UNIVERSITÄT LEIPZIG

Wirtschaftswissenschaftliche Fakultät
Faculty of Economics and Management Science

Working Paper, No. 89

Philipp Mandel/
Bernd Süssmuth

Size Matters. The Relevance and Hicksian Surplus of Agreeable College Class Size

Juli 2010

ISSN 1437-9384

Size Matters.

The Relevance and Hicksian Surplus of Agreeable College Class Size

Philipp Mandel [a] and Bernd Süssmuth [a b]

[a] *University of Leipzig**

[b] *CESifo Munich*

Abstract

The contribution of this paper is twofold. First, we examine the impact of class size on student evaluations of instructor performance using a sample of approximately 1,400 economics classes held at the University of Munich from Fall 1998 to Summer 2007. Controlling for both instructor and course fixed effects, we offer confirmatory evidence for the recent finding of a large, highly significant, and nonlinear negative impact of class size on student evaluations of instructor effectiveness that is robust to the inclusion of course and instructor fixed effects. Beyond that, we run a survey based on the contingent valuation method and a representative sample of all Munich students of management science to quantify the welfare surplus of an agreeable class size. We find the average monetary value of the surplus to lie between 5 and 300 Euros per semester and student. Overall, Hicksian and Marshallian surpluses can reach substantial values of 0.5 to 0.8 million Euros per semester.

JEL classification: I21, I23, C83

Keywords: Class size; Student evaluation; Contingent valuation method

*Correspondence: Department of Economics, University of Leipzig, Grimmaische Str. 12, D-04109 Leipzig, Germany; Email: `mandel@wifa.uni-leipzig.de`, `suessmuth@wifa.uni-leipzig.de`

We thank Pia Montag, Fabian Feierabend, and Constantin Tabor for assistance in assembling the data and Christa Hainz for providing us with some part of the instructional evaluation data. We would also like to thank Marco Sunder and participants of seminars at the University of Munich and the University of Leipzig for many valuable comments and suggestions.

1 Introduction

Although there has been made some recent progress (Bedard and Kuhn 2008, Kokkelenberg *et al.* 2008, Westerlund 2008), college courses still represent a relatively novel laboratory from which to infer class size effects. We subscribe to the view of Bedard and Kuhn (2008) that summarizes the abundant wealth of literature on class size, referring to the comprehensive reviews by Hanushek (2003) and Krueger (2003), in two central insights: (i) results can depend considerably on econometric specification, and (ii) the profession has not yet reached a consensus estimate of the impact of class size on student performance. Bedard and Kuhn (2008) are the first to show that (i) does, in contrast to results for test-based outcomes at both primary/secondary and college level, not apply to the result of a large negative impact of class size on instructor effectiveness as measured by college-level course evaluations. In the literature analyzing introductory and intermediate college economics courses, there is rather mixed evidence for the relationship between class size and student performance: Little or no evidence is found by Saunders (1980) and Kennedy and Siegfried (1997) using scores on the U.S. TUCE (Test of Understanding College Economics) exam, while Lopus and Maxwell (1995) and Kennedy and Siegfried (1997) find a positive relationship using scores on the TUCE III exam. Finally, Arias and Walker (2004) and Kokkelenberg *et al.* (2008) relying on student exam points and grades at public universities in the U.S. find a negative relationship. All these student test score-based studies are to some extent subject to measurement error, instructors' discretion over grades, attrition between courses, and several other deficiencies (Bedard and Kuhn 2008, p. 254).

A negative relationship between class size and instructional student evaluations is found in the studies by Bedard and Kuhn (2008) and Westerlund (2008) for a U.S. and a Scandinavian university, respectively. Both studies do not suffer from the possibility that results may confound the effects of class size and instructor quality as is the case for precursory work like McConell and Sosin (1984), DeCanio (1986), and Siegfried and Walstad (1990).

The aim of the present paper is twofold. First, we analyze whether the findings of the large, highly significant, and nonlinear negative impact of class size on student evaluations of instructor effectiveness reported in the seminal study by Bedard and Kuhn (2008) can be replicated using data from a university outside the United States. Our sample consisting of 1,438 economics classes (on 129 different topics) held by 299 instructors at the University of Munich from Fall 1998 to Summer 2007 exceeds the one of Bedard and Kuhn who studied 655 courses offered by 64 instructors between Fall 1997 and Spring 2004 at the University of California, Santa Barbara (UCSB). The econometric approach for the most part of our Section 2 adheres to their methodology. We find profound confirmatory evidence for the UCSB findings that we check – in contrast, e.g., to Westerlund (2008) – also for robustness to the inclusion of course and instructor fixed effects. The latter is particularly important considering problems of unobserved heterogeneity, for example, the possibility that the best instructors might have been systematically assigned to larger courses by department chairs.

Secondly, university-rating agencies, students, and tuition paying parents frequently claim to place a high weight on an agreeable class size. However, as an agreeable class size at the college level is neither guaranteed nor does there exist a direct market (both holding, in particular, for public schools in continental Europe), class size has the notion of an intangible. We make a first attempt to quantify the implied welfare surplus of this non-marketed intangible using a survey based on the contingent valuation method (CVM) for a representative sample of all students enrolled in management science (*Betriebswirtschaftslehre*) at the two universities in Munich. We find that the monetary value that students ascribe to the preservation of the status quo of an agreeable class size lies between 5 and 300 Euros per semester and student. As is common practice in the CVM framework, we derive our estimates from stated willingness-to-pay and willingess-to-accept responses in the counterfactual, though realistic, scenario of a merger of the two departments. To the best of our knowledge, no study of college-level class size has used such a CVM approach.

2 Class size and instructor effectiveness

2.1 Student evaluation data

As noted, the data for this study include nearly all economics classes offered at the University of Munich (Ludwig Maximilian University, henceforth: LMU) from Fall 1998 (*Wintersemester 1998/1999*) to Summer 2007 (*Sommersemester 2007*):[1] During this period of 18 semesters, 1,438 economics classes on 129 different topics were offered by 299 instructors. Our data include information about class size, the semester (*Wintersemester*, *Sommersemester*), the year that each course was offered, the level of the class (lower division, upper division), whether or not the course is a program requirement, the instructor, and the average evaluation score. Summary statistics for all variables are reported in Table 1. We follow Bedard and Kuhn (2008) by using a variety of class size specifications to explore the relationship between class size and student evaluations of instructor effectiveness. In particular, we will use linear, quadratic, cubic, and – going beyond Bedard and Kuhn – also splined and fourth order polynomial specifications for class size, as well as categorical class size indicators to allow for the flexible estimation of any nonlinearity in the relationship between class size and student evaluations of instructor effectiveness.

The evaluation data are published and made available, corresponding to the natural unit of observation (Bedard and Kuhn 2008, p. 255), in the form of student evaluation scores aggregated to class means:

$$E_{tci} = \frac{\sum_{j=1}^{R_{tci}} e_{tcij}}{R_{tci}}, \tag{1}$$

where e denotes individual student evaluation scores, E is the average class evaluation score, R is the number of evaluation responses,[2] t denotes year t =1998/1999,..., 2007),

[1] It should be noted that disclosure of an instructor's rating results is not mandatory. However, the resulting attrition is less than 2%. A subsample of this data set is also used and described in Süssmuth (2006).

[2] The number of responses (R) might differ from class size, or enrollment, due to absenteeism on the day that evaluations are adminisitered (at LMU this usually is the case in the middle of the semester), withdrawals from the course, or voluntary non-reponses. As there are no official

c denotes course, and i denotes instructor. Similar to the U.S. practice (Hamermesh and Parker 2005, Bedard and Kuhn 2008), the rating forms at LMU include: 'Overall, my personal impression is that the instructor was excellent (5); very good (4); satisfactory (3); unsatisfactory (2); very unsatisfactory (1)'.[3]

At LMU, the staff at the chair of the students' dean (*StudiendekanIn*) is responsible for the provision of rating forms and the coordination of students who administer the evaluation instrument. After the evaluation, results are published online and in the magazine of the economics students' representative body. The run of the print version of this magazine is approximately 2,500. Besides E, the published evaluation summary contains information on the number of participants in the class, the title of the class, and the instructor of record. This information is important because it allows us to estimate instructor fixed effects models that control for time-invariant instructor heterogeneity and instructor and course fixed effects models that control for both instructor and course-specific heterogeneity.

2.2 Descriptive analysis

In this subsection, we follow Bedard and Kuhn (2008) by considering it instructive to examine the raw mean evaluation scores across the distribution of class sizes before turning to the more formal analysis. To facilitate this exercise, Table 2 reports the mean average evaluation score for classes size 1-19, 20-39, 40-59, 60-79, 80-99, 100-149, 150-199, 200-299, and 300+. These cut-offs were chosen to ensure comparability with the UCSB findings and to ensure that all groups have reasonable sample size, respectively. The columns of Table 2 report the mean average evaluation score, the class means difference to the preceding class size group, test statistics for the null hypothesis that a given mean is the same as the mean of the immediately preceding class size group, and the sample

enrollment statistics available, we spot checked R with available statistics on the number of students taking the final exam for the respective class. We find virtually no difference in these figures.

