

The Effect of Germany's Federalism on Student Success

The "Index of Commitment" as Comparative Measure for Study and Examination Regulations

Christoph Hönnige | Victoria A Bauer | Julian Bernauer | Steffen Zittlau | Volker Epping | Vincent Widdig | Monika Jungbauer-Gans | Axel Oberschelp | Sören Isleib | Anh Nguyen Xuan

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Abstract

Long-term studies and drop-outs are a major issue in higher education research, but explanatory factors have often been focusing on attitudinal and sociological characteristics using student surveys as methodology. Institutional rules regarding study and learning regulations have often been neglected, although recent research has shown that they incentivize student behaviour.

We develop an Index of Commitment (IOC) to cover these rules over different types of study phases and different types of commitments of different actors. We distinguish between an early study phase, a main phase and a late study phase and commitments regarding consultation and examination rules by the state, a higher education institution (HEI) and students.

This paper shows empirically that there is a considerable variance of these rules between the 16 German states, which are responsible for the legislation and financing of most of the higher education institutions in Germany. We find states with very soft regulation, where legislation sets almost no rules and student autonomy is held in high regard and states with very precise rules setting strong incentives and leaving only little room for implementation to the HEI. We can show that our index correlates with the percentage of students successfully finishing their degree in time in a state.

By presenting our index, we provide a comprehensive understanding of the commitment of study and examination regulations. The findings and insights can contribute to the ongoing discourse on student autonomy and state control in higher education, as well as inform policy makers and educational institutions in developing effective strategies to address dropout and long-term study. It also shows again that “bringing the state back in” in higher education research is important.

Keywords

Governance, Legislation, Germany, Federalism, Examination, Graduation

Authors

Christoph Hönnige, Leibniz Universität Hannover
Victoria A. Bauer, Leibniz Universität Hannover
Julian Bernauer, Universität Mannheim, MZES
Steffen Zittlau, Universität Mannheim, MZES
Volker Epping, Leibniz Universität Hannover
Vincent Widdig, Leibniz Universität Hannover
Monika Jungbauer-Gans, Leibniz Universität Hannover, DZHW
Axel Oberschelp, DZHW
Sören Isleib, DZHW
Anh Nguyen Xuan, DZHW

1. Introduction

The importance of curriculum design, examination conditions and quality assurance in higher education (HE) has grown steadily worldwide in recent years (Williams & Harvey, 2015). This is due to the global competition for students as stakeholders (Leišytė & Westerheijden, 2013; Bateson & Taylor, 2004) and the impact of university rankings and excellence competitions on students' choice of university (Horstschräer, 2012; Rostan & Vaira, 2011).

In Germany, higher education institutions (HEIs) are competing for a steadily shrinking birth cohort due to demographic change, while the proportion of a cohort entering higher education is stagnating at 29 % (Autorengruppe Bildungsberichtserstattung, 2022) despite the abolition of tuition fees in all federal states at least from 2013 (Thomsen & von Haaren-Giebel, 2016) and contrary to the objectives of the European Union towards a share of 25 - 34 year olds with a tertiary education of at least 45 % by 2030 (Council of the European Union, 2021).

This is problematic in view of the increasing demand for academically qualified professionals in Germany (Bundesinstitut für Berufsbildung, 2022), which leads to increased pressure on the higher education system not only to achieve higher entry rates, but also to reduce the dramatically high rates of drop-outs and continuous enrolments, as graduates are quickly needed in the labour market.

There is an established pool of literature on the explanatory power of individual characteristics of students to explain student success (cf. Day et al., 2018; Fong et al., 2017; Kuh et al., 2007; Kuh et al., 2006a). Recent studies have also stressed the importance of curriculum design, examinations rules and institutional support structures as institutional characteristics to explain study drop-out and long-term study (cf. Himmler et al., 2019; Behlen et al., 2021; Behlen et al., 2022). However, this body of literature is still limited and most articles analyse the effect of single rules on student success, but so far, there are no articles providing institutional overviews over the current situation.

Germany's federal system provides an interesting example to look at study rules in a broader context due to the organisation of the Higher Education System. Almost all universities are state universities with the 16 subnational states (*"the Länder"*) being responsible for organisation and financing research and teaching, only two of the universities are federal universities and there are only a few and rather small private universities. The states

Recent research has shown (Döhler et al., 2023), that state rules have a strong impact on the organisation of the universities. Beyond higher education, subnational states determine primary and secondary education as well. There is not only scientific literature about the effect of the Länder on secondary school success (e.g. Büchler, 2016; Helbig, 2012), but the large school studies like PISA and IGLU show huge, systematic and persistent performance differences between the subnational states.

German higher education institutions thus use different strategies to ensure student success and to meet the preferences of students as consumers (Naidoo et al., 2011), resulting in a heterogeneous picture of the binding nature of study and examination regulations at the level of the German Länder and within the Länder. This heterogeneity of regulations has not yet been systematically recorded or categorised and therefore represents a research gap. Furthermore, it is necessary to examine whether certain regulations have a positive impact on the study situation due to appropriate adjustments or whether they have a negative impact due to increasing formalisation and bureaucratisation and thus lead to non-completion of degree programmes.

Our research question is: **Does the commitment of students and HEI to study regulations explain the successful finishing of degrees in time?**

This article thus introduces the Index of Commitment (IOC) to measure the degree of commitment of institutional rules in the higher education laws of the 16 German states. It provides a theoretical concept for commitment including consultation and examination rules for different phases of study, entry phase, main phase and late phase. Afterwards the commitment is measured for the 16 states, based on the empirical regulations of the German Länder (federal) higher education laws (“Landeshochschulgesetze”, LHGs).

Our first main finding is that, in the German federal system, there is considerable variation in the degree of commitment between the Länder with regard to regulations on the examination and consultation of students. Using descriptive analyses, we rank the LHGs in terms of different dimensions of commitment rules.

Our second main finding is that institutional regulations, especially those related to examination rules, have a discernible impact on HE students' study behaviour. The positive correlation between commitment to examination regulations and the percentage of students who complete their studies within the expected time frame provides evidence of a concrete link between institutional regulations and academic outcomes.

This study contributes to the academic discourse on the enforceability of rules in state higher education governance and provides insights into effective ways of balancing state control and student autonomy in higher education with the aim of reducing dropout and long-term study. This research paves the way for more nuanced and context-specific investigations of the interplay between institutions and individual behaviour in HE, and contributes not only to the field of HE research, but also to broader discussions of institutional effects on behaviour.

2. The German higher education system: Bringing the state back in

2.1 State control in German higher education

In general, higher education is the responsibility of the 16 states (Art. 30 Basic Law) with three major exemptions: The central state can regulate the access to higher education as well as the degree types (Art. 74 (1) 33 Basic Law), even though the states may deviate from these rules, it can foster research (Art. 74 (1) 13 Basic Law) and it can jointly foster research and teaching co-operation with all states (Art. 91b (1) Basic Law). Almost all rules can thus be found in the form of state legislation, the so called *Landeshochschulgesetze* (LHG). As such, the state produces the central environment for the universities (Krücken et al., 2021).

