of education to encourage an efficiency-versus-equality trade-off. While a stronger market dependency in education should increase educational efficiency, it is also expected to produce higher degrees of inequality in education.

In several fields of societal life, such as compulsory education, the state traditionally holds a strong monopoly almost in all capitalist societies, with private actors playing only a minor role. However, we have shown that the extent of deregulation varies in kind and degree among the OECD member states. In our analysis, we have focused on three aspects of deregulation: institutional privatization, financial privatization, and school autonomy. We can indeed show that deregulation can occur in very different ways. Moreover, different kinds of deregulation are rather uncorrelated as, for example, institutional and financial privatization. Beyond that, different kinds of deregulation also have different impacts on efficiency and equality of education.

In line with the Coleman-Hoffer thesis (1982), our results elucidate that deregulation of education – at least institutional privatization and school autonomy – increases educational achievement of all students, thereby fostering the educational efficiency of the national education systems. Nevertheless, it becomes also evident that higher status groups benefit more strongly from deregulation, thereby raising the degree of educational inequality. These results indeed confirm that deregulation of education provokes

an efficiency-versus-equality trade-off in national education systems. Even in the case of financial privatization we can observe an efficiency-versus-equality trade-off. While financial privatization rather lowers efficiency, it seems to decrease the achievement gap between the rich and the poor: The negative effect of financial privatization is weaker for pupils from lower social backgrounds. We can conclude that a retreat of the state from public education entails stronger inequality structures on a higher general level of education. This in turn means that it still remains a normative question whether one prefers equality on a lower general level of education or a higher level of education at the expense of a higher degree of inequality. These preferences will probably mainly depend on moral principles, i.e. education as a civil right (de-commodification and centralization) versus individual freedom (marketization and autonomy). One shortcoming in our paper is surely that we did not test net effects of variables at the county-year-level, but only bivariate associations, plus each cross-level interaction. Further research should be based on an even larger database and try to separate the net effects of each indicator of deregulation.

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Appendix 1: Share of Private schools in OECD countries in percent

Country	**Share private schools (%) 2000**	**Share private schools (%) 2003**	**Share private schools (%) 2006**	**Change 2000 to 2006 (in percentage points)**
AUS	30.6	29.0	29.9	-0.6
AUT	9.6	missing	missing	missing
BEL	12.4	11.2	14.7	2.3
CAN	10.0	8.3	11.0	1.0
CHE	6.1	4.7	4.8	-1.4
CHL	30.1	missing	29.8	-0.3
CZE	5.1	5.3	4.1	-0.9
DEU	2.7	3.9	4.4	1.6
DNK	5.8	6.9	8.6	2.8
ESP	17.1	14.5	15.0	-2.1
FIN	0.2	0.2	0.2	0.1
FRA	24.6	missing	missing	missing
GBR	10.2	6.6	7.1	-3.1
GRC	16.3	12.2	18.5	2.3
HUN	12.4	8.9	9.5	-3.0
IRL	8.9	7.0	9.1	0.2
ISL	0.6	0.4	0.6	0.0
ITA	24.9	27.8	30.9	6.0
JPN	27.5	25.8	29.3	1.8
KOR	50.9	48.0	52.6	1.7
LUX	0.0	2.7	2.2	2.2
LVA	4.4	3.7	3.8	-0.6
MEX	62.8	60.6	51.8	-11.0
NLD	5.3	4.4	3.7	-1.6
NOR	0.5	0.4	0.3	-0.2
NZL	19.7	22.2	22.8	3.1
POL	7.7	4.0	3.6	-4.1
PRT	12.1	16.0	16.0	3.8
ROU	5.4		6.6	1.1
SVK	missing	7.5	5.0	missing
SWE	0.1	0.2	0.1	0.0
TUR	missing	44.7	44.6	missing
USA	8.3	12.4	12.4	4.1
EST	missing	missing	2.2	missing
LTU	missing	missing	2.0	missing
SVN	missing	missing	5.8	missing
Minimum	0.0	0.2	0.1	-11.0
Maximum	62.8	60.6	52.6	6.0
Mean	13.9	13.8	13.6	0.2

Note: Aggregated Data of the PISA school level data.

Appendix 2: Mean share of Private funding schools receive in OECD countries (in percent)

Country	Share private funding (%) 2000	Share private funding (%) 2003	Share private funding (%) 2006	Change 2000-2006 (in percent-age points)
AUS	Missing	0.0	Missing	Missing
AUT	12.7	8.0	9.3	-3.4
BEL	73.8	68.1	68.7	-5.1
CAN	Missing	6.7	7.3	Missing
CHE	6.4	5.5	5.0	-1.4
CHL	45.5	Missing	56.6	11.1
CZE	6.0	6.6	6.6	0.6
DEU	4.4	7.4	5.7	1.3
DNK	24.7	20.5	24.0	-0.7
ESP	39.3	36.0	35.4	-3.9
FIN	2.8	6.6	3.0	0.2
FRA	21.6	0.0	Missing	Missing
GBR	8.6	6.1	7.6	-1.0
GRC	7.2	4.1	5.2	-2.0
HUN	5.3	11.3	16.3	11.0
IRL	60.9	61.0	60.3	-0.6
ISL	0.8	0.4	1.1	0.3
ITA	5.8	4.7	3.9	-1.9
JPN	30.2	27.3	30.9	0.7
KOR	52.3	55.9	46.3	-6
LUX	12.1	14.1	14.4	2.3
LVA	0.7	1.0	0.0	-0.7
MEX	15.4	14.9	15.0	-0.4
NLD	73.5	74.5	67.7	-5.8
NOR	1.4	0.9	1.9	0.5
NZL	4.6	4.7	5.7	1.1
POL	2.9	0.7	1.6	-1.3
PRT	7.3	6.2	10.2	2.9
ROU	0.9	Missing	0.0	-0.9
SVK	Missing	12.0	7.7	Missing
SWE	3.4	4.4	8.3	4.9
TUR	Missing	3.4	2.3	Missing
USA	6.6	5.1	7.8	1.2
EST	Missing	Missing	1.9	Missing
LTU	Missing	Missing	0.7	Missing
SVN	Missing	Missing	2.3	Missing
Minimum	0.7	0.0	0.0	-0.7
Maximum	73.8	74.5	68.7	-5.1
Mean	18.5	15.4	15.9	-2.6

Note: Aggregated Data of the PISA school level data.