[3] Just like UCSB scores, LMU scores actually run from (1) excellent to (5) very unsatisfactory, but we follow Bedard and Kuhn (2008) by reversing them for interpretive ease.

size. The reported results show that there is a substantial reduction in mean evaluation scores as class size rises from 1-19 to 20-39. At this point, scores continue to fall with class size but become rather flat until class size jumps over 79 students, where scores sizably increase for the tiny lecture halls class size (80-99). Thereafter, scores significantly drop and become again relatively flat (with an insignificant spike in class means for moving from small lecture halls 100-149 to medium-sized lecture halls 150-199). Finally, there is a remarkable 0.34 increase in mean evaluation score for raising class size beyond 299 students. The general shape and nonlinear nature of the relationship between student evaluations and class size can also be seen by simply plotting average student evaluation scores against class size, including median bands (Figure 1).

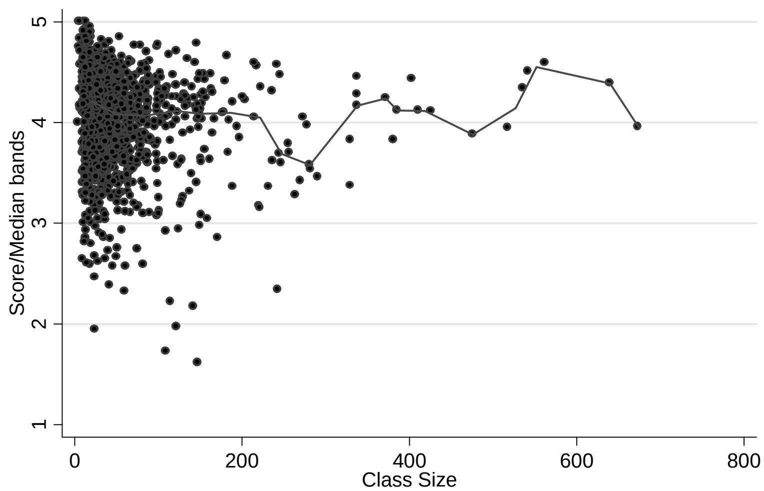

Figure 1. Mean student evaluations across class size and median bands

2.3 Fixed effects model estimates

While the results reported in Table 2 are, though not as much as for UCSB evaluations, suggestive of lower student evaluations in large classes, they are not conclusive evidence since the raw mean differences do not control for observables or time-invariant unobservables. For example, they will be biased if instructors with different levels of teaching ability are assigned to classes of different size. Actually, the last peak (for class size 300+) is suggestive for the possibility that the best instructors might have been systematically assigned to larger courses by department chairs. Since we know which instructors are teaching which classes, we can purge our estimates of this type of bias using a fixed effects model.

To estimate the impact of class size on average student evaluations, we consider the following fixed effects model, including a class size polynomial

$$E_{tci} = \alpha_i + \sum\nolimits_{m=1}^{M} \beta_m \left(S_{tci}\right)^m + \mathbf{x}_t'\delta + \mathbf{z}_c'\delta + u_{tci}, \qquad (2)$$

where α is a vector of instructor fixed effects, S denotes class size, $\mathbf{x}_t$ contains a time trend and a dummy variable for summer semester (Table 1), $\mathbf{z}_c$ contains time-invariant course characteristics defined in Table 1, and u is the usual error term. All models are weighted by the square root of the number of participants per class to address the heteroscedasticity resulting from the aggregation of individual outcomes. If we replace α_i by a scalar constant β_0, our specification boils down to a pooled OLS model that we use as a baseline specification. For this case, Figure 2 shows the adjusted R squared as a function of m, where $M = 8$. It suggests that the goodness of fit is merely sensitive to the choice of the polynomial degree if we abstract from the linear specification ($M = 1$).

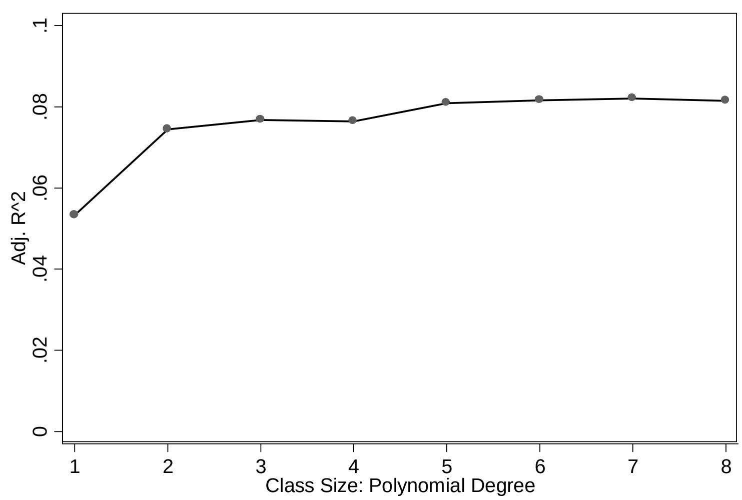

Figure 2. Adjusted R squared and polynomial degree of class size

Additionally, we consider alternative functional forms for class size, i.e., a logarithmic form ($\beta_1 \ln S_{tci}$), linear and cubic splines with knots at class sizes of 20, 50, 100, and 300 students,[4] as well as dummies for class size categories C (Table 2) as in Bedard and

[4]Results for a logarithmic form are available on request from the authors.

Kuhn (2008):

$$E_{tci} = \alpha_i + \sum_{m=1}^{8} \beta_m C_{m,tci} + \mathbf{x}_t'\delta + \mathbf{z}_c'\delta + u_{tci}. \quad (3)$$

An attractive feature of the above panel specifications (2) and (3) is that the instructor fixed effects allow us to purge the class size estimate of any potential bias induced by time-invariant instructor heterogeneity. In this context, Bedard and Kuhn (p. 257) note that although Siegfried and Kennedy (1995) find no evidence that department chairs assign better instructors to large introductory economics classes (which are generally the largest courses offered), our model's ability to include instructor fixed effects across all economics classes ensures that any non-random assignment across economics classes at large, based on instructor quality, are not biasing the estimated impact of class size on student evaluations.

As Kelly Bedard and Peter Kuhn note, models (2) and (3) have three major advantages over most of the previously estimated models in the literature. First, the panel nature allows for the inclusion of instructor fixed effects. This is important because instructors differ across important margins such as teaching ability and grading schemes. Secondly, the pooling across courses and years ensures a sufficient sample size to allow for the use of a variety of flexible class size functional forms. This is important because there is no reason to believe that the relationship between student evaluations and class size are linear (Figure 1), or even quadratic. In fact, as we will see, the relationship between student evaluations and class size is initially quite steeply negative, subsequently becomes rather flat, and between class sizes beyond 150-200 students and 300-400 students may even rise slightly. Third, we can also include course fixed effects to equations (2) and (3) to control for course heterogeneity on such margins as difficulty and average student interest in particular subject matters.

The core set of results for the impact of class size on average student evaluations of instructor effectiveness are reported in Table 3. The first pair of columns report the pooled cross-section results. Column (i) specifies class size as a cubic function and column (ii) specifies it as a flexible set of indicator variables. Focusing on the results reported in column (ii), as class size initially rises average student evaluations fall, but there are three upward spikes at class sizes of 70-90, 125-175, and 250-300+. The latter is the most profound one with an increase of 0.26.

It is easier to describe the relationship between class size and class evaluations graphically. For comparative purposes, Figure 3 begins by plotting the predicted mean evaluations by class size based on the standard cross-sectional model with discrete categories, splines, and fourth order polynomial class size specifications (all class size coefficients used in Figures 3-5 are reported in the tables in the Appendix).

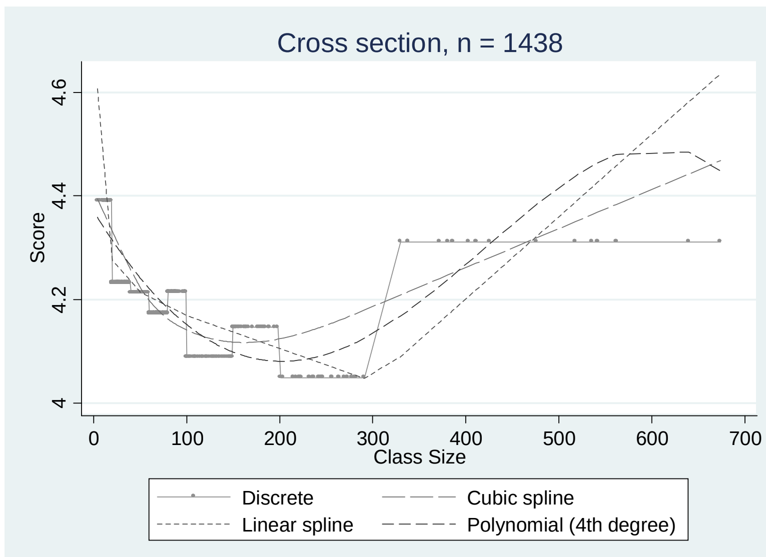

Figure 3. Cross section predictions

Columns (iii) and (iv) in Table 3 replicate columns (i) and (ii) with the addition of instructor fixed effects. Three features of the instructor fixed effects (I-FE) estimates warrant comment. First, the sample is smaller because instructors only observed once during the sample period are excluded from the I-FE sample. Second, once time-invariant instructor heterogeneity has been accounted for it is clear that omitted variables bias flattens out the cross-sectional point estimates for the relationship between student evaluations of instructor effectiveness across class size. There obviously is no more U-shape resultant. In other words, the differences between the cross-section and I-FE results are consistent with department chairs assigning "better" instructors to larger classes. This is most easily be seen by comparing Figures 3 and 4.