As German universities are based on the principle of academic freedom, higher education institutions have traditionally been actors independent of state governance. The universities are thus also able to set their statutory rules within the boundaries of the federal and state legislation, which they also do with regard to examinations.

While academic freedom is still important today, the definitive views of external evaluators from around the world on the appropriate governance of higher education have already allowed for the implementation of features of new public governance and have influenced assessments and evaluations of the sector (Zapp et al., 2021). Increasing state regulation has been accompanied by a loss of traditional forms of autonomy, namely that of the academic professions (Schimank, 2005). All German Länder have implemented a policy of deregulating professorial autonomy, which is expected to lead to efficiency gains, as state laws define the tasks and missions of universities (Kosmützky, 2012).

Conflicting political expectations are therefore the fundamental problem currently facing German universities. The unresolved paradoxes of university governance and the introduction of entrepreneurial concepts are major hurdles.

As a result, there are significant differences and variations between the Länder. Universities in different Länder can choose their legal status. They can choose to remain public institutions or to become foundations, thus gaining more financial and organisational autonomy. The approval of study programmes has been transferred from ministries to newly established accreditation institutions, where peer review and quality standards play a greater role. It is up to the government of a particular Land to decide whether a particular programme or university fits into the Land's overall strategy (Schimank, 2005).

In conclusion, German federalism provides an interesting case for analysis of different examination rules across the 16 states and possible effects of these differences, which can also be seen in other areas of university governance (Döhler et al. 2023). Beyond this, in further studies, it also seems to analyse differences within states, as the HEI can use statutory law to implement and shape study rules within the boundaries of the *Landeshochschulgesetze*.

2.2 Regulations of examination and consultation

As a result of the aforementioned reform processes of the last two decades with regard to the Bologna Reform, New Public Management and the strengthening of autonomy, HEIs in Germany and Europe have undergone a profound process of change, which has been reflected in the governance of teaching and research (Knoke & Krücken, 2012; Wolter, 2012). The idea of giving higher education institutions greater autonomy and thus responsibility for the development of a teaching and research programme has been accompanied by the systematic introduction of quality assurance processes (Boer et al., 2010), which are intended to ensure transparency and implement a variety of requirements, such as the inclusion of increasing proportions of cohorts in higher education, the reduction of dropout rates or the increase in practical relevance (Knoke & Krücken, 2012).

Fundamental features that characterise the governance of teaching and learning at higher education institutions and are relevant to the study situation relate in particular to the two areas of 1) examination, including performance incentives conveyed through examination requirements, e.g. repetition options, examination points, orientation phases with minimum requirements (Dörsam, 2018), and 2) consultation, including navigation in everyday study through information offers and advice, and in particular whether they are anchored in binding form in the regulations (Vossensteyn et al., 2015). Whether and in which direction the characteristics of greater formalisation of study conditions influence the course of study has not yet been sufficiently empirically analysed (Vossensteyn et al., 2015).

Previous empirical research indicates that the distribution of exams and the number of exam periods in the first year of study, as well as fewer opportunities to repeat exams, can have a positive effect on students' academic progress (Jansen, 2004). Recent research from an economic perspective using field experiments, indicates that study rules have an impact on student success (Behlen et al., 2021; Brade et al., 2019; Himmler et al., 2019). This literature starts from the point that students have an inherent tendency to procrastinate (Steel, 2007; Ellis & Knaus, 1977). It shows that the impact of soft commitments in the form of agreements between student and HEI to stay on track have a stronger effect than pure reminder to take part in an exam or no action at all. Exam commitments seem to have a strong effect especially on the procrastinating type of student. A second interesting finding is that it makes a significant difference, if students are automatically registered for an exam – but

can opt-out – or if they have to register themselves as an opt-in-act. The former leads to higher participation rates than the latter. A large-scale analysis of administrative data from some German universities (Berens et al., 2019; Schneider et al., 2019) indicates that early exam participation is a good indicator for later student success and that an early warning system using these data makes a difference.

In conclusion, it seems to be important to analyse existing rules in the higher education legislation and the different temporal stages. Previous research has focused on a few selected rules but so far, there is no overview about the existing rules or a classification of these. Especially the early stage seems to be of interest, with regard to examination rules, number of attempts, timing and setting of registration, but also the control of progress and consultation offers.

3. Student success: Degrees in the expected time

The definition of student success is hotly debated in the literature. In a narrow definitional sense, objective criteria are easily observable and serve as a solid indicator of human capital outcomes, leading to good grades being the most common operationalisation of student success (Trapmann et al., 2007; Robbins et al., 2004). However, there is also a focus on subjective criteria for student success, such as satisfaction, social contacts, passion for the subject, autonomy and a balance between requirements and support (Bosse et al., 2019; Krempkow, 2007; Schomburg, 2007).

From an institutional perspective, success is usually defined as a student who completes the planned degree (Petri, 2021). This measure of success focuses on the relationship between the HEI offering a particular programme of study and the student - it is by no means a statement about the success of the education system or the success of a student in tertiary education. Typically, this definition of success is also used by governments and HEIs when measuring success rates for different types of degrees, which are often used as a basis for funding (Dougherty & Reddy, 2011; Heublein, 2014). On the opposite, no success is defined as a student who does not complete the programme. This student may change subject or HEI, or leave HEI and choose another type of tertiary education, or leave the education system entirely for work (Tieben, 2023).

Another aspect often included in official measures is time. Slow progress and long duration of students is an issue faced by higher education institutions worldwide (Jansen, 2004; Behr et al, 2020). For example, the Organisation for Economic Co-operation and Development's definition of student success includes aspects of completion within the typical programme duration (OECD, 2019). Typically, in time is measured in relation to the expected duration of a programme, which is often 3 years in the bachelor system. However, the definition which study duration is "in time" and which is not varies. Some measures calculate the expected duration plus 2 semesters. The reason for this relaxation of the measure is to cover different behaviour of universities with regard to counting delays because of the Erasmus program, child care or other reasons. This extended measure is a more robust measuring strategy.

The combination of these two dimensions leads to four types of study outcomes, which differ with regard to their efficiency regarding the aim of the state and the university to ensure the finishing of a degree in time. We take the perspective of efficiency here, as tertiary education is not cost free for the state and the HEI. Study places are limited and teaching of courses is costly, with costs varying strongly by degrees. In the many HEI systems funding is mainly allocated according to student numbers and / or students finishing a degree.

