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**Bachelor Econometrics and Operations Research
Erasmus University Rotterdam**

*Report of the limited programme assessment
3 and 4 November 2022*

Utrecht, The Netherlands
March 2023
www.AeQui.nl
Assessment Agency for Higher Education

Colophon

Programme

Erasmus University Rotterdam
Bachelor Econometrics and Operations Research
Location: Rotterdam
Mode of study: fulltime
Croho: 56833
Result of institutional assessment: positive

Committee

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prof.dr. Niels Hermes, domain expert
em.prof.dr. Eelke de Jong, domain expert
prof.dr.ir. Paula van Veen-Dirks: domain expert
prof.dr. Henk Vording, domain expert
Judith Kikkert, BSc, student
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The committee was presented to the NVAO for approval.

The assessment was conducted under responsibility of
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Summary

On 3 and 4 November 2022 an AeQui committee assessed the bachelor programme in Econometrics and Operations Research of Erasmus