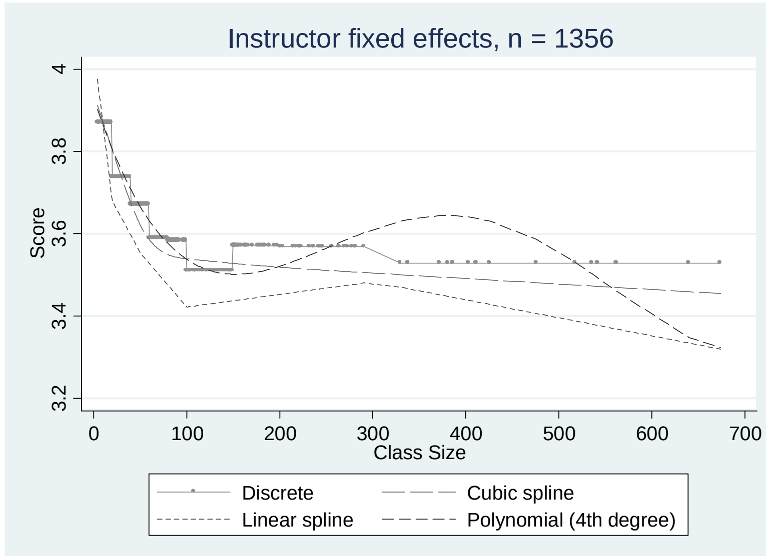

Figure 4. I-FE predictions

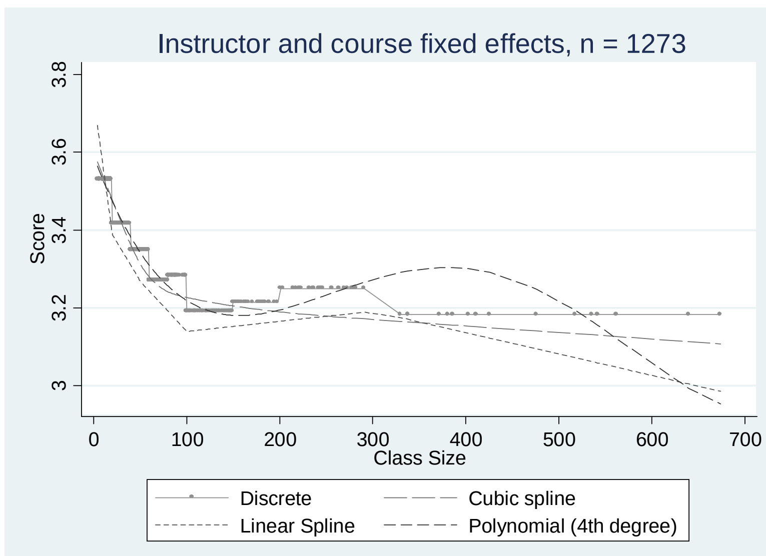

Figure 5. I-C-FE predictions

As a final check for time invariant omitted variables bias we add course fixed effects to the model that already includes instructor fixed effects (I-C-FE) as described in (2) and (3). It is important to note that sample size again reduces because instructors who taught only one course are excluded as well as courses taught by a single instructor during the entire sample period. These exclusions reduce the sample size to 1,273 observations. The I-C-FE results using a cubic function of class size and a flexible set of class size indicators are reported in columns (v) and (vi) in Table 3. Detailed estimates are reported in Tables 4-7.

Overall, it appears that the simple pooled cross-section estimates are biased by the omission of time-invariant instructor and course controls. Furthermore, an accurate estimate of the impact of class size on student evaluations of instructor effectiveness does require a flexible functional form for class size, regardless of the inclusion or exclusion of instructor and/or course fixed effects. Estimates of the impact of class size on test-based outcomes, at all levels of education from primary school through college, seem to depend to a large extent on the econometric specification. In contrast, our estimates of the impact of class size on student evaluations of instructor effectiveness are remarkably consistent across instructor fixed effect and instructor-plus-course fixed effect specifications. In all cases we consistently find a large negative impact of class size on student evaluations of instructor effectiveness using a representative sample that encompasses economics courses at all college levels.

3 The contingent value of an agreeable class size

3.1 Data and empirical approach

The Contingent Valuation Method (CVM) is a survey-based technique to assess positive externalities of more or less intangible goods that are not directly internalized by the market by quantifying the corresponding willingness-to-pay (WTP)[5] of concerned individuals (Arrow *et al.* 1993). The adequate CVM set-up allows one to quantify the uncompensated Hicksian surplus, the compensated Hicksian surplus, and the Marshallian

[5]Note, in our study one half of repondents were asked for a rebate amount of tuition fees, in order to sustain their initial utility level. This "willingness-to-accept" measure quantifies an upper bound value of the contingent value. As can be seen from Figure 6.

surplus, where the latter can be approximated by

$$MS \approx ES + \frac{1}{2}\left(CS - ES\right) = \int_{Q_S}^{Q_B} H\left(U_0\right) dQ + \frac{1}{2}\left(\int_{Q_S}^{Q_B} H\left(U_1\right) dQ - \int_{Q_S}^{Q_B} H\left(U_0\right) dQ\right) \quad (4)$$

and CS, ES, and MS denote compensated, equivalent, and Marshallian surplus, respectively. $H\left(U_0\right)$ and $H\left(U_1\right)$ represent compensated and equivalent Hicksian demand, respectively. The Marshallian demand is given by the line running through ba in the right-hand side diagram of Figure 6. The derivation of the welfare measures shown in Figure 6 is standard, apart from the underlying scenario starting from a reduction of "quality" (i.e., an increase of class size) rather than from the usual increase in price. Values on the abscissa are contingent, inasmuch they have to be interpreted relative to the status quo. In this sense, they represent a demand for the status quo which we presume to reflect an agreeable class size as students would not have enrolled given inacceptable conditions.

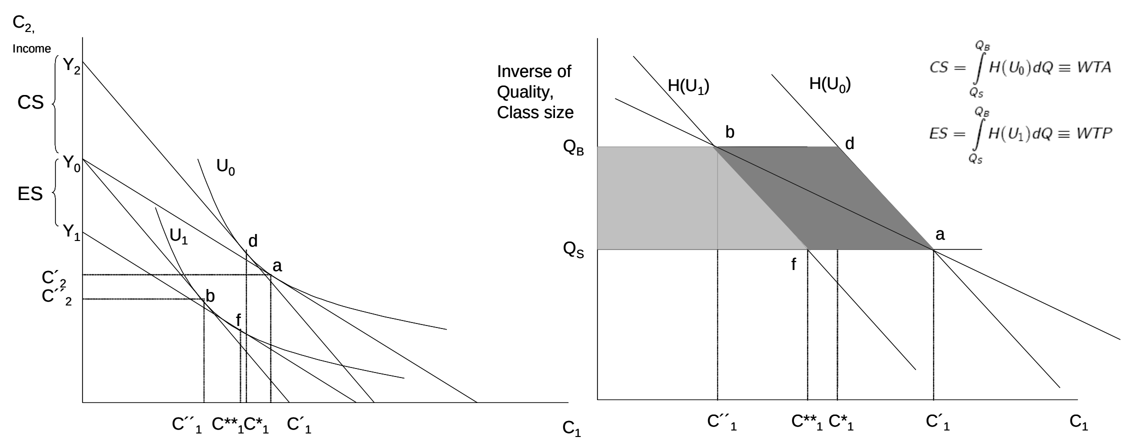

Figure 6. CS, ES, and MS derived from WTP and WTA

In 2007, we conducted an online survey, for which we recruited participants online and offline. On-campus offline-interviews and pre-tests supplemented the survey. In order to avoid issues of selectivity we tried to get our number of respondents as close as possible to the total population (Table 8). Furthermore, no information on the survey's content was given prior to the interviews and online query. The withdrawal rate after start was < 3%. After some stratification along the two central dimensions gender and lower/upper division, the sample consists of 560 (553) individuals (Table 8). It is a representative sample of all students enrolled in management studies, i.e., in "*Betriebswirtschaftslehre*" leading to the degree of a "*Diplom Kaufmann*" awarded by either of the two universities in Munich, i.e., either of LMU or of Munich University of Technology (*Technische Universität München*, henceforth TUM). This degree is equivalent to an M.Sc./M.A. degree in business administration (management) in German speaking countries. Note, in our study one half of respondents were asked for a rebate of tuition fees that were introduced in Munich in 2007 in order to sustain their initial utility level. This WTA measure quantifies an upper bound value of the contingent value (Figure 6).

There are several papers that document what has become known as "warm glow"-effect in the context of CVM (see, e.g., Andreoni 1989, Kahnemann and Knetsch 1992, Nunes and Schokkaert 2003). Accordingly, survey participants potentially gain some sort of moral satisfaction through the mere act of giving or claiming to be willing to give per se. This effect relates to concepts such as peer-group pressure, feelings of guilt, and sympathy. It superimposes a "cold" WTP, in particular, in face-to-face interviews. The fact that the bias induced by a "warm glow" is pronounced for personal interviews is documented by Schkade and Payne (1994) who analyze verbal protocols of CVM-based studies. These authors find that some respondents vocalize a parallel with charitable contributions when answering the WTP survey in front of an interviewer. We can interpret this finding as lending support to the hypothesis that the "warm glow" is a relevant bias in personal rather than in online interviews as in the one of the present study.