From a state and university perspective, finishing a degree in the expected time is the most efficient outcome (type 1) and dropping out at a very late stage the most inefficient (type 4). Still efficient for a university and the state is a student who is finishing a degree, although with delay (type 2). Less efficient is a student who drops out at an early stage, although this might be considered efficient still, if this happens in the first two semesters and it becomes less efficient, the later this occurs during the course of the studies (type 3).

| | | Duration | |
|---------|----------------|---|--|
| | | In expected duration | Longer than expected |
| Success | Completion | Type 1: Degree in RSZ +2 Outcome: Very Efficient from state and HEI perspective | Type 2: Degree after RSZ+2 Outcome: Efficient from state and HEI perspective |
| | Non-completion | Type 3: Dropout in RSZ +2 Outcome: Less efficient from state and HEI perspective | Type 4: Dropout after RSZ+2 Outcome: Inefficient from state and HEI perspective |

Table 1: Types of study outcome: success and duration

If one accepts the axiom that the state and the HEI have the aim to ensure a timely and successful completion of the studies and that they are rational actors, we should assume that their preference order is type 1 > type 2 > type 3 > type 4.

All other things equal, institutional rules to commit students to achieve the aims of the institutions are one mechanism, universities use to ensure these aims. Others may be designing study programmes which can be studied successfully in a timely fashion without work overload or consultation offers for students, which is both a commitment by the HEI to the students

4. Conceptualising an Index of Commitment

4.1 Commitment as central concept and actors

The central concept we introduce is the commitment to complete the studies of a degree successfully and in time. This commitment is an agreement between three actors: the student, the HEI and the state financing the HEI and thus legislating certain rules regarding the relationship of student and HEI. This triangle relationship occurs in almost all countries and for different degrees to varying extents.

Commitments may manifest in many forms e.g. by rules, institutions, words or written promises. With regard to commitment, we focus on the institutional rules laid down in state laws and examination regulations in this article. This form of commitment can be given by the state or the HEI in form of guaranteed consultation offers, timing and frequency of examination offers or consideration disadvantages because of disabilities or parenthood in examination rules. This form of commitment may also be by a student enrolling in a course and thus agreeing to the examination rules.

These rules are rather installed top-down, first by the state legislation and then the HEI, which implements the state legislation within the given boundaries. But they may be adapted also bottom-

up. As in the German system, students are involved in the governance of the University and may exert political pressure to adapt legislation in a more liberal sense.

We find two ideal types of commitment: (A) A complete de-regulation, where the state leaves the regulation of examination rules completely to the HEI. In this type we thus find a high degree of student autonomy and HEI autonomy. Almost no rules and if there are any, only optional rules. (B) A high degree of regulation by the state and the HEI regarding examinations and consultation. Rules occur in the form of requirements and not as options. Examination systems can gradually move between those two ideal types. We consider commitment as a continuous variable in principle.



Figure 1: Unidimensional model of commitment in HEI regulations

4.2 The set of rules and incentives

While it is the axiom of rational choice institutionalism (Hall & Taylor, 1996) that rules set incentives for actors, the strength of the incentive of course depends on the costs of the rule and the personal-trade-offs. With regard to study related regulations, we find a broad variety of relevant rules which may increase the commitment to a certain degree and thus influence speed and success of study.

- a. Information: The provision of information to students is the softest form of rules. The idea is that information provision can shape the behaviour of students. The provision of information can be e.g. about the progress of the study or the provision of a study plan. This is also known as nudging and a rather soft incentive.
- b. Consultation: Consultation may improve student success and study speed by reducing errors in the study plan, avoid work overload, too little work or advice with problems. This may happen as a general advice, as a special advice for students with psychic, social or physical issues or for students who make little progress. This is a rather soft incentive.
- c. Achievements: Exam rules might specify achievements a student is required to fulfil, e.g. a certain amount of ECTS points in a period, a peculiar class to participate or a particular exam to write, or the participation in classes in general. Achievements are a strong incentives.
- d. Deadlines: Deadlines might be set until when an information has to be given, a consultation process has to be conducted or requirements to be fulfilled. The deadline may be linked to sanctions. The length of a deadline makes a strong difference in the incentive, e.g. a model where all examinations need to be passed two semesters after the expected study time is a far stronger incentive than when the deadline is set 8 semesters after the expected study time.
- e. Sanctions: A non-fulfilment in a consultation process or requirements or violation of deadlines can lead to sanctions. Sanctions may or may not be qualified in the rules. Types of sanctions may be a deduction in marks or failing an exam or the studies finally or direct de-registration. Sanctions may create a strong incentive, even in advance as a threat (autolimitation)
- f. Protections: There may also be protection rules. Students may have a special protection leading to an extension of the expected study time or changes in exam types or a prolonging of exam time. Typically, protected students are in maternity or parental leave, have certified disabilities or take care of relatives. This may be extended to further groups like students with children, health issues, are professional sports students, participate in the university

governance, have language issues, participated in the Erasmus program or have other issues. Protection rules soften the incentives of other rules.

Also, the state legislation does control the flexibility the HEI have with regard to the rules they set towards their students. We find three types of regulations

1. No rule: There is no information on rule setting
2. Optional rule: The institution can set a rule
3. Obligational rule - negative: The institution must not set a rule.
4. Obligational rule - positive: The institution has to set a rule.

For an institution, the flexibility decreases from no rule to obligational rule. That means the state control over the HEI und thus indirectly over the student and his/her behaviour increases. While categories 1 and 2 theoretically give a HEI the same freedom, the optional rules postulate an opportunity for the HEI to introduce a regulation and thus incentivises to do so.

The timing of setting a regulation will also shape the incentives for students. We can differentiate between twos stages during a 6-semester course of the studies where rules can be set:

1. Entry stage: Semester 1 and 2
2. Main stage: Semesters 2 to 6
3. Late stage: After Semester 6

Depending on the aim of the rule setter, the stage of the studies might make a difference depending on the type of the rules. Information provision might have a strong positive effect on long-term study in the entry stage of studies but not in a late stage. High ECTS requirements in the early stages might reduce long-term study on the one hand, but increase the drop-out rate on the other hand.

4.3 The Index of Commitment (IOC)

We conceptualise an Index of Commitment (IOC) with regard to two substantial dimensions when and where regulation may occur. We firstly include the study phase and secondly, the type of commitment.

The study phase is divided into three temporal categories: (1) the entry phase, from the enrolment at the HEI up to the end of the first semester, (2) the main phase of study (for bachelor programmes mostly from the second to the sixth semester), and (3) the late phase of studies counted from the moment the expected duration is exceeded (e.g. 3 years). Secondly, the type of commitment is divided in two categories: (A) Commitment regarding guidance and consultation to be offered by the university and/or to be accepted by the student and (B) commitment enforced by examination regulations. Examination regulations may contain rules on deadlines, number of examination attempts or similar. Consultation regulations may contain rules on what consultation a university has to offer or when a student shall take formal consultation on his/her studies.

These two dimensions are being substantiated with rules set by states and universities. This leads to six fields, which can be filled with different indicators. The rules allow for a continuous shift from one end to the other, reflecting the varying degrees of regulation in different HE contexts. The endpoints are strong regulation and strong deregulation. These two dimensions are generalizable beyond the German context.