Appendix 3: Degrees of autonomy 2000[10]

Country	A	B	C	D	E	F	G	H	I	J	K	L	Mean
AUS	52.4	52.4	52.4	52.4	52.4	52.4	52.4	52.4	52.4	64.0	52.4	52.4	53.4
AUT	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	41.3	25.0	25.0	26.4
BEL	97.3	97.3	97.3	97.3	97.3	97.3	97.3	97.3	97.3	97.7	97.3	97.3	97.3
CAN	67.1	67.1	67.1	67.1	67.1	67.1	67.1	67.1	67.1	86.6	67.1	67.1	68.7
CHE	89.4	89.4	89.4	89.4	89.4	89.4	89.4	89.4	89.4	95.6	89.4	89.4	89.9
CHL	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	52.6	49.5	49.5	49.8
CZE	96.7	96.7	96.7	96.7	96.7	96.7	96.7	96.7	96.7	97.5	96.7	96.7	96.7
DEU	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	24.5	9.0	9.0	10.3
DNK	68.2	68.2	68.2	68.2	68.2	68.2	68.2	68.2	68.2	97.6	68.2	68.2	70.7
ESP	38.7	38.7	38.7	38.7	38.7	38.7	38.7	38.7	38.7	37.7	38.7	38.7	38.6
FIN	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9	61.3	39.9	39.9	41.7
FRA	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	21.9	6.0	6.0	7.4
GBR	88.8	88.8	88.8	88.8	88.8	88.8	88.8	88.8	88.8	99.3	88.8	88.8	89.7
GRC	81.2	81.2	81.2	81.2	81.2	81.2	81.2	81.2	81.2	85.4	81.2	81.2	81.6
HUN	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.9	99.9	100.0	99.9	99.9	100.0
IRL	74.7	74.7	74.7	74.7	74.7	74.7	74.7	74.7	74.7	88.6	74.7	74.7	75.8
ISL	95.3	95.3	95.3	95.3	95.3	95.3	95.3	95.3	95.3	99.7	95.3	95.3	95.7
ITA	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.3	10.9	10.9	10.9
JPN	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2	33.2	34.6	33.2	33.2	33.3
KOR	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	32.3	22.1	22.1	23.0
LUX	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LVA	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	100.0	99.0	99.0	99.1
MEX	47.9	47.9	47.9	47.9	47.9	47.9	47.9	47.9	47.9	60.2	47.9	47.9	48.9
NLD	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
NOR	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing
NZL	99.3	99.3	99.3	99.3	99.3	99.3	99.3	99.3	99.3	100.0	99.3	99.3	99.4
POL	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing
PRT	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	20.6	7.1	7.1	8.3
ROU	76.1	76.1	76.1	76.1	76.1	76.1	76.1	76.1	76.1	16.1	76.1	76.1	71.1
SVK	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing
SWE	86.0	86.0	86.0	86.0	86.0	86.0	86.0	86.0	86.0	100.0	86.0	86.0	87.2
TUR	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing
USA	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
EST	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing
LTU	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing
SVN	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing
Mean	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7	60.7	66.4	60.7	60.7	61.2
Max.	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Note: Aggregated Data of the PISA school level data (mean over all schools per country).

[10] A= Courses offered, B= Course content , C= Textbook selection , D=Admission, E= Student assessment , F= Disciplinary policy , G= Budget allocation , H= budget , I= Salary increase , J= hiring , K= firing , L= salary.

Appendix 4: Degrees of autonomy 2003[11]