In our query students were first asked some introductory questions on their financial situation, the educational background of their parents (both of these first two questions were intended to capture the budgetary situation of respondents), the progress of their studies, and the personal weight they put on the quality of higher education in comparison to their student class mates (Table 9). Then we asked them for the average number of student class mates they are currently attending classes with. We used a payment card answering scheme relying on the same class size groups as in Section 2. It was followed for about one half of the respondents ($N_{\text{WTP}} = 278$) by the following counterfactual scenario: "*As has been recently discussed in the media, the two Munich departments offering programs in management and business administration (Betriebswirtschaftslehre), that is, LMU and TUM, will be merged into one department. Overall, the aim of the merger is to realize synergies. The merger implies that, on average, more students than before attend the average class offered. For you this would bear the implication that you end up in the next higher class size group [pop-up with ticked average class size group and next higher group is shown]. Please abstract from any other imaginable consequences of the merger – like changes of staff or changes in the corporate identity of the department – and focus on the increase in class size. Would you personally be willing to contribute some of your own money every semester to ensure that class size remains the same as before the merger of departments?*" The other approximate half of students ($N_{\text{WTA}} = 275$) was confronted with the same scenario, however, with a different ending question: "*[...] How much of your paid semestral tuition does the university need to transfer back to you in order to make you indifferent to the class-size situation before the merger?*"

In a series of pre-tests, the questionnaire and, in particular, also the above scenario were carefully tested. The pre-tests provided relevant information with regard to participants' understanding, potential caveats of the scenario, and ranges of possible WTP and WTA values and ranges. The latter is of particular importance as our survey did not rely on an unfavorable dichotomous choice framework or open-ended valuation question but on a closed-ended one, that is, on a valuation question in payment card format (Whitehead 2006). The ultimate of eight possible answers (0 Euros and the seven ranges 1-10, 11-20, 21-40, 41-80, 81-150, 151-300, 301-500 Euros) is truncated at 500 Euros. Nevertheless, respondents were also given the possibility to express another (possibly higher) amount. As is standard in CVM-studies, we used reminders of budget constraints to minimize hypothetical bias of respondents. We classify stated WTP and WTA values in eight groups using the respective range means. In accordance with our pre-test runs, boundary values are set to 0 and 300 Euros, respectively.

3.2 Findings

As can be seen from Table 9, averaging WTP and WTA samples (first column), students are willing to pay for the avoidance (or need to be paid for the acceptance) of a marginal deterioration of class size by one additional student 4.87 Euros per semester. For a substantial increase, i.e., for the doubling of the existing class size, the corresponding amount is 324.74 Euros. For the first case (marginal deterioration) this in combination with the total number of students from our underlying population (Table 8) implies an equivalent Hicksian surplus of 5,411.58 ($= 3.03 \cdot 1,786$) Euros, a compensated Hicksian surplus of 12,073.36 Euros, and a Marshallian surplus of 8,742.47 Euros per semester. The latter is a straightforward approximation of $\mathsf{Q_B baQ_S}$ in Figure 6. In the second case (substantial deterioration), our results imply an equivalent Hicksian surplus of 329,820.62 ($= 184.67 \cdot 1,786$) Euros, a compensated Hicksian surplus of 832,865.38 Euros, and a Marshallian surplus of 581,343 Euros per semester. Our detailed results reported in Tables 10-12 are graphically summarized in the following Figures 8 and 9.

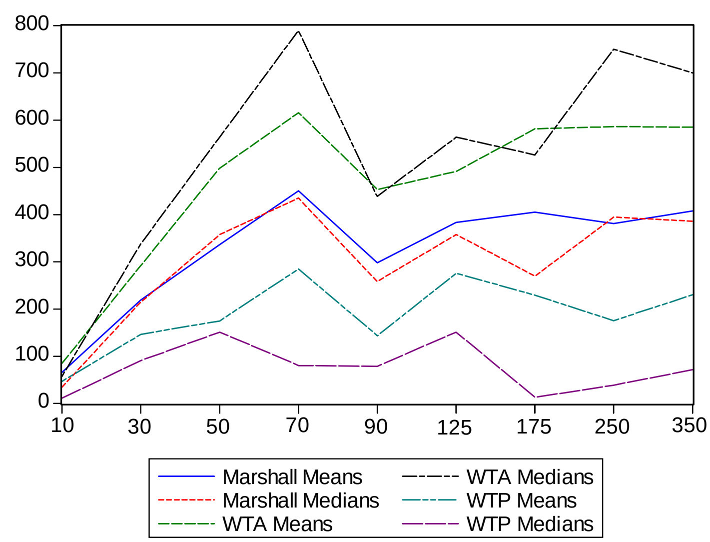

Figure 8. Calculated amounts for doubling class size

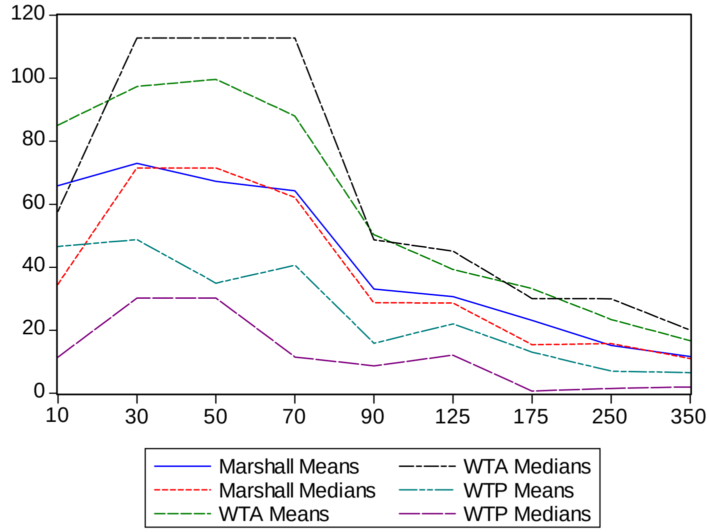

Figure 9. Calculated amounts for increasing class size by 10 students

In Figure 8 and 9 the amount in Euros is depicted on the ordinate, the class size on the abscissa. Obviously, the substantial deterioration scenario (Figure 8) reinforces our findings from the instructional evaluations analysis, inasmuch as our WTP/WTA measures increase up to class sizes of 125 students, that is, approximately corresponding to the lower turning point of the polynomial function describing the relationship of evaluations and class size in Figure 4 and 5. For both scenarios (Figure 8 and 9), there also can be found local peaks in the nearance of a class size somehow below 100 students which approximately coincide with a local peak found in evaluations of instructor efficiency for roughly the same class size (Figure 5).

4 Conclusion

This paper provided profound confirmatory evidence for the recent finding of a large, highly significant, and nonlinear negative impact of class size on student evaluations of instructor effectiveness that is robust to the inclusion of course and instructor fixed effects. Going beyond this confirmation of the findings for economics courses offered by UCSB that are analyzed in the seminal study by Bedard and Kuhn (2008), we run a survey based on the contingent valuation method and a representative sample of all Munich students of management and business administration (*Diplom-Studiengang Betriebswirtschaftslehre*) to quantify the welfare surplus of an agreeable class size. We find the average monetary value of the surplus to lie between 5 and 300 Euros per semester and student. Overall, Hicksian and Marshallian surpluses can reach substantial values of 0.5 to 0.8 million Euros per semester. From an administrator's perspective, our findings imply that both instructor efficiency as measured by instructional evaluations and welfare measures are (highly) elastic in classes with less than approximately 100 students, while beyond this threshold the valuation of the status quo becomes insensitive to increases in class size.

References

[1] Andreoni, J. (1989), Giving with impure altruism: Applications to charity and Ricardian Equivalence, Journal of Political Economy 97, 1447-1458.

[2] Arias, J.J. and D.M. Walker (2004), Additional evidence on the relationship between class size and student performance, Journal of Economic Education 35, 311-329.

[3] Arrow, K., Solow, R., Portney, P., Leamer, E., Radner, R., and H. Schuman (1993), Report of the NOAA Panel on contingent valuation, Federal Register 58, 4601-4614.

[4] Bedard, K. and P. Kuhn (2008), Where class size really matters: Class size and student ratings of instructor effectiveness, Economics of Education Review 27, 253-265.

[5] DeCanio, S. J. (1986), Student evaluations of teaching – a multinomial logit Approach, Journal of Economic Education 17, 165-175.

[6] Hamermesh, D.S. and Parker, A. (2005), Beauty in the classroom: instructors' pulchritude and putative pedagogical productivity, Economics of Education Review 24, 369–76.

[7] Hanushek, E.A. (2003), The failure of input-based schooling policies, Economic Journal 113, F64-F98.

[8] Kahnemann, D. and J. Knetsch (1992), Valuing public goods: The purchase of moral satisfaction, Journal of Environmental Economics and Management 22, 57-70.

[9] Kennedy, P.E. and J.J. Siegfried (1997), Class size and achievement in introductory economics: Evidence from the TUCE III data, Economics of Education Review 16, 385-394.

[10] Kokkelenberg, E.C., Dillon, M., and S.M. Christy (2008), The effects of class size on student grades at a public university, Economics of Education Review 27, 221-233.

[11] Krueger, A.B. (2003), Economic considerations and class size, Economic Journal 113, F34-F63.

[12] McConnell, C.R. and K. Sosin (1984), Some determinants of student attitudes toward large classes, Journal of Economic Education 38, 220-229.

[13] Lopus, J.S. and N.L. Maxwell (1995), Should we teach microeconomics principles before macroeconomics principles?, Economic Inquiry 33, 336-350.