Index of Commitment IOC

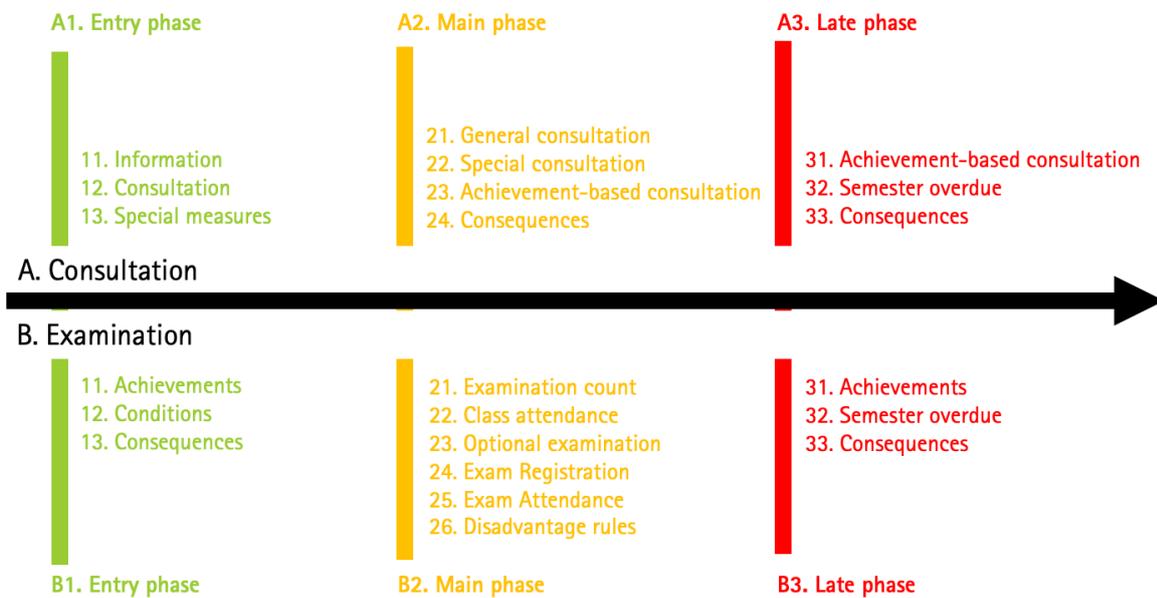


Figure 2: The Index of Commitment IOC and its components

For the analysis of the German rules, we use a set of indicators related to the state laws as comparable unit. These rules are not encompassing, and might be amended and modified by the universities in their central or decentral examination rules. But they set boundaries in which a university may act. The indicator set A1 includes information, if consultation or information occurs in the early study phase or if a state proposes special measures in the introductory period. Indicator set A2 covers the general consultation of students, a consultation process which is initiated if a student is not achieving given aims and the consequences of this. A3 contains consultation processes which are initiated after the end of the expected study time, especially on what lack of achievements this is based, how long the student is overdue and what are the consequences of the consultation process. B1 covers achievements, conditions and consequences in the early phase, B2 a set of general examination rules, especially if all exams are counted, if class attendance is required, if early exams are possible, rules for exam registration and attendance and rules for disadvantaged students. B3 contains the same indicators as A3 for the consultation process.

As the fine details of the rules strongly vary between states and creativity seems to have little boundaries. The indicators mainly establish, if a category is being used and a rule is established or not, and if a rule is optional or required to be implemented by a university with a state. The points in each of the six fields vary between 5 and 6, thus the fields are roughly comparable and there is no implicit weighting through the pointing system.

5. Case selection, Data, Methods

Our database contains the State Laws of Higher Education (“Landeshochschulgesetze”) in Germany from 2005 until 2022. These documents typically are 50-60 pages long and regulate among other things the basic rules of teaching and learning. They are changed in irregular periods by state governments depending on their political preferences. If a change occurs which affects our index, we show this in our data analysis indexing the datapoint with the respective year.

To externally validate our index, we use data from the German Centre for Higher Education Research and Science Studies (DZHW) “ICE Land” project as student success and therefore dependent variable. The data contain degree completion rates of the German Länder in the suggested study time (“Regelstudienzeit”, RSZ) and the suggested study time with two additional semesters (RSZ +2; see section 3). We use descriptive analyses, particularly scatterplots, to rank the LHGs along our different dimensions. We also use bi-variate plots to externally validate our index.

The following indicators are being used:

| Number | Indicator | Categories |
|---|---------------------------------|---|
| A1 – Consultation & Early phase (max 5 points) | | |
| A11 | Information | Information about study progress None (0), optional (1), required (2) |
| A12 | Consultation | Consultation about study progress None (0), optional (1), required (2) |
| A13 | Special measures | Other special measures, e.g. mentoring, orientation period, study plan None (0), yes (1) |
| A2 - Consultation & Main phase (max 6 points) | | |
| A21 | General consultation | General consultation None (0), yes (1) |
| A22 | Special consultation | Consultation for students with special needs or psychological issues typically protected by B26. None (0), yes (1) |
| A23 | Achievement-based consultation | Consultation if certain achievements are not fulfilled, e.g. too few ECTS None (0), optional (1), required (2) |
| A24 | Consequences of consultation | Consequences of missed consultation or failed tasks, e.g. exmatriculation None (0), optional (1), required (2) |
| A3 - Consultation & Late phase (max 6 points) | | |
| A31 | Consultation | Consultation after the end of the study period None (0), optional (1), required (2) |
| A32 | Semester overdue | Semester overdue after which consultation is conducted None (0), 5+ (1), 1-4 (2) |
| A33 | Consequences of consultation | Consequences of missed consultation or failed tasks, e.g. exmatriculation None (0), optional (1), required (2) |
| B1 – Examination & Early phase (max 5 points) | | |
| B11 | Achievements | Achievements in early period defined None (0), yes (1) |
| B12 | Conditions | Achievements need to be fulfilled, e.g. a certain module completed None (0), optional (1), required (2) |
| B13 | Consequences of non-achievement | Consequences if student fails achievements, e.g. exmatriculation None (0), optional (1), required (2) |
| B2 – Examination & Main phase (max 6 points) | | |
| B21 | Examination count | Examinations may not be counted in the first year. No (1), yes (0) |
| B22 | Class attendance | Class attendance needs to be especially justified by teachers No (1), yes (0) |
| B23 | Optional examination | An optional early exam is possible (“Freischuss”) |

| | | |
|--|---------------------------------|---|
| | | No (0), yes (1) |
| B24 | Exam Registration | Non-registration to an exam is counted as fail No (0), yes (1) |
| B25 | Exam Attendance | Non-attendance of an exam is counted as fail No (0), yes (1) |
| B26 | Disadvantage protection rules | Compensation for students with disadvantages, e.g. children, disabilities Extended legal rules (1), additional rules (0) |
| B3 – Examination & Late phase (max 6 points) | | |
| B31 | Achievements | Achievements after the end of the study period None (0), optional (1), required (2) |
| B32 | Semester overdue | Number of semesters after end of regular study period None (0), 5+ (1), 1-4 (2) |
| B33 | Consequences of non-achievement | Consequences if student fails achievements, e.g. exmatriculation None (0), optional (1), required (2) |

Table 2: The indicators of the Index of Commitment IOC

6. Empirical results for the Index of Commitment (IOC)

Our empirical results will be presented in three steps. First, we will introduce the index split on the two types of commitments, consultation and examination rules. Second, we will introduce which states focus on which phase of the studies. Third, we will externally validate our index with regard to aggregate variables we take from the ICE Land database.