Country	A	B	C	D	E	F	G	H	I	J	K	L	Mean
AUS	99.5	88.1	99.9	95.3	99.2	100.0	100.0	91.5	25.1	69.8	55.0	23.3	78.9
AUT	75.2	76.4	98.8	77.0	81.3	99.3	97.7	22.0	0.9	34.6	17.2	0.9	56.8
BEL	81.9	68.4	99.0	93.3	97.2	99.6	96.5	85.7	0.0	86.3	87.1	0.1	74.6
CAN	95.5	58.0	91.4	92.7	95.2	99.9	98.7	81.7	42.6	86.5	65.4	42.5	79.2
CHE	73.9	69.0	81.4	80.5	88.4	99.9	96.3	79.4	19.5	98.2	90.1	16.2	74.4
CHL	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing
CZE	91.0	90.9	100.0	98.2	99.4	100.0	97.8	93.2	79.6	100.0	100.0	80.0	94.2
DEU	89.4	70.5	100.0	91.0	95.9	99.1	98.0	15.7	22.2	36.4	12.9	1.7	61.1
DNK	91.7	89.5	99.7	89.1	89.5	98.4	99.5	93.8	45.0	98.5	75.3	28.6	83.2
ESP	61.6	70.8	100.0	75.0	96.2	98.8	99.0	86.7	6.9	36.0	36.2	6.5	64.5
FIN	99.8	92.0	100.0	71.2	99.0	99.9	99.9	80.5	5.9	70.1	35.6	10.1	72.0
FRA	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing
GBR	100.0	98.4	100.0	71.4	100.0	100.0	99.9	90.7	87.1	99.1	92.1	85.6	93.7
GRC	1.8	1.3	3.7	100.0	3.8	100.0	100.0	100.0	2.0	3.9	3.9	2.0	35.2
HUN	88.5	89.1	100.0	99.7	100.0	100.0	97.9	93.9	57.9	100.0	99.1	45.3	89.3
IRL	97.2	53.2	100.0	95.9	98.2	100.0	96.3	81.6	4.7	90.4	74.1	4.7	74.7
ISL	88.9	87.1	99.6	82.7	100.0	100.0	98.1	93.9	49.5	100.0	99.6	24.4	85.3
ITA	89.3	84.4	100.0	91.4	99.8	99.9	99.0	27.6	1.9	8.0	7.8	2.3	59.3
JPN	99.4	100.0	97.6	100.0	100.0	100.0	96.0	56.5	32.0	31.7	29.4	26.5	72.4
KOR	98.4	99.1	100.0	93.1	99.3	100.0	96.1	92.8	7.7	33.2	18.5	15.5	71.2
LUX	5.1	5.1	5.1	100.0	5.1	100.0	100.0	100.0	5.1	5.1	94.9	5.1	44.2
LVA	88.4	79.5	100.0	99.5	97.3	100.0	95.4	87.7	59.2	99.2	100.0	46.1	87.7
MEX	72.2	70.5	84.9	83.4	96.1	99.6	86.0	85.6	45.0	81.7	70.6	48.3	77.0
NLD	100.0	100.0	100.0	99.2	98.8	99.5	98.8	99.5	73.1	99.5	99.3	91.3	96.6
NOR	40.6	65.8	98.3	30.0	74.0	94.3	99.5	77.6	24.1	70.4	52.3	2.6	60.8
NZL	100.0	99.4	100.0	90.0	98.9	100.0	100.0	99.3	37.5	100.0	99.2	21.7	87.2
POL	59.9	100.0	100.0	98.7	100.0	100.0	92.8	42.1	17.3	100.0	100.0	25.4	78.0
PRT	60.9	43.5	100.0	92.9	69.4	70.6	92.4	90.8	0.9	11.7	8.6	0.9	53.6
ROU	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing
SVK	82.7	79.9	98.0	97.4	92.7	99.6	97.8	88.4	66.0	100.0	100.0	67.6	89.2
SWE	79.9	96.0	100.0	66.5	100.0	100.0	98.8	91.6	91.9	100.0	87.7	74.3	90.6
TUR	51.0	38.7	97.8	76.8	93.6	98.9	68.4	54.6	5.9	7.6	7.1	6.9	50.6
USA	98.3	88.5	96.1	79.2	93.3	98.6	95.3	89.9	78.2	99.0	96.6	78.1	90.9
EST	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing
LTU	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing
SVN	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing	miss-ing
Mean	78.7	75.1	91.7	87.0	88.7	98.5	96.4	79.1	33.2	68.6	63.9	29.5	74.2
Max.	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	91.9	100.0	100.0	91.3	96.6
Min.	1.8	1.3	3.7	30.0	3.8	70.6	68.4	15.7	0.0	3.9	3.9	0.1	35.2

Note: Aggregated Data of the PISA school level data.

[11] A= Courses offered, B= Course content , C= Textbook selection , D=Admission, E= Student assessment , F= Disciplinary policy , G= Budget allocation , H= budget , I= Salary increase , J= hiring , K= firing , L= salary.

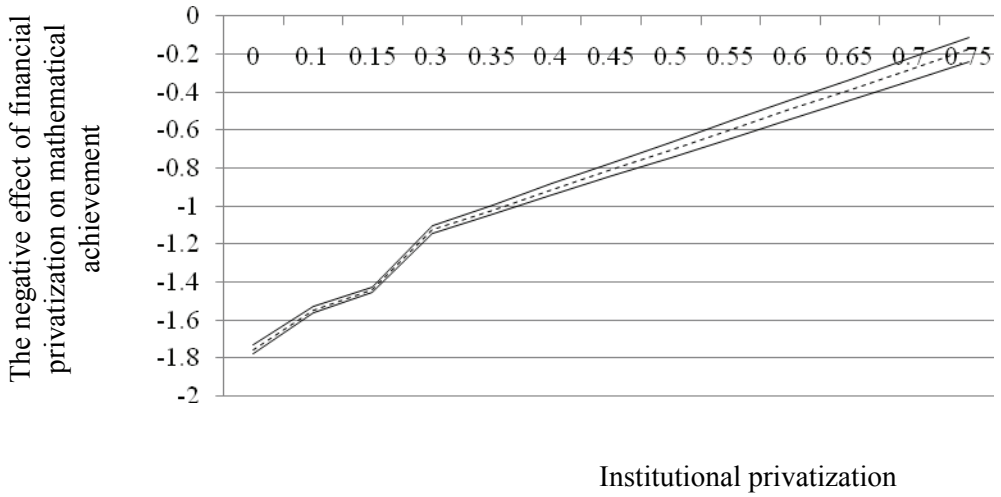
Appendix 5: Degrees of autonomy 2006[12]