[14] Nunes, P.A.L.D. and E. Schokkaert (2003), Identifying the warm glow effect in contingent valuation, Journal of Environmental Economics and Management 45, 231-245

[15] Saunders, P. (1980), The lasting effect of introductory economics courses, Journal of Economic Education 12, 1-14.

[16] Schkade, D. and J. Payne (1994), How people respond to contingent valuation questions: A verbal protocol analysis of willingness to pay for an environmental regulation, Journal of Environmental Economics and Management 26, 88-109.

[17] Süssmuth, B. (2006), Beauty in the classroom: Are German students less blinded? Putative pedagogical productivity due to professors' pulchritude: Peculiar or pervasive?, Applied Economics 38, 231-238.

[18] Siegfried, J.J. and W.B. Walstad (1990), Research on teaching college economics, in Saunders, P. and W.B. Walstad (eds.), The Principles of Economics Course: A Handbook for Instructors, McGraw-Hill, New York, 270-286.

[19] Siegfried, J.J. and P.E. Kennedy (1995), Does pedagogy vary with class size in introductory economics?, American Economic Review, Papers and Proceedings 85, 347-351.

[20] Westerlund, J. (2008), Class size and student evaluations in Sweden, Education Economics 16, 19-28.

[21] Whitehead, J.C. (2006), A practitioner's primer on contingent valuation, in Alberini, A. and J.R. Kahn (eds.), Handbook on Contingent Valuation, Edward Elgar, Cheltenham, U.K., 92-115.

Table 1. Summary statistics

	(1)	(2)
Mean evaluation score	4.07 (0.47)	4.06 (0.46)
Class size	52.73(63.08)	53.47 (61.98)
Required course	0.61 (0.49)	0.65 (0.48)
Introductory course	0.27 (0.45)	0.27 (0.45)
Summer semester	0.46 (0.50)	0.49 (0.50)
N	1438	1273

Notes:

Includes all classes addressing economics students offered by the Department of Economics, University of Munich (LMU), between Winter 1998/1999 and Summer 2007 (18 semesters).

Standard deviations in parentheses.

(1) total sample

(2) I-C-FE subsample

Table 2. Distribution of average evaluations across class size

Class size	Average evaluation (class means) (1)	Class means differences to preceding class size group (2)	Means test t-Statistic (3)	Sample size (4)
1-19	4.22	--	--	384
20-39	4.05	-0.17	-5.22	432
40-59	4.01	-0.04	-1.40	244
60-79	3.97	-0.04	-0.87	145
80-99	4.02	0.05	0.87	75
100-149	3.89	-0.13	-1.40	82
150-199	3.96	0.06	0.49	33
200-299	3.80	-0.15	-1.14	25
300+	4.14	0.34	2.37	18

Table 3. The impact of class size on student ratings of instructor effectiveness: Summary table

	Cross Section		I-FE		I-C-FE	
	i	ii	iii	iv	v	vi
Class Size	-0.0033*** (0.00069)		-0.0048*** (0.00051)		-0.004*** (0.00055)	
(Class Size)^2 /100	0.0011*** (0.00032)		0.0018*** (0.00023)		0.0016*** (0.00025)	
(Class Size)^3 /100,000	-0.0009** (0.00038)		-0.0018*** (0.00027)		-0.0017*** (0.00029)	
Class Size 20-39		-0.158*** (0.040)		-0.133*** (0.029)		-0.114*** (0.032)
Class size 40-59		-0.178*** (0.044)		-0.199*** (0.032)		-0.181*** (0.035)
Class Size 60-79		-0.217*** (0.048)		-0.281*** (0.036)		-0.260*** (0.039)
Class Size 80-99		-0.176*** (0.057)		-0.286*** (0.042)		-0.247*** (0.045)
Class Size 100-149		-0.301*** (0.053)		-0.360*** (0.040)		-0.339*** (0.043)
Class Size 150-199		-0.244*** (0.067)		-0.299*** (0.052)		-0.315*** (0.055)
Class Size 200-299		-0.341*** (0.070)		-0.302*** (0.056)		-0.280*** (0.061)
Class Size 300+		-0.079 (0.072)		-0.341*** (0.062)		-0.347*** (0.072)
N	1438	1438	1356	1356	1273	1273
R^2 adj. (%)	8.35	8.56	66.22	66.29	68.37	68.31
F-Statistic for Class Size	9.73	7.73	12.96	12.74	11.18	10.97
P-Value of F-statistic	0.00	0.00	0.00	0.00	0.00	0.00
Root MSE	0.45	0.45	0.27	0.27	0.26	0.26
Predicted impact of increasing class size from						
10-30	-0.06	-0.16	-0.08	-0.13	-0.07	-0.11
30-50	-0.05	-0.02	-0.07	-0.07	-0.06	-0.07
50-70	-0.04	-0.04	-0.06	-0.08	-0.05	-0.08
70-90	-0.03	0.04	-0.05	-0.01	-0.04	0.01
90-125	-0.04	-0.13	-0.05	-0.07	-0.04	-0.09
125-175	-0.03	0.06	-0.03	0.06	-0.02	0.02
175-250	0.01	-0.10	0.03	-0.00	0.04	0.04
250-300+		0.26		-0.04		-0.07

Note: *, **, *** denotes significance at 10, 5, 1% level of significance; heteroskedastic consistent standard errors are given in parentheses. All results are weighted by the square-root of class size; all specifications i–vi include a constant. All models include indicators for semester and year. Columns i and ii include indicators for required and upper division classes. Column iii and iv include instructor controls. Columns v and vi include instructor and course control.

Table 4. The impact of class size on student ratings of instructor effectiveness

	i	ii	iii	iv	v	vi	vii	viii	ix	x	xi	xii
	Cross Section				**I-FE**				**I-C-FE**			
Class Size	-0.00013	-0.0020***	-0.0033***		-0.0006***	-0.0020***	-0.0048***		-0.0007***	-0.0019***	-0.004***	
	(0.00014)	(0.00035)	(0.00069)		(0.00012)	(0.00029)	(0.00051)		(0.00014)	(0.00032)	(0.00055)	
(Class Size)^2 /100		0.00038***	0.0011***			0.00026***	0.0018***			0.00024***	0.0016***	
		(0.00007)	(0.00032)			(0.00005)	(0.00023)			(0.00005)	(0.00025)	
(Class Size)^3 /100,000			-0.0009**				-0.0018***				-0.0017***	
			(0.00038)				(0.00027)				(0.00029)	
Class Size 20-39				-0.158***				-0.133***				-0.114***
				(0.040)				(0.029)				(0.032)
Class size 40-59				-0.178***				-0.199***				-0.181***
				(0.044)				(0.032)				(0.035)
Class Size 60-79				-0.217***				-0.281***				-0.260***
				(0.048)				(0.036)				(0.039)
Class Size 80-99				-0.176***				-0.286***				-0.247***
				(0.057)				(0.042)				(0.045)
Class Size 100-149				-0.301***				-0.360***				-0.339***
				(0.053)				(0.040)				(0.043)
Class Size 150-199				-0.244***				-0.299***				-0.315***
				(0.067)				(0.052)				(0.055)
Class Size 200-299				-0.341***				-0.302***				-0.280***
				(0.070)				(0.056)				(0.061)
Class Size 300+				-0.079				-0.341***				-0.347***
				(0.072)				(0.062)				(0.072)
N	1438	1438	1438	1438	1356	1356	1356	1356	1273	1273	1273	1273
R^2 adj. (%)	6.00	8.07	8.35	8.56	64.13	64.89	66.22	66.29	66.76	67.34	68.37	68.31
F-Statistic for Class Size	8.05	10.01	9.73	7.73	12.01	12.33	12.96	12.74	10.53	10.75	11.18	10.97
P-Value of F-statistic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Root MSE	0.46	0.45	0.45	0.45	0.28	0.28	0.27	0.27	0.27	0.27	0.26	0.26

Note: *, **, *** denotes significance at 10, 5, 1% level of significance; heteroskedastic consistent standard errors are given in parentheses. All results are weighted by the square-root of class size; all specifications i – xii include a constant. All models include indicators for school term and year. Columns i-iv include indicators for required and upper division classes. Column v-viii include instructor controls. Column ix-xii include instructor and course control.