6.1 The Index of Commitment, by types of commitment

Figure 3 presents the Index of Commitment (IOC) in total and split for the two dimensions consultation and examination. The theoretical range for the index is 16 points for consultation and 17 points for examinations, so in total 33 points for the IOC. As we can see, the lowest value for consultation is 1 (NDS; SL), the highest 8 (HH; BRE, MV). The lowest value is explained by the offer of general consultation – and nothing additional. The lowest value for examination is 3 (RLP, SA), the highest 16 (BY). In general, the values for consultation are lower (median = 4, mean = 4.2), than for examination (median = 5.5, mean = 6.7). The overall index has an empirical range from 5 (RLP) to 20 (BY) with a median = 11 and a mean = 10.9. States like Bavaria Hamburg and Baden-Württemberg exhibit the highest value on the scale, Rhineland-Palatine, Hesse, Saarland and Sachsen-Anhalt the lowest.

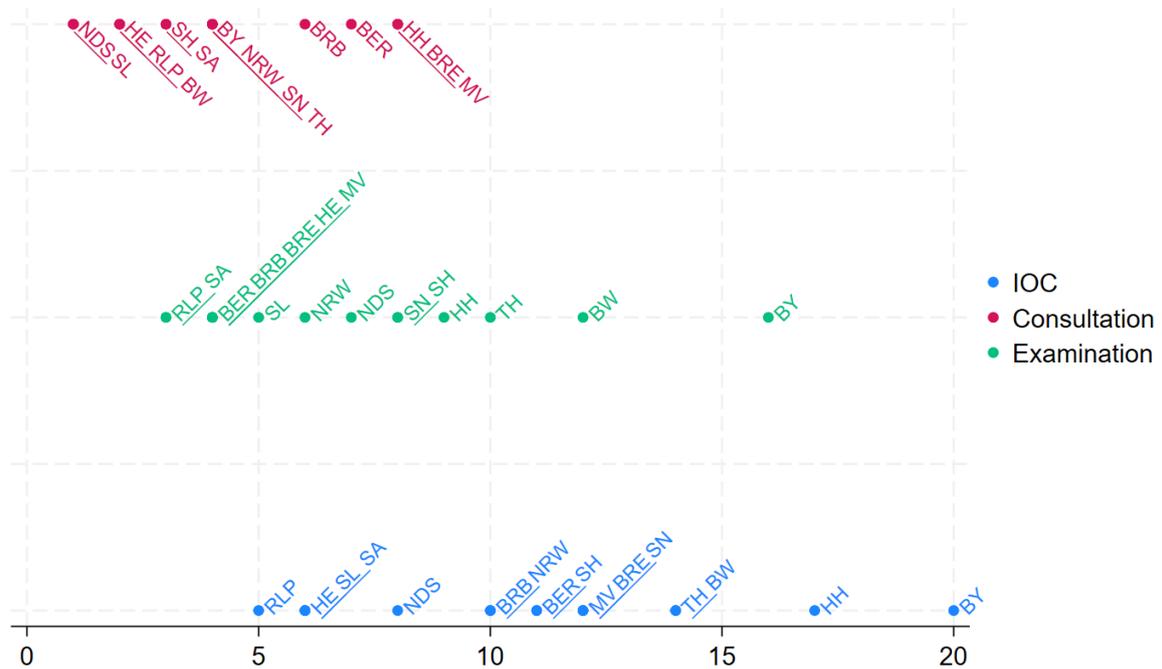


Figure 3: The Index of Commitment, by types of commitment for 16 German states

Figure 4 is the scatterplot for examination (y-axis) and consultation (x-axis). This allows us to test the relationship between consultation strategies and examination strategies. As a general pattern, there is no relationship, the correlation coefficient is -0.18 and not significant. Instead, we find the states scattered over the place and can thus rather identify four types of states with different strategies: (1) autonomy: low consultation and low examination values, (2) state control: high consultation and high examination values, (3) consultation: high consultation and low examination values and (4) examination: low consultation and high examination values.

6.2 The Index of Commitment, by study phase

In the next step, we focus on the temporal dimension of the Index of Commitment (IOC). Here, the index can take a maximum value of 10 for the early study phase, of 11 for the main phase and 12 for the late phase. The three partial indices are compared in figure 5. Means (medians) are 2.8 (2) for the early phase, 5.3 (5) for the main phase and 2.9 (2.5) for the late phase.

While the values for the early phase are distributed across almost the entire index, the values for the main phase are rather concentrated and we find a bipolar distribution for the late phase. It is kind of surprising that many states do not invest in the early phase of the studies despite high drop-out rates in the beginning. It is also visible, that – despite issues with long-term study – half of the states do not have any provisions for the late study phase, neither consultation, nor examination rules. The exemption is Hamburg, which has provisions for both aspects, however, little in the early phase.