Country	A	B	C	D	E	F	G	H	I	J	K	L	Mean
AUS	98.3	81.8	99.4	95.8	96.5	98.6	99.0	88.7	23.2	73.6	44.9	17.8	76.5
AUT	80.1	77.1	98.3	86.5	72.1	98.5	96.3	20.1	0.0	32.1	21.9	0.9	57.0
BEL	82.9	63.1	98.4	89.9	94.1	95.9	87.0	76.3	1.1	86.6	78.9	1.1	71.3
CAN	90.9	51.4	77.6	88.1	77.8	87.3	89.9	63.7	21.7	79.8	44.6	19.6	66.0
CHE	66.1	58.1	75.2	85.9	74.1	95.6	92.9	74.8	20.9	93.4	84.1	13.5	69.6
CHL	89.5	66.0	94.0	95.2	90.5	97.1	86.2	67.4	47.8	59.4	56.8	50.7	75.1
CZE	99.5	96.4	90.9	100.0	95.9	100.0	99.0	89.7	88.5	100.0	100.0	90.8	95.9
DEU	89.7	60.9	94.4	92.8	85.4	95.1	95.0	87.1	8.7	42.9	16.4	5.0	64.4
DNK	78.2	75.0	82.5	78.2	75.1	82.9	82.9	79.2	31.7	80.9	56.0	29.8	69.4
ESP	57.3	57.0	97.8	61.1	80.7	96.3	96.8	85.3	8.7	34.5	34.4	8.8	59.9
FIN	92.6	70.1	100.0	76.7	98.3	98.5	98.6	67.3	9.0	63.4	31.2	10.3	68.0
FRA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GBR	92.0	86.5	91.0	71.8	91.3	91.6	91.5	80.1	82.4	91.5	85.8	74.8	85.9
GRC	9.1	1.5	5.4	71.3	23.6	88.7	59.1	66.8	2.7	5.2	5.2	1.0	28.3
HUN	89.7	85.3	95.9	96.3	97.5	97.6	95.1	87.3	66.7	98.3	97.4	59.0	88.8
IRL	97.0	58.9	98.2	97.4	97.1	98.2	95.9	74.4	4.7	81.3	70.9	6.2	73.3
ISL	63.3	62.5	84.5	81.2	93.8	95.4	84.8	68.0	13.9	95.3	87.6	11.1	70.1
ITA	78.1	78.8	96.0	94.0	94.6	96.9	91.5	30.3	2.8	21.8	13.0	2.8	58.4
JPN	96.8	97.8	95.2	100.0	99.8	100.0	92.5	44.9	33.4	33.5	33.5	32.3	71.6
KOR	96.7	98.2	100.0	91.3	85.1	95.0	93.6	79.8	7.3	43.5	39.1	16.4	70.5
LUX	42.1	40.3	43.2	96.1	25.4	91.7	100.0	84.8	12.6	60.5	47.3	12.6	54.7
LVA	86.8	52.7	98.5	97.9	90.2	100.0	31.7	93.1	41.3	100.0	100.0	38.6	77.6
MEX	19.1	24.6	66.4	73.8	70.0	94.7	85.4	59.1	21.2	51.5	36.8	22.3	52.1
NLD	94.9	92.8	99.5	98.8	97.7	99.5	99.5	98.5	69.1	100.0	99.5	81.2	94.2
NOR	46.1	59.6	97.4	53.4	58.7	92.1	95.9	71.7	21.9	72.2	49.7	14.4	61.1
NZL	95.7	91.7	95.2	92.4	95.1	95.7	95.2	92.1	33.6	95.2	92.9	14.5	82.4
POL	70.4	99.4	99.4	98.5	99.4	99.4	63.6	41.5	22.1	99.1	97.8	26.6	76.4
PRT	76.1	46.8	99.0	89.6	70.2	74.6	79.3	82.3	4.6	21.9	10.7	4.5	55.0
ROU	77.7	44.1	91.7	27.2	59.3	99.3	45.3	63.0	10.4	8.9	21.7	8.1	46.4
SVK	77.5	63.1	88.6	100.0	85.5	97.8	96.5	82.8	51.2	99.8	99.8	59.3	83.5
SWE	73.7	91.4	99.5	77.0	95.0	99.4	98.2	87.6	92.8	99.5	77.4	77.9	89.1
TUR	42.2	10.6	72.8	83.1	50.1	41.7	71.1	69.0	2.3	6.0	3.8	3.8	38.0
USA	96.8	88.7	98.1	90.0	92.6	98.2	96.0	95.6	91.8	98.1	98.6	89.4	94.5
EST	97.7	96.9	98.1	99.5	97.5	100.0	97.3	93.3	63.5	98.3	98.9	34.2	89.6
LTU	93.8	81.4	98.0	97.6	95.2	98.4	78.6	68.2	17.1	97.5	98.3	19.3	78.6
SVN	73.1	63.3	94.4	77.7	76.7	99.2	97.3	75.2	31.4	99.6	94.5	12.6	74.6
Mean	75.3	65.9	86.5	83.5	80.0	91.4	85.0	71.9	29.5	67.4	59.1	27.0	68.5
Max.	99.5	99.4	100.0	100.0	99.8	100.0	100.0	98.5	92.8	100.0	100.0	90.8	95.9
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

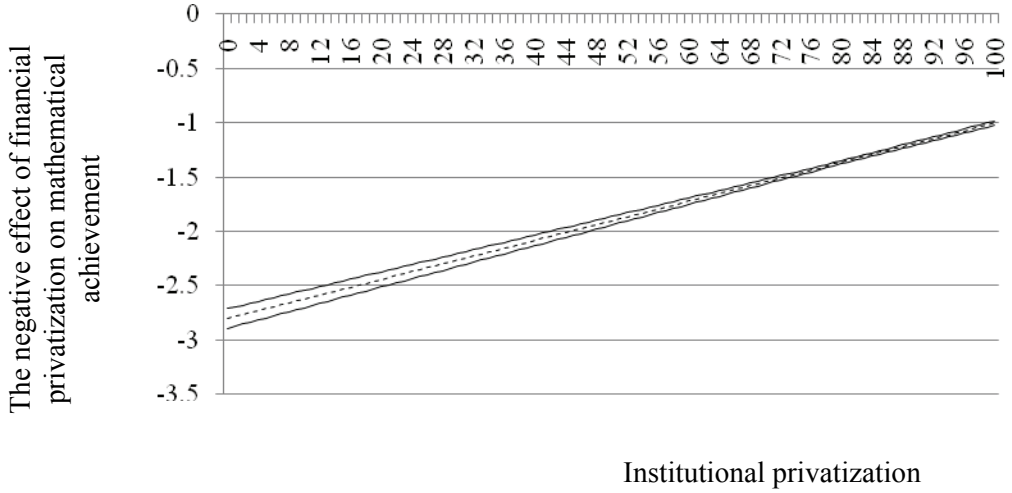
Note: Aggregated Data of the PISA school level data.