Table 5. The impact of class size on student ratings of instructor effectiveness using the I-C-FE sample

	i	ii	iii	iv	v	vi	vii	viii	ix	x	xi	xii
	Cross Section				**I-FE**				**I-C-FE**			
Class Size	-0.00014	-0.0021***	-0.0034***		-0.0006***	-0.0018***	-0.0047***		-0.0007***	-0.0019***	-0.004***	
	(0.00015)	(0.00038)	(0.00073)		(0.00013)	(0.00030)	(0.00052)		(0.00014)	(0.00032)	(0.00055)	
(Class Size)^2 /100		0.00040***	0.0011***			0.00024***	0.0018***			0.00024***	0.0016***	
		(0.00007)	(0.00034)			(0.00005)	(0.00024)			(0.00005)	(0.00025)	
(Class Size)^3 /100,000			-0.0008**				-0.0018***				-0.0017***	
			(0.00041)				(0.00028)				(0.00029)	
Class Size 20-39				-0.156***				-0.132***				-0.114***
				(0.044)				(0.030)				(0.032)
Class size 40-59				-0.181***				-0.196***				-0.181***
				(0.047)				(0.033)				(0.035)
Class Size 60-79				-0.242***				-0.287***				-0.260***
				(0.052)				(0.036)				(0.039)
Class Size 80-99				-0.166***				-0.271***				-0.247***
				(0.062)				(0.042)				(0.045)
Class Size 100-149				-0.297***				-0.354***				-0.339***
				(0.056)				(0.040)				(0.043)
Class Size 150-199				-0.260***				-0.296***				-0.315***
				(0.070)				(0.052)				(0.055)
Class Size 200-299				-0.389***				-0.273***				-0.280***
				(0.076)				(0.057)				(0.061)
Class Size 300+				-0.037				-0.328***				-0.347***
				(0.086)				(0.066)				(0.072)
N	1273	1273	1273	1273	1273	1273	1273	1273	1273	1273	1273	1273
R^2 adj. (%)	5.01	7.38	7.60	8.09	65.25	65.88	67.19	67.39	66.76	67.34	68.37	68.31
F-Statistic for Class Size	6.16	8.24	7.97	6.60	13.38	13.66	14.36	14.14	10.53	10.75	11.18	10.97
P-Value of F-statistic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Root MSE	0.46	0.45	0.45	0.45	0.28	0.27	0.27	0.27	0.27	0.27	0.26	0.26

Note: *, **, *** denotes significance at 10, 5, 1% level of significance; heteroskedastic consistent standard errors are given in parentheses. All results are weighted by the square-root of class size; all specifications i – xii include a constant. All models include indicators for school term and year. Column i-iv include indicators for required and upper division classes. Column v-viii include instructor controls. Column ix-xii include instructor and course control.

Table 6. The impact of class size on student ratings of instructor effectiveness: Splines

	i	ii	iii	iv	v	vi	vii	viii	ix
	Cross Section			**I-FE**			**I-C-FE**		
Class Size	-0.0029**			-0.0070***			-0.0065***		
	(0.00121)			(0.00089)			(0.00098)		
$(\text{Class Size})^2/100$	0.0008			0.0037***			0.0034***		
	(0.00010)			(0.00076)			(0.00076)		
$(\text{Class Size})^3/100{,}000$	0.0001			-0.0071***			-0.0064***		
	(0.0026)			(0.0018)			(0.0020)		
$(\text{Class Size})^4/10^6$	-0.0009			0.0043***			0.0038**		
	(0.0022)			(0.0015)			(0.0016)		
Splcs1		-0.0207***			-0.0186***			-0.0176***	
		(0.0065)			(0.0046)			(0.0052)	
Splcs2		0.0187**			0.0144***			0.0136**	
		(0.0074)			(0.0052)			(0.0058)	
Splcs3		0.0011			0.0015			0.0017	
		(0.00023)			(0.0016)			(0.0016)	
Splcs4		0.0003			0.0029***			0.0028***	
		(0.0012)			(0.0009)			(0.0009)	
Splcs5		0.0022***			-0.0007			-0.0008	
		(0.0007)			(0.0006)			(0.0006)	
Cscubicspline1			-0.0039***			-0.0067***			-0.0062***
			(0.0011)			(0.0008)			(0.0009)
Cscubicspline2			0.0295*			0.0716***			0.0604***
			(0.0179)			(0.0130)			(0.0141)
Cscubicspline3			-0.0430			-0.1143***			-0.0958***
			(0.0300)			(0.0219)			(0.0236)
N	1438	1438	1438	1356	1356	1356	1273	1273	1273
R^2 adj. (%)	8.30	8.98	8.26	66.44	66.71	66.49	68.52	68.64	68.47
F-Statistic for Class Size	9.13	9.34	9.63	13.03	13.12	13.11	11.22	11.24	11.23
P-Value of F-statistic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Root MSE	0.45	0.45	0.45	0.27	0.27	0.27	0.26	0.26	0.26

Note: *, **, *** denotes significance at 10, 5, 1% level of significance; heteroskedastic consistent standard errors are given in parentheses. All results are weighted by the square-root of class size; all specifications i – ix include a constant. All models include indicators for school term and year. Column i-iii include indicators for required and upper division classes. Column iv-vi include instructor controls. Column vii-ix include instructor and course control.

Table 7. The impact of class size on student ratings of instructor effectiveness using the I-C-FE sample: Splines

	i	ii	iii	iv	v	vi	vii	viii	ix
	Cross Section			**I-FE**			**I-C-FE**		
Class Size	-0.0029** (0.0013)			-0.0072*** (0.0009)			-0.0065*** (0.00098)		
(Class Size)^2 /100	0.0007 (0.0010)			0.0041*** (0.0007)			0.0034*** (0.00076)		
(Class Size)^3 /100,000	0.0003 (0.0028)			-0.0081*** (0.0019)			-0.0064*** (0.0020)		
(Class Size)^4 /10^6	-0.0009 (0.0023)			0.0052*** (0.0015)			0.0038** (0.0016)		
Splcs1		-0.0207*** (0.0072)			-0.0178*** (0.0048)			-0.0176*** (0.0052)	
Splcs2		0.0181** (0.0083)			0.0135** (0.0054)			0.0136** (0.0058)	
Splcs3		0.0020 (0.00025)			0.0016 (0.0016)			0.0017 (0.0016)	
Splcs4		-0.0003 (0.0013)			0.0031*** (0.0009)			0.0028*** (0.0009)	
Splcs5		0.0026*** (0.0008)			-0.0012** (0.0006)			-0.0008 (0.0006)	
Cscubicspline1			-0.0043*** (0.0012)			-0.0069*** (0.0008)			-0.0062*** (0.0009)
Cscubicspline2			0.0336* (0.0189)			0.0736*** (0.0130)			0.0604*** (0.0141)
Cscubicspline3			-0.0498 (0.0317)			-0.1180*** (0.0221)			-0.0958*** (0.0236)
N	1273	1273	1273	1273	1273	1273	1273	1273	1273
R^2 adj. (%)	7.54	8.35	7.53	67.51	67.71	67.49	68.52	68.64	68.47
F-Statistic for Class Size	7.48	7.82	7.90	14.48	14.54	14.54	11.22	11.24	11.23
P-Value of F-statistic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Root MSE	0.45	0.45	0.45	0.27	0.27	0.27	0.26	0.26	0.26

Note: *, **, *** denotes significance at 10, 5, 1% level of significance; heteroskedastic consistent standard errors are given in parentheses. All results are weighted by the square-root of class size; all specifications i – ix include a constant. All models include indicators for school term and year. Column i-iii include indicators for required and upper division classes. Column iv-vi include instructor controls. Column vii-ix include instructor and course control.

Table 8. CVM sample and stratification

Business Administration Students (Diplom) in Munich (LMU, TUM) in Summer (Sommersemester) 2007		
	Total population	Sample
No. of student	1786	560
Male	1087 (60.86%)	341 (60.89%)
Female	699 (39.14%)	219 (39.11%)
Upper division (Hauptstudium)	1266 (70.88%)	397 (70.89%)
Lower division (Grundstudium)	520 (29.12%)	163 (29.11%)

Note: Seven observations were excluded due to the fact, that the status quo was already the highest possible class size group (> 500 students); therefore, an unbiased measuring of WTP was not possible.

Table 9. Summary statistics: CVM survey

	Sample	WTP	WTA
Amount (categories)	145.80 (118.15)	85.00 (100.78)	207.26 (101.56)
	Median: 115.5	Median: 60.5	Median: 225.5
Amount (double class size)	324.74 (287.88)	184.67 (235.56)	466.33 (266.14)
	Median: 288.75	Median: 90.75	Median: 450
Amount (plus one student)	4.87 (5.14)	3.03 (4.20)	6.76 (5.33)
	Median: 3.03	Median: 1.53	Median: 5.78
Parents educ. background	0.54 (0.50)	0.55 (0.50)	0.54 (0.50)
Male	0.6076 (0.4887)	0.5971 (0.4914)	0.6182 (0.4867)
Introductory (lower) division	0.2893 (0.4539)	0.2662 (0.4369)	0.3124 (0.4687)
Financial situation	0.42 (0.49)	0.43 (0.50)	0.41 (0.49)
Weight	0.52 (0.50)	0.54 (0.5)	0.49 (0.50)

Note: Includes 553 business administration (Betriebswirtschaftslehre: BWL) students in Munich (pooled LMU, TUM). Representative in terms of gender, study progress for all BWL (Diplom) students enrolled at one of the two universities in Munich, summer semester 2007. The whole sample divides into two subsamples WTP and WTA with 278 (275) students each.

Standard deviations in parentheses.

Calculation of amounts for *substantial deterioration scenario* (2nd line): Take two neighboring class size groups $\alpha = [A$ to $B]$ and $\beta = [(B + 1)$ to $C]$, implying different mean values μ_α and μ_β. There is one amount X (in Euros) stated for sticking to size α and not moving to size β. From this it is straightforward to calculate the considered counterfactual increase in percent as $(\mu_\beta - \mu_\alpha)/\mu_\alpha$. Rescaling the effect to 100 percent (doubling class size) and applying it to X renders the calculated amount for the substantial deterioration scenario.

Calculation of amounts for *marginal deterioration scenario* (3rd line): Take two neighboring class size groups $\alpha = [A$ to $B]$ and $\beta = [(B + 1)$ to $C]$, implying different mean values μ_α and μ_β. There is one amount X (in Euros) stated for sticking to size α and not moving to size β. The amount to block the increase of size by one additional student then simply is calculated as $X/(\mu_\beta - \mu_\alpha)$.