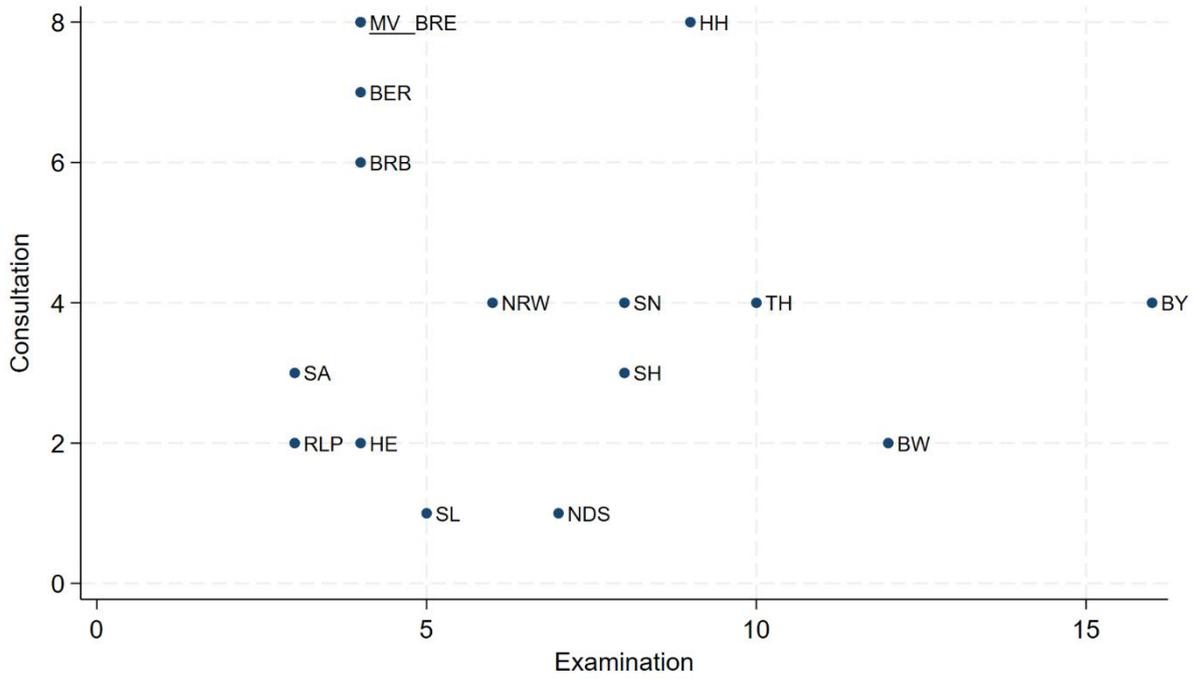


Figure 4: The correlation between consultation and examination, Index of Commitment IOC

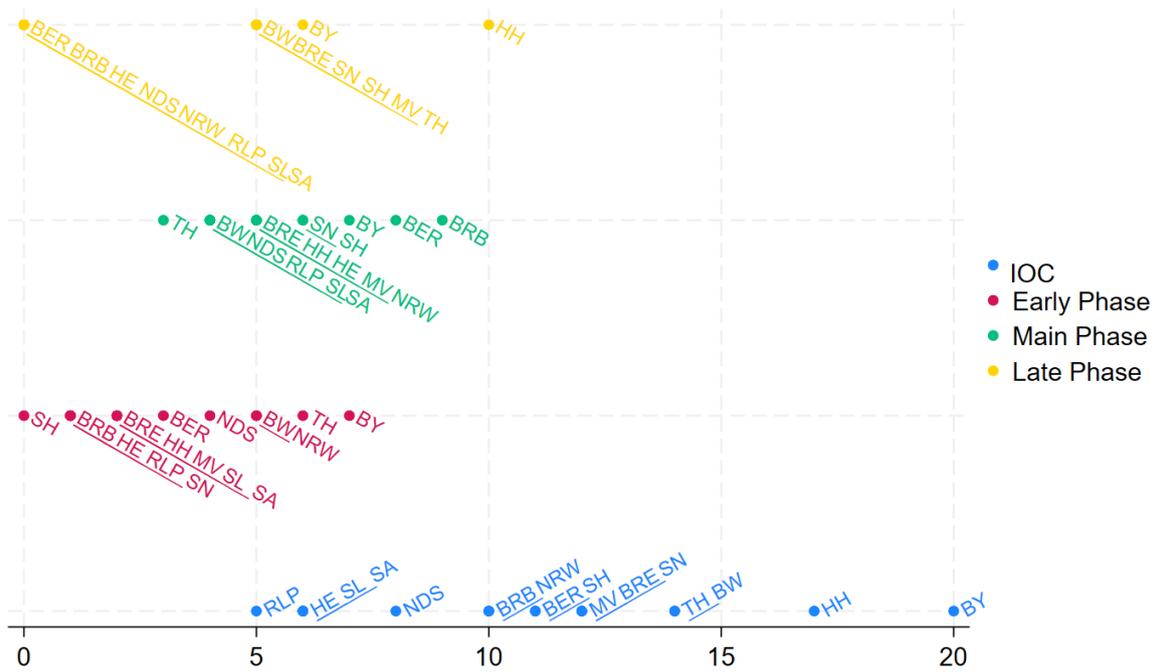


Figure 5: The Index of Commitment, by study phase

Figure 6 shows the relationship between the early study phase and the late phase of study. Again, we see no relationship with the correlation coefficient only 0.10 and insignificant. We do not see states,

which strongly invest in both the late and the early phase, but states, which neither have a focus on both. Bavaria, Thuringia, Baden-Württemberg and Hamburg seems to invest most in the end and the beginning. What is also visible is that at the end, states rather decide to take measure or not, but there is not visible difference within groups.

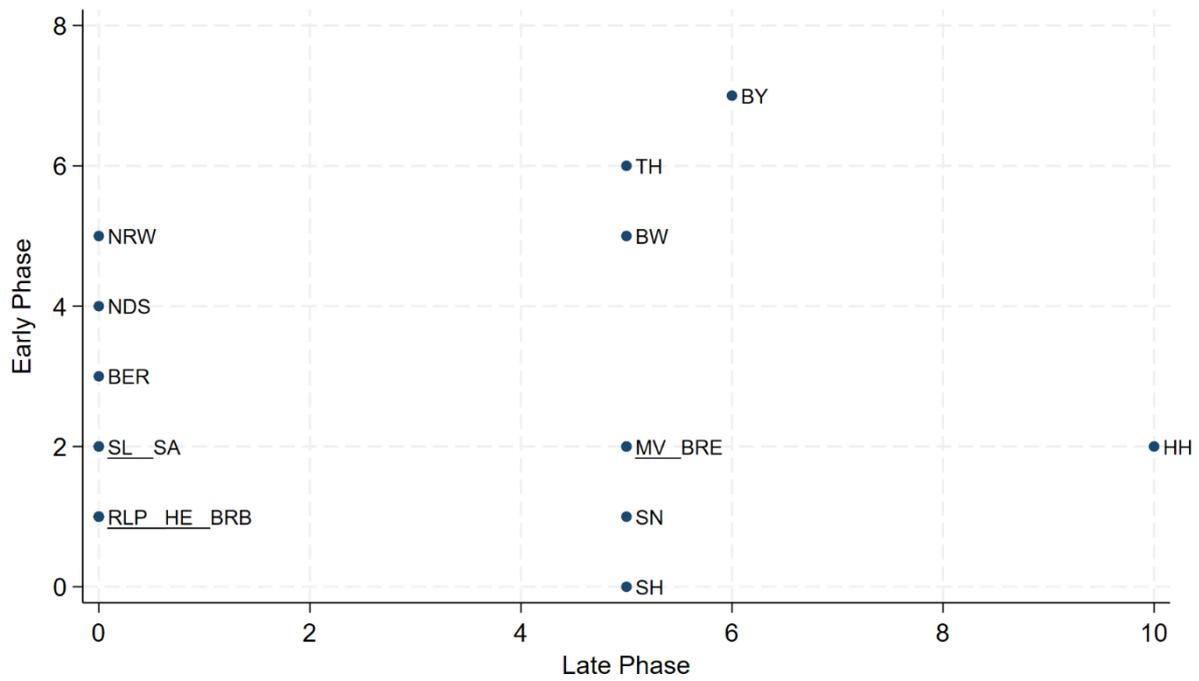


Figure 6: The correlation between consultation and examination, Index of Commitment IOC

7. Face validity: How the IOC explains successfully finishing a degree in time

In this section we analyse the correlation between different aspects of our index and student behaviour. We focus on completion rates within the regular study period plus two semesters (RSZ+2). Due to a lack of data on dropout rates, we cannot distinguish between dropouts and long-term students among those who do not complete their studies. The data are taken from the ICE Land database.