[12] A= Courses offered, B= Course content , C= Textbook selection , D=Admission, E= Student assessment , F= Disciplinary policy , G= Budget allocation , H= budget , I= Salary increase , J= hiring , K= firing , L= salary.

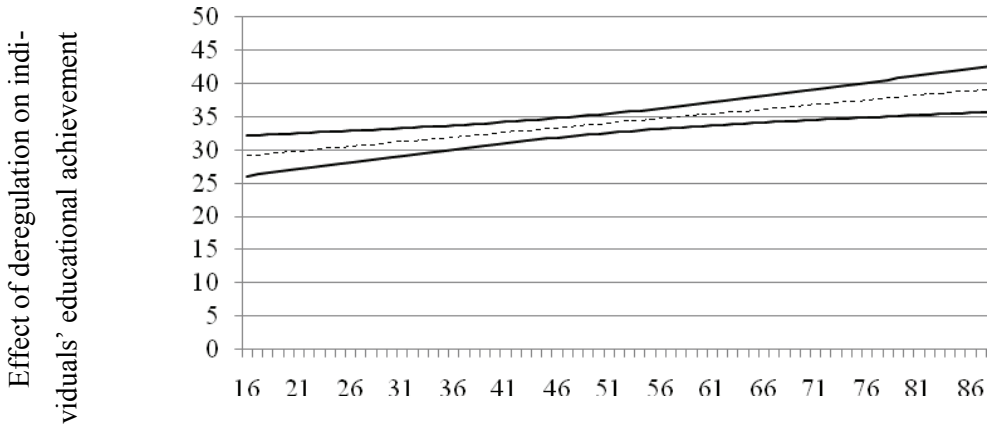
Appendix 6: The negative Effect of Funding privatization depending on the degree of Institutional Privatization



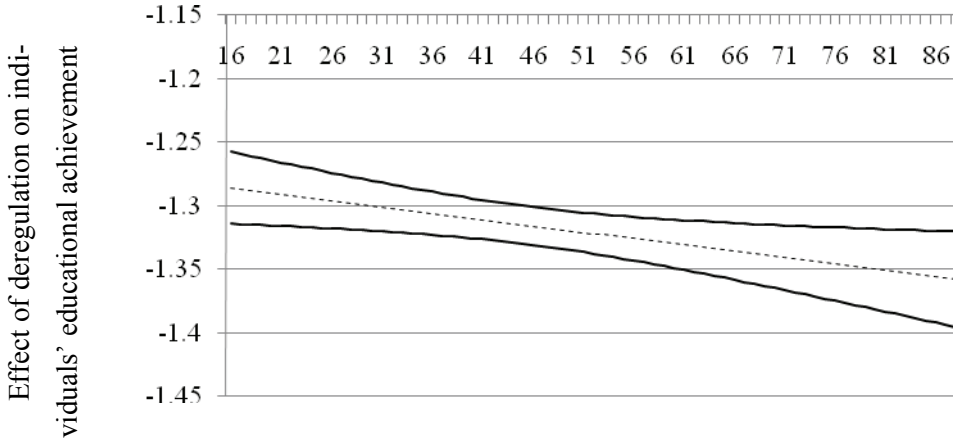
Appendix 7: The negative Effect of Funding privatization depending on the degree of School autonomy regarding budgeting



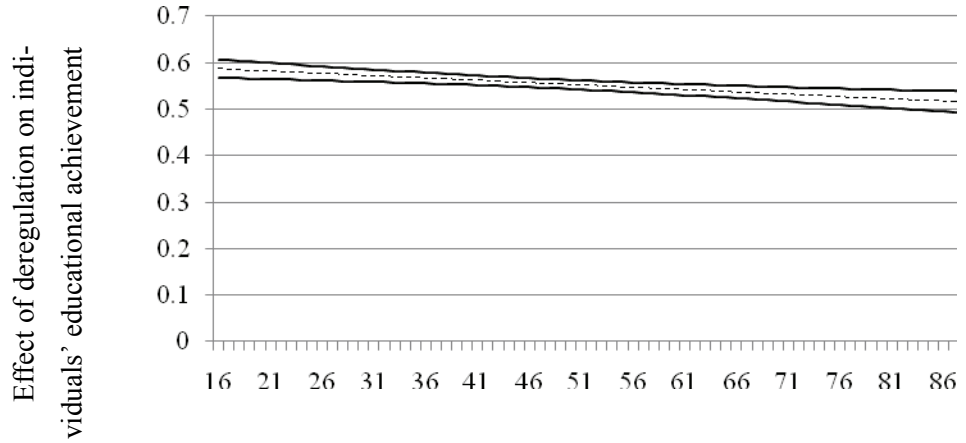
Appendix 8: Marginal effects of institutional privatization on educational achievement of pupils from different social classes.