Table 10. Stated amounts for increasing class size to next higher class size group

	Number of observations			Amount							
				Sample		WTP		WTA		Marshall	
Class size category (average)	Sample	WTP	WTA	Mean	Median	Mean	Median	Mean	Median	Mean	Median
10 – 30 students	17	10	7	124.9	60.5	93.2	23.0	170.2	115.5	131.7	69.3
30 – 90 students	148	74	74	146.1	115.5	97.5	60.5	194.7	225.5	146.1	143.0
50 – 70 students	110	59	51	129.9	115.5	69.9	60.5	199.2	225.5	134.6	143.0
70 – 90 students	49	24	25	129.6	115.5	81.3	23.0	175.9	225.5	128.6	124.3
90 – 125 students	32	20	12	100.8	60.5	55.6	30.5	176.2	170.5	115.9	100.5
125 – 175 students	41	18	23	158.7	115.5	110.3	60.3	196.5	225.5	153.4	143.0
175 – 250 students	40	17	23	185.0	225.5	128.1	5.5	249.3	225.5	173.7	115.5
250 – 350 students	66	31	35	157.2	115.5	70.1	15.5	234.4	300	152.3	157.8
350 – 500+ students	50	25	25	174.7	225.5	116.0	30.5	250.8	300	174.8	165.3

Table 11. Calculated (from stated) amounts for doubling class size

	Number of observations			Amount							
				Sample		WTP		WTA		Marshall	
Class size category (average)	Sample	WTP	WTA	Mean	Median	Mean	Median	Mean	Median	Mean	Median
10 students	17	10	7	62.5	30.3	46.6	11.5	85.1	57.8	65.9	34.6
30 students	148	74	74	219.2	173.3	146.3	90.8	292.1	338.3	219.2	214.5
50 students	110	59	51	324.67	288.8	174.8	151.3	498.0	563.8	336.4	357.5
70 students	49	24	25	453.4	404.3	284.6	80.5	615.5	789.3	450.1	434.9
90 students	32	20	12	259.1	155.6	142.8	78.4	452.8	438.4	298.0	258.4
125 students	41	18	23	396.7	288.8	275.8	151.3	491.4	563.8	383.5	357.5
175 students	40	17	23	431.7	526.2	229.1	12.8	581.4	526.2	405.3	269.5
250 students	66	31	35	393.0	288.8	175.2	38.8	585.9	750.0	380.6	394.4
350 students	50	25	25	407.7	526.2	230.2	71.2	585.2	700.0	407.8	385.6

Table 12. Calculated (from stated) amounts for increasing class size by 10 students

	Number of observations			Amount							
				Sample		WTP		WTA		Marshall	
Class size category (average)	Sample	WTP	WTA	Mean	Median	Mean	Median	Mean	Median	Mean	Median
10 students	17	10	7	62.4	30.3	46.6	11.5	85.1	57.8	65.9	34.6
30 students	148	74	74	73.1	57.8	48.8	30.3	97.4	111.3	73.1	71.5
50 students	110	59	51	65.0	57.8	35.0	30.3	99.6	111.3	67.3	71.5
70 students	49	24	25	64.8	57.8	40.7	11.5	88.0	111.3	64.3	62.1
90 students	32	20	12	28.8	17.3	15.9	8.7	50.3	48.7	33.1	28.7
125 students	41	18	23	31.7	23.1	22.1	12.1	39.3	45.1	30.7	28.6
175 students	40	17	23	24.7	30.1	13.1	0.7	33.2	30.1	23.2	15.4
250 students	66	31	35	15.7	11.6	7.0	1.6	23.4	30.0	15.2	15.8
350 students	50	25	25	11.6	15.0	6.6	2.0	16.7	20.0	11.7	11.0

Table 12. OLS estimates – dependent: Stated amounts in CVM survey

	Next category		Double class size		Plus 10 students	
Class Size 20-39	21.22	12.87	156.74**	137.65***	10.61	7.81
	(32.25)	(32.58)	(20.86)	(38.01)	(16.12)	(15.75)
Class size 40-59	4.95	-0.34	262.19***	249.08***	2.47	0.61
	(32.75)	(32.74)	(31.42)	(41.91)	(16.37)	(15.89)
Class Size 60-79	4.64	-6.71	390.97***	364.73***	2.32	-1.14
	(35.18)	(34.68)	(61.07)	(63.15)	(17.59)	(16.89)
Class Size 80-99	-24.16	-15.90	196.62**	215.28**	-33.67**	-30.55*
	(36.07)	(34.78)	(50.44)	(52.46)	(16.33)	(15.76)
Class Size 100-149	33.77	4.49	334.25***	264.39***	-30.72*	-39.30**
	(35.91)	(35.58)	(48.43)	(55.09)	(15.86)	(15.60)
Class Size 150-199	60.09	17.20	369.21***	268.65***	-37.79**	-49.63***
	(36.28)	(36.52)	(47.12)	(58.16)	(15.64)	(15.61)
Class Size 200-299	32.29	-9.66	330.56***	230.66***	-46.74***	-58.31***
	(34.45)	(35.79)	(41.26)	(57.01)	(15.51)	(15.58)
Class Size 300-500	48.83	19.94	345.27***	273.64***	-50.81***	-58.74***
	(35.25)	(36.59)	(43.10)	(57.89)	(15.47)	(15.68)
WTP		-120.71***		-276.06***		-39.09***
		(8.61)		(20.18)		(3.56)
Parents Edu		4.31		6.89		0.53
		(8.60)		(20.11)		(3.62)
Male		19.78**		45.94**		7.46**
		(8.72)		(20.47)		(3.59)
IntrSt		31.89**		77.36*		7.91
		(16.25)		(39.86)		(5.07)
Financial		14.61*		34.96*		2.68
		(8.55)		(20.15)		(3.58)
Weight		30.38***		82.16***		9.85***
		(8.44)		(19.77)		(3.51)
C	124.91***	156.97***	62.46	129.86***	62.46***	73.62***
	(30.86)	(34.29)	(15.43)	(61.73)	(15.43)	(16.19)
N	553	553	553	553	553	553
R^2 adj. (%)	1.58	30.43	9.82	35.86	20.83	36.41
F-Statistic for Class Size	2.17	24.68	26.84	30.90	38.40	28.82
P-Value of F-statistic	2.83	0.00	0.00	0.00	0.00	0.00
Root MSE	117.21	98.55	273.38	230.56	45.75	41.00

Note: Robust standard errors in parentheses
Including a dummy for the respective university (LMU/TUM) does not qualitatively alter results.

Universität Leipzig

Wirtschaftswissenschaftliche Fakultät

Nr. 1	Wolfgang Bernhardt	Stock Options wegen oder gegen Shareholder Value? Vergütungsmodelle für Vorstände und Führungskräfte 04/1998
Nr. 2	Thomas Lenk / Volkmar Teichmann	Bei der Reform der Finanzverfassung die neuen Bundesländer nicht vergessen! 10/1998
Nr. 3	Wolfgang Bernhardt	Gedanken über Führen – Dienen – Verantworten 11/1998
Nr. 4	Kristin Wellner	Möglichkeiten und Grenzen kooperativer Standortgestaltung zur Revitalisierung von Innenstädten 12/1998
Nr. 5	Gerhardt Wolff	Brauchen wir eine weitere Internationalisierung der Betriebswirtschaftslehre? 01/1999
Nr. 6	Thomas Lenk / Friedrich Schneider	Zurück zu mehr Föderalismus: Ein Vorschlag zur Neugestaltung des Finanzausgleichs in der Bundesrepublik Deutschland unter besonderer Berücksichtigung der neuen Bundesländer 12/1998
Nr: 7	Thomas Lenk	Kooperativer Förderalismus – Wettbewerbsorientierter Förderalismus 03/1999
Nr. 8	Thomas Lenk / Andreas Mathes	EU – Osterweiterung – Finanzierbar? 03/1999
Nr. 9	Thomas Lenk / Volkmar Teichmann	Die fisikalischen Wirkungen verschiedener Forderungen zur Neugestaltung des Länderfinanz-ausgleichs in der Bundesrepublik Deutschland: Eine empirische Analyse unter Einbeziehung der Normenkontrollanträge der Länder Baden-Würtemberg, Bayern und Hessen sowie der Stellungnahmen verschiedener Bundesländer 09/1999
Nr. 10	Kai-Uwe Graw	Gedanken zur Entwicklung der Strukturen im Bereich der Wasserversorgung unter besonderer Berücksichtigung kleiner und mittlerer Unternehmen 10/1999
Nr. 11	Adolf Wagner	Materialien zur Konjunkturforschung 12/1999
Nr. 12	Anja Birke	Die Übertragung westdeutscher Institutionen auf die ostdeutsche Wirklichkeit – ein erfolg-versprechendes Zusammenspiel oder Aufdeckung systematischer Mängel? Ein empirischer Bericht für den kommunalen Finanzausgleich am Beispiel Sachsen 02/2000
Nr. 13	Rolf H. Hasse	Internationaler Kapitalverkehr in den letzten 40 Jahren – Wohlstandsmotor oder Krisenursache? 03/2000
Nr. 14	Wolfgang Bernhardt	Unternehmensführung (Corporate Governance) und Hauptversammlung 04/2000
Nr. 15	Adolf Wagner	Materialien zur Wachstumsforschung 03/2000
Nr. 16	Thomas Lenk / Anja Birke	Determinanten des kommunalen Gebührenaufkommens unter besonderer Berücksichtigung der neuen Bundesländer 04/2000
Nr. 17	Thomas Lenk	Finanzwirtschaftliche Auswirkungen des Bundesverfassungsgerichtsurteils zum Länderfinanzausgleich vom 11.11.1999 04/2000
Nr. 18	Dirk Bültel	Continous linear utility for preferences on convex sets in normal real vector spaces 05/2000
Nr. 19	Stefan Dierkes / Stephanie Hanrath	Steuerung dezentraler Investitionsentscheidungen bei nutzungsabhängigem und nutzungsunabhängigem Verschleiß des Anlagenvermögens 06/2000
Nr. 20	Thomas Lenk / Andreas Mathes / Olaf Hirschefeld	Zur Trennung von Bundes- und Landeskompetenzen in der Finanzverfassung Deutschlands 07/2000
Nr. 21	Stefan Dierkes	Marktwerte, Kapitalkosten und Betafaktoren bei wertabhängiger Finanzierung 10/2000
Nr. 22	Thomas Lenk	Intergovernmental Fiscal Relationships in Germany: Requirement for New Regulations? 03/2001
Nr. 23	Wolfgang Bernhardt	Stock Options – Aktuelle Fragen Besteuerung, Bewertung, Offenlegung 03/2001