Figure 7 shows the relationship between the consultation element of the IOC as independent variable and percentage of students with degree in RSZ+2 as dependent variable. As we can see, there is no relationship. It is an almost perfect point cloud with a coefficient of -0.33 which is not significant at $p=0.587$.

Figure 8 shows the relationship between the examination element of the IOC as independent variable and percentage of students with degree in RSZ+2 as dependent variable. As we can see, this element of the IOC has a positive and significant effect on the dependent variable with a coefficient of 0.73 which is significant at $p=0.057$. The higher the commitment by examination regulations, the higher the percentage of students is which finish their degree almost in time. This is surprising, given the fact, that the data of the dependent variable is highly aggregated on the state level across many HEI and

degree types. Outliers are Saarland and Mecklenburg-Vorpommern, which thus deserve closer inspection.

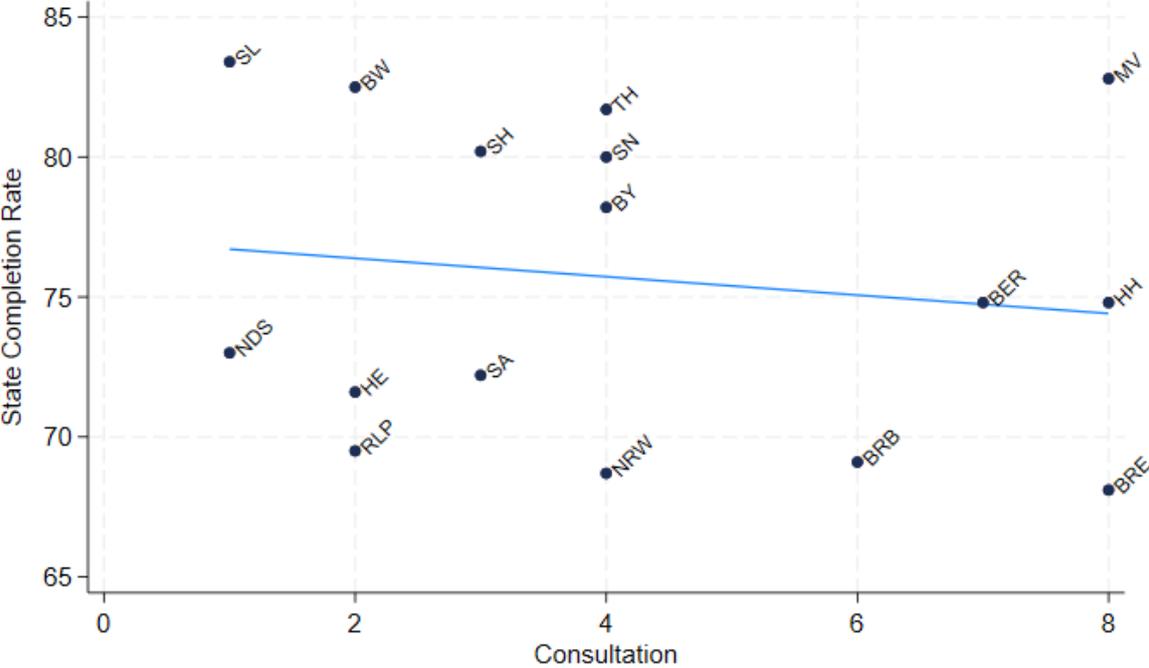


Figure 7: The correlation between consultation and percentage students finishing in RSZ+2

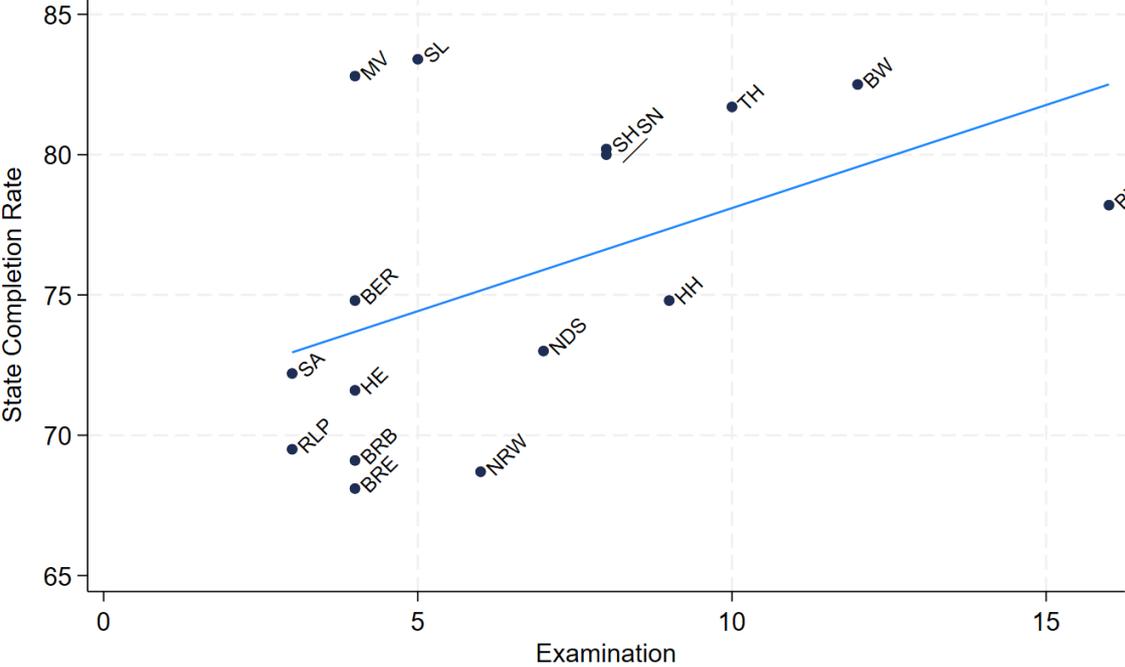


Figure 8: The correlation between examination and percentage students finishing in RSZ+2

The last figure 9 shows the relationship between the final study phase element of the IOC as independent variable and percentage of students with degree in RSZ+2 as dependent variable. As we can see, this element of the IOC has a positive and significant effect on the dependent variable with a coefficient of 0.74 which is slightly above the 10 % significance threshold at $p=0.102$. The higher the consultation and examination commitment regulations at a late stage, the higher the percentage of students is which finish their degree almost in time. We can also see that there are three outliers: Saarland, Bremen and Hamburg, which also deserve closer inspection.