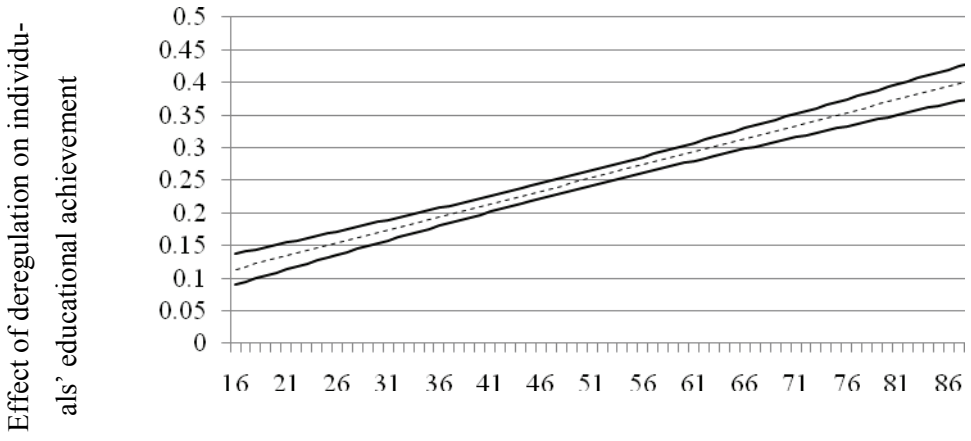
Appendix 9: Marginal effects of financial privatization on educational achievement of pupils from different social classes.



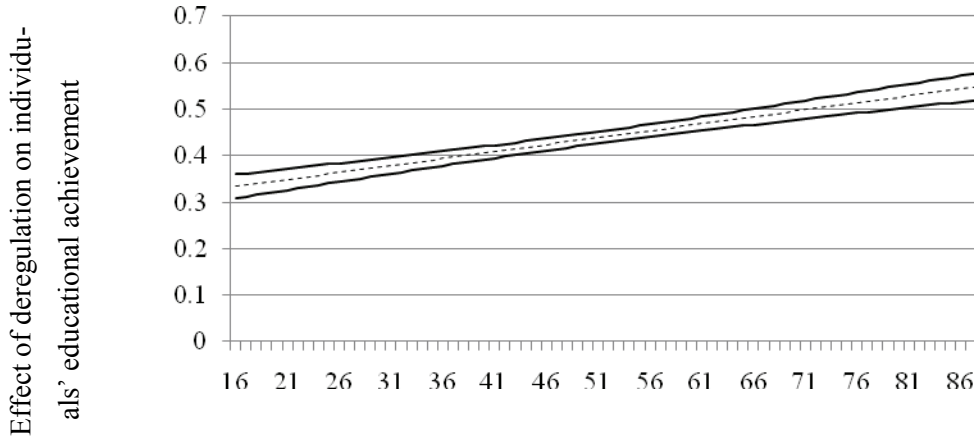
Appendix 10: Marginal effects of school autonomy regarding the courses offered on educational achievement of pupils from different social classes.



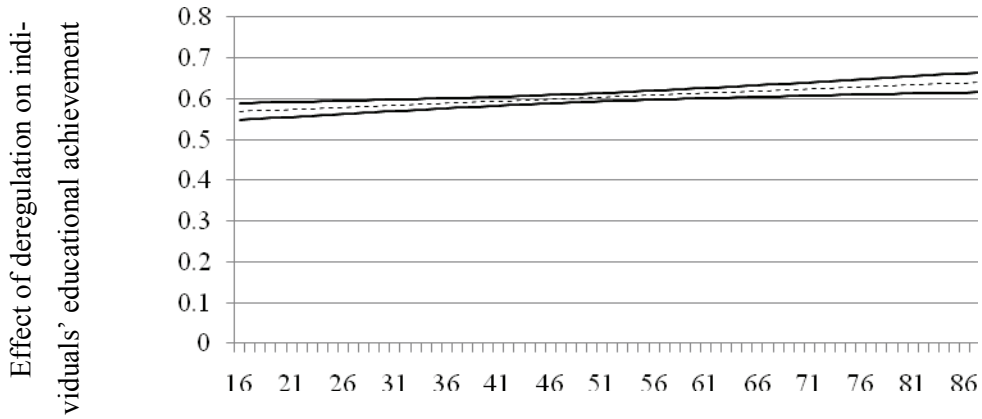
Appendix 11: Marginal Effects of school autonomy regarding budgeting on Educational Achievement of pupils from different social classes.



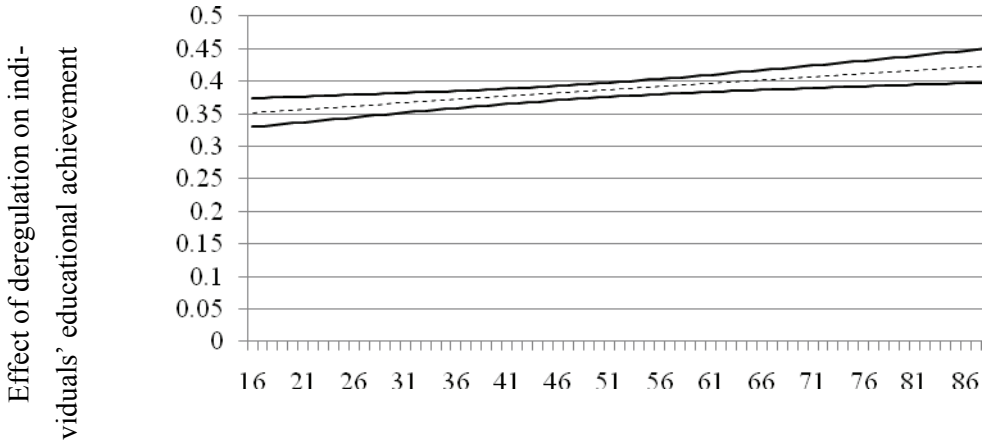
Appendix 12: Marginal Effects of school autonomy regarding budget allocation on Educational Achievement of pupils from different social classes.