Nr. 24	Thomas Lenk	Die „kleine Reform" des Länderfinanzausgleichs als Nukleus für die „große Finanzverfassungs-reform"? 10/2001
Nr. 25	Wolfgang Bernhardt	Biotechnologie im Spannungsfeld von Menschenwürde, Forschung, Markt und Moral Wirtschaftsethik zwischen Beredsamkeit und Schweigen 11/2001
Nr. 26	Thomas Lenk	Finanzwirtschaftliche Bedeutung der Neuregelung des bundestaatlichen Finanzausgleichs – Eine allkoative und distributive Wirkungsanalyse für das Jahr 2005 11/2001
Nr. 27	Sören Bär	Grundzüge eines Tourismusmarketing, untersucht für den Südraum Leipzig 05/2002
Nr. 28	Wolfgang Bernhardt	Der Deutsche Corporate Governance Kodex: Zuwahl (comply) oder Abwahl (explain)? 06/2002
Nr. 29	Adolf Wagner	Konjunkturtheorie, Globalisierung und Evolutionsökonomik 08/2002
Nr. 30	Adolf Wagner	Zur Profilbildung der Universitäten 08/2002
Nr. 31	Sabine Klinger / Jens Ulrich / Hans-Joachim Rudolph	Konjunktur als Determinante des Erdgasverbrauchs in der ostdeutschen Industrie? 10/2002
Nr. 32	Thomas Lenk / Anja Birke	The Measurement of Expenditure Needs in the Fiscal Equalization at the Local Level Empirical Evidence from German Municipalities 10/2002
Nr. 33	Wolfgang Bernhardt	Die Lust am Fliegen Eine Parabel auf viel Corporate Governance und wenig Unternehmensführung 11/2002
Nr. 34	Udo Hielscher	Wie reich waren die reichsten Amerikaner wirklich? (US-Vermögensbewertungsindex 1800 – 2000) 12/2002
Nr. 35	Uwe Haubold / Michael Nowak	Risikoanalyse für Langfrist-Investments Eine simulationsbasierte Studie 12/2002
Nr. 36	Thomas Lenk	Die Neuregelung des bundesstaatlichen Finanzausgleichs auf Basis der Steuerschätzung Mai 2002 und einer aktualisierten Bevölkerungsstatistik 12/2002
Nr. 37	Uwe Haubold / Michael Nowak	Auswirkungen der Renditeverteilungsannahme auf Anlageentscheidungen Eine simulationsbasierte Studie 02/2003
Nr. 38	Wolfgang Bernhard	Corporate Governance Kondex für den Mittel-Stand? 06/2003
Nr. 39	Hermut Kormann	Familienunternehmen: Grundfragen mit finanzwirtschaftlichen Bezug 10/2003
Nr. 40	Matthias Folk	Launhardtsche Trichter 11/2003
Nr. 41	Wolfgang Bernhardt	Corporate Governance statt Unternehmensführung 11/2003
Nr. 42	Thomas Lenk / Karolina Kaiser	Das Prämienmodell im Länderfinanzausgleich – Anreiz- und Verteilungsmitwirkungen 11/2003
Nr. 43	Sabine Klinger	Die Volkswirtschaftliche Gesamtrechnung des Haushaltsektors in einer Matrix 03/2004
Nr. 44	Thomas Lenk / Heide Köpping	Strategien zur Armutsbekämpfung und –vermeidung in Ostdeutschland: 05/2004
Nr. 45	Wolfgang Bernhardt	Sommernachtsfantasien Corporate Governance im Land der Träume. 07/2004
Nr. 46	Thomas Lenk / Karolina Kaiser	The Premium Model in the German Fiscal Equalization System 12/2004
Nr. 47	Thomas Lenk / Christine Falken	Komparative Analyse ausgewählter Indikatoren des Kommunalwirtschaftlichen Gesamt-ergebnisses 05/2005
Nr. 48	Michael Nowak / Stephan Barth	Immobilienanlagen im Portfolio institutioneller Investoren am Beispiel von Versicherungsunternehmen Auswirkungen auf die Risikosituation 08/2005

Verzeichnis 3

Nr. 49	Wolfgang Bernhardt	Familiengesellschaften – Quo Vadis? Vorsicht vor zu viel „Professionalisierung“ und Ver-Fremdung 11/2005
Nr. 50	Christian Milow	Der Griff des Staates nach dem Währungsgold 12/2005
Nr. 51	Anja Eichhorst / Karolina Kaiser	The Instiutional Design of Bailouts and Its Role in Hardening Budget Constraints in Federations 03/2006
Nr. 52	Ullrich Heilemann / Nancy Beck	Die Mühen der Ebene – Regionale Wirtschaftsförderung in Leipzig 1991 bis 2004 08/2006
Nr. 53	Gunther Schnabl	Die Grenzen der monetären Integration in Europa 08/2006
Nr. 54	Hermut Kormann	Gibt es so etwas wie typisch mittelständige Strategien? 11/2006
Nr. 55	Wolfgang Bernhardt	(Miss-)Stimmung, Bestimmung und Mitbestimmung Zwischen Juristentag und Biedenkopf-Kommission 11/2006
Nr. 56	Ullrich Heilemann / Annika Blaschzik	Indicators and the German Business Cycle A Multivariate Perspective on Indicators of lfo, OECD, and ZEW 01/2007
Nr. 57	Ullrich Heilemann	"The Suol of a new Machine" zu den Anfängen des RWI-Konjunkturmodells 12/2006
Nr. 58	Ullrich Heilemann / Roland Schuhr / Annika Blaschzik	Zur Evolution des deutschen Konjunkturzyklus 1958 bis 2004 Ergebnisse einer dynamischen Diskriminanzanalyse 01/2007
Nr. 59	Christine Falken / Mario Schmidt	Kameralistik versus Doppik Zur Informationsfunktion des alten und neuen Rechnungswesens der Kommunen Teil I: Einführende und Erläuternde Betrachtungen zum Systemwechsel im kommunalen Rechnungswesen 01/2007
Nr. 60	Christine Falken / Mario Schmidt	Kameralistik versus Doppik Zur Informationsfunktion des alten und neuen Rechnungswesens der Kommunen Teil II Bewertung der Informationsfunktion im Vergleich 01/2007
Nr. 61	Udo Hielscher	Monti della citta di firenze Innovative Finanzierungen im Zeitalter Der Medici. Wurzeln der modernen Finanzmärkte 03/2007
Nr. 62	Ullrich Heilemann / Stefan Wappler	Sachsen wächst anders Konjunkturelle, sektorale und regionale Bestimmungsgründe der Entwicklung der Bruttowertschöpfung 1992 bis 2006 07/2007
Nr. 63	Adolf Wagner	Regionalökonomik: Konvergierende oder divergierende Regionalentwicklungen 08/2007
Nr. 64	Ullrich Heilemann / Jens Ulrich	Good bye, Professir Phillips? Zum Wandel der Tariflohndeterminanten in der Bundesrepublik 1952 – 2004 08/2007
Nr. 65	Gunther Schnabl / Franziska Schobert	Monetary Policy Operations of Debtor Central Banks in MENA Countries 10/2007
Nr. 66	Andreas Schäfer / Simone Valente	Habit Formation, Dynastic Altruism, and Population Dynamics 11/2007
Nr. 67	Wolfgang Bernhardt	5 Jahre Deutscher Corporate Governance Kondex Eine Erfolgsgeschichte? 01/2008
Nr. 68	Ullrich Heilemann / Jens Ulrich	Viel Lärm um wenig? Zur Empirie von Lohnformeln in der Bundesrepublik 01/2008
Nr. 69	Christian Groth / Karl-Josef Koch / Thomas M. Steger	When economic growth is less than exponential 02/2008
Nr. 70	Andreas Bohne / Linda Kochmann	Ökonomische Umweltbewertung und endogene Entwicklung peripherer Regionen Synthese einer Methodik und einer Theorie 02/2008
Nr. 71	Andreas Bohne / Linda Kochmann / Jan Slavík / Lenka Slavíková	Deutsch-tschechische Bibliographie Studien der kontingenten Bewertung in Mittel- und Osteuropa 06/2008