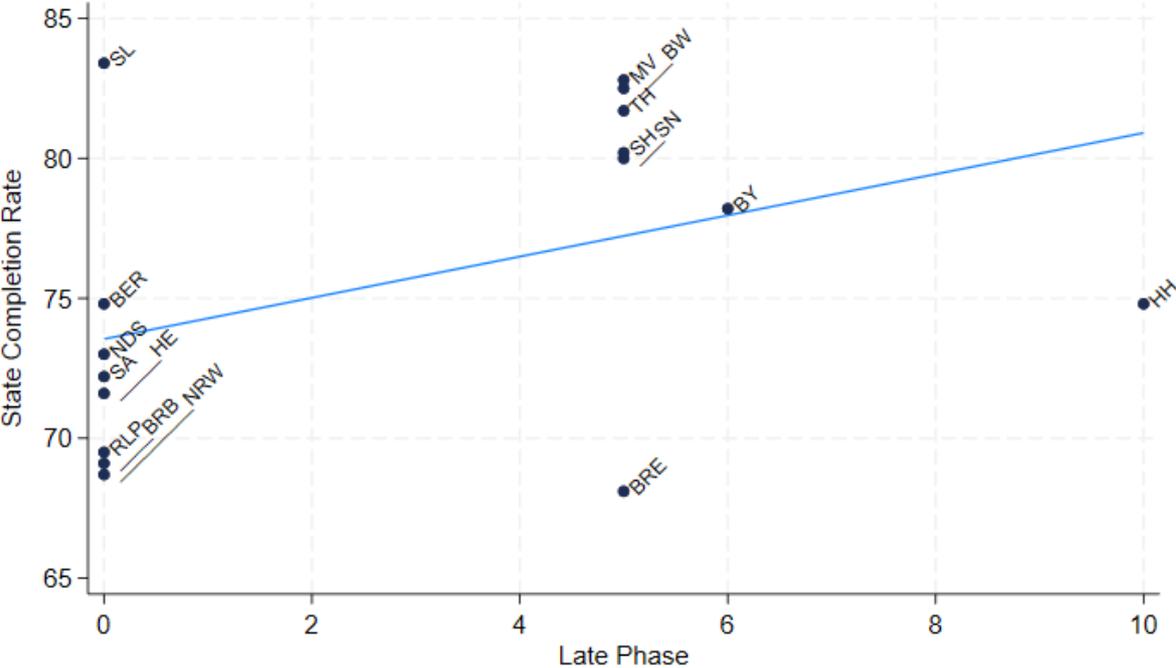


Figure 9: The correlation between final study phase and percentage students finishing in RSZ+2

8. Conclusion and discussion

Research on the effect of institutions on behaviour has been the dominant paradigm in sociology, political science and economics in the last 30 years (Hall & Taylor, 1996). In research on student-centred HE research – especially with a focus on student behaviour and student success – it has been rather neglected. Only recently effects of study regulations have been under increased scrutiny (cf. Behlen et al., 2022).

This paper thus focuses on study and examination rules. We construct an index with which we can measure differences between state legislation and between HEI with regard to the degree of commitment students, HEI and the state have to successfully finish the study in time. The index consists of two dimensions: the temporal aspect, with regard to the start of the studies, the main phase and the final phase and the type of commitment with regard to the fundamental features of consultation and examination regulations. It covers the commitment of the state, the HEI and the

student. Our central expectation is that study rules shape the behaviour of students with regard to the risk of dropout and finishing in time. The higher the commitment, the less students will be overdue.

Empirically, we use the German case, which allows considerable variance on several levels. Our first main finding is that there is considerable variation in the degree of commitment between the 16 German states in the federal system regarding regulations for examination and consultation of students. Our second main finding is that examination regulations – but less so consultation regulations – have an effect of long-term study and study completion. The less regulated a HEI is with regard to commitment rules, the lesser the percentage of students finishing a degree in time successfully.

The empirical results of this study in the German higher education context advance the international state of research by introducing the concept of the commitment of different actors (students, HEIs and the state) as a central factor. We provide important implications in three key areas:

1) Recognition of contextual variance: We highlight the importance of taking regional and institutional heterogeneity into account when analysing the determinants of student success (Gewinner et al, 2022; Wollscheid & Hovdhaugen, 2021). The considerable variation in the degree of commitment regulation across the 16 German Länder highlights the need to recognise and account for contextual variance between and even within higher education systems. Thus, previous research on factors influencing student behaviour, dropout and progression needs to be more reflective of the institutional contexts of the individuals observed.

2) Redefining institutional effects: Previous research may have underestimated the extent to which institutions can shape their academic environments based on their own strategic goals and values (Medland, 2014; Raaper, 2017). While previous research has often focused on more general institutional characteristics (Aina et al., 2022; Kuh et al., 2006b), this study's emphasis on specific engagement regulations highlights the concrete ways in which institutions shape student behaviour and outcomes through rules related to testing and advising. This perspective encourages a more nuanced understanding of how institutions influence students' trajectories, even in a less stratified and more equal university system such as Germany's (Deppe et al., 2015). As such, the findings of our study redefine the notion of institutional effects on student behaviour.

3) Policy implications and improvements for HE management: The findings underline the importance of certain examination regulations in promoting timely degree completion (Sun & Lee, 2020). Policy-makers and educational administrators can use the results of this study to fine-tune their regulatory approaches in order to better align them with their goals. The Index of Commitment (IOC) serves as a tool to assess the effectiveness of institutional regulations at both the HEI and state level, and to identify areas where adjustments may be needed to improve student success rates.

In summary, we argue for a more nuanced and context-sensitive approach to understanding how regulations shape student outcomes and behaviour in HE. This study provides a basis for future research to explore the multifaceted relationship between regulations, levels of institutional autonomy and student success.

Our analysis thus shows potential for future research. Firstly, our analysis remained on the macro level with aggregate data on state level and a few illustrative cases on university level. As we have seen there are systematic differences between HEI, even within one state and often within one HEI. To understand the mechanisms on individual HEI level, the examination and consultation regulations need to be collected and analysed systematically. Secondly, institutional rules create incentives not only with regard to long-term study, but also drop-out. Rules can be created in a way that drop-out is incentivized early or late or not at all. Further research needs to systematically disentangle the

relationship between these types of behaviour and examination and consultation regulations. Lastly, the variance we found for the German states indicates that a comparative perspective is paramount. This is true for other federal systems like Austria and Switzerland, but also for systems with different funding institutions like in the United States. Also interesting are cases where a change in the incentive structure occurred like the United Kingdom before and after the introduction of study fees.

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