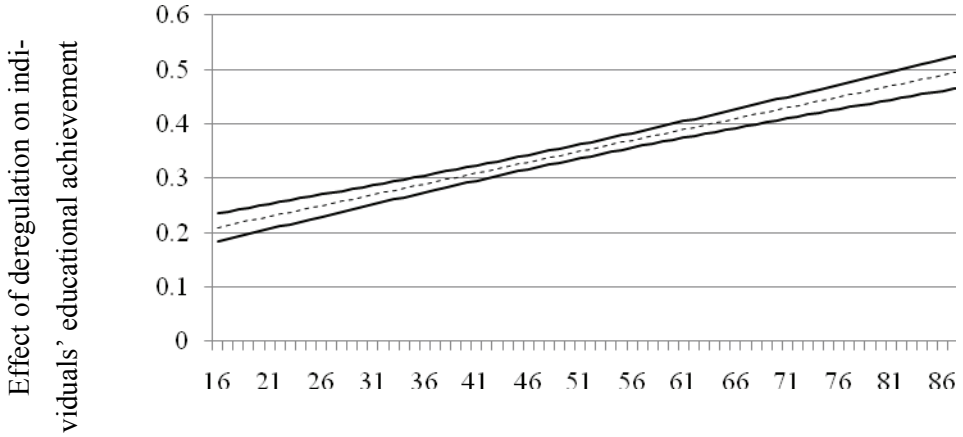
Appendix 13: Marginal effects of school autonomy regarding course contents on educational achievement of pupils from different social classes.



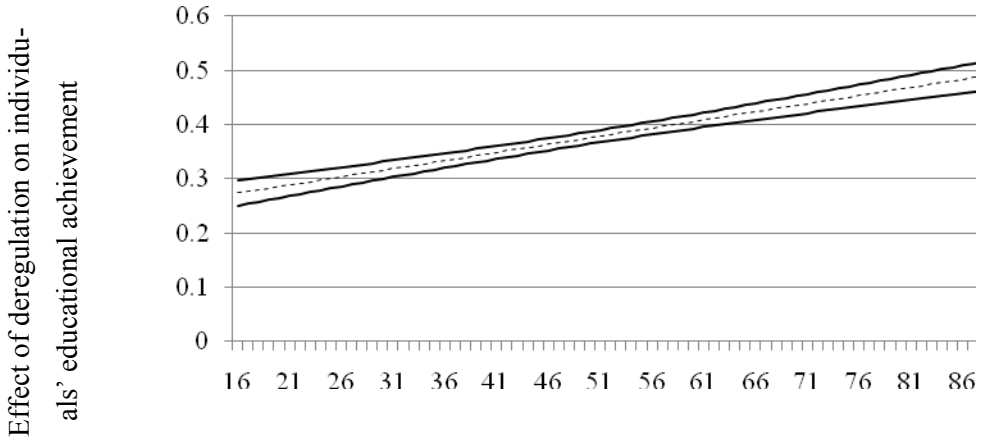
Appendix 14: Marginal effects of school autonomy regarding textbook selection on educational achievement of pupils from different social classes.



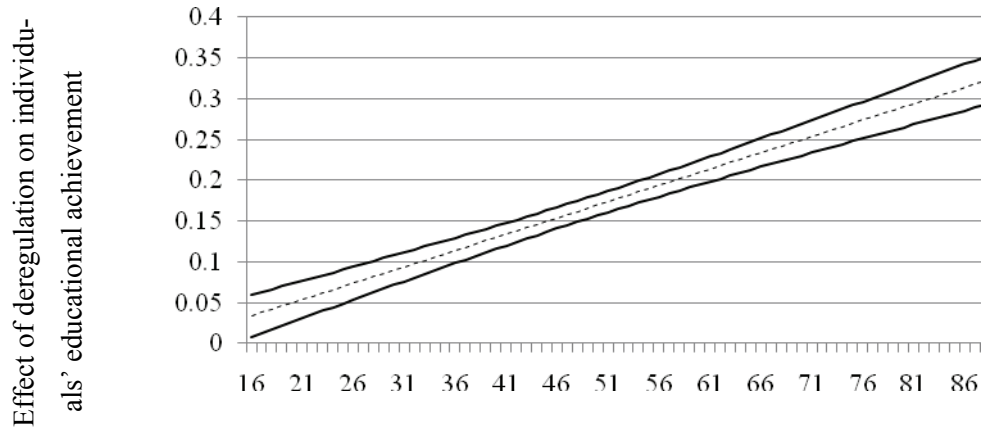
Appendix 15: Marginal effects of school autonomy regarding school admissions on educational achievement of pupils from different social classes.



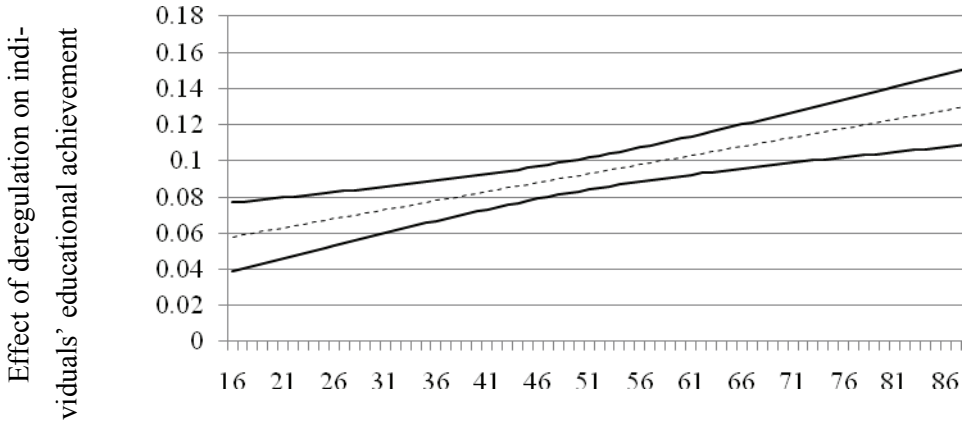
Appendix 16: Marginal effects of school autonomy regarding student assessment on educational achievement of pupils from different social classes.



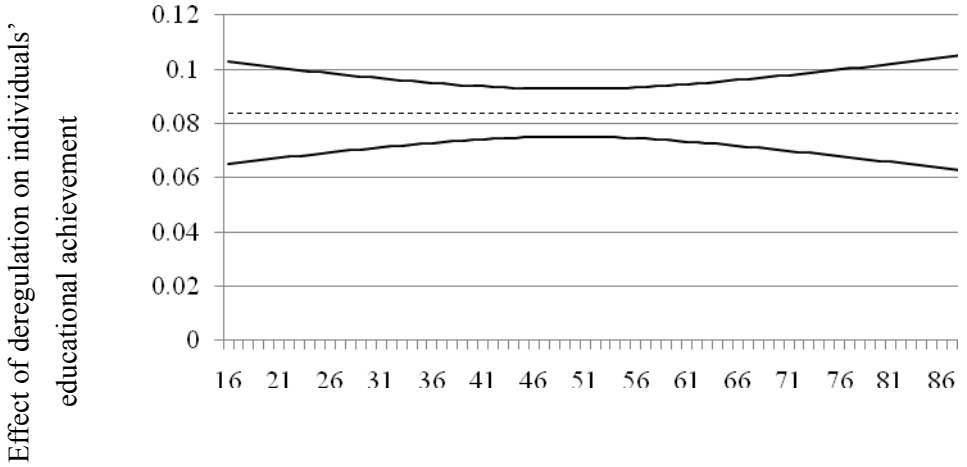
Appendix 17: Marginal effects of school autonomy regarding disciplinary policies on educational achievement of pupils from different social classes.



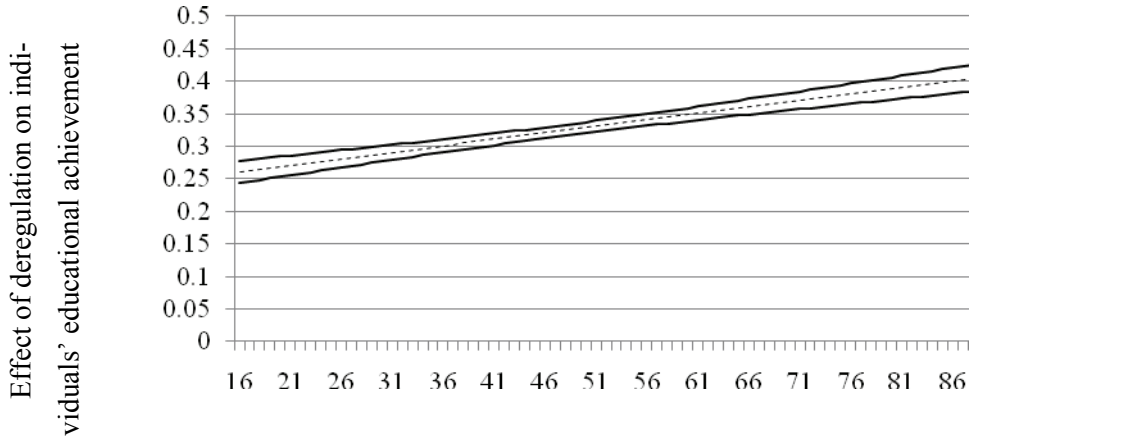
Appendix 18: Marginal effects of school autonomy regarding teachers' salaries on educational achievement of pupils from different social classes.



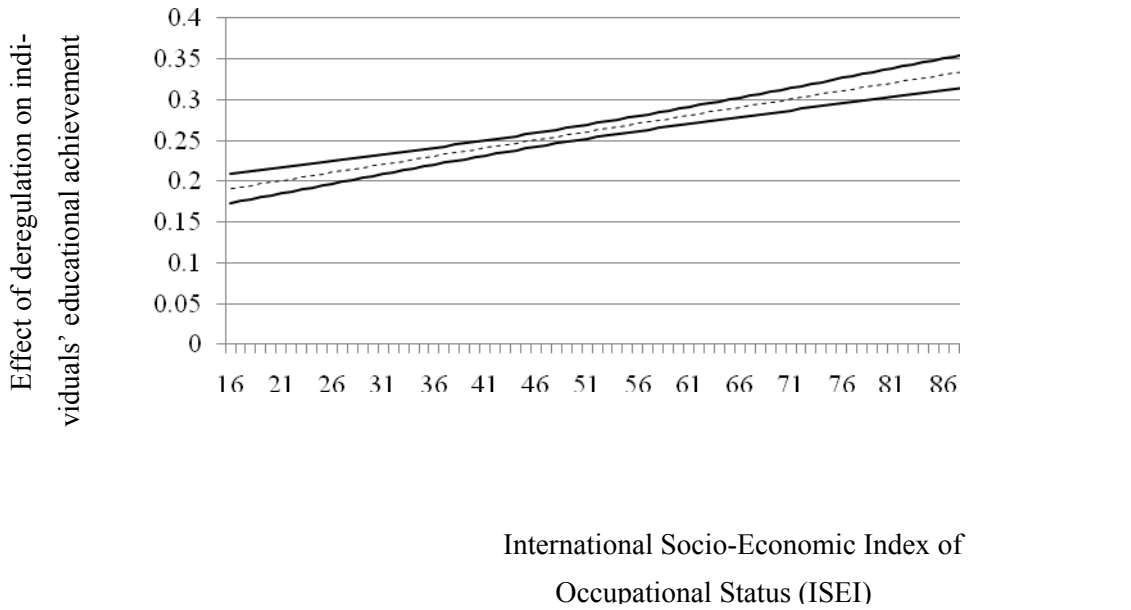
Appendix 19: Marginal effects of school autonomy regarding teachers' salary increases on educational achievement of pupils from different social classes.



Appendix 20: Marginal effects of school autonomy regarding hiring teachers on educational achievement of pupils from different social classes.



Appendix 21: Marginal effects of school autonomy regarding firing teachers on educational achievement of pupils from different social classes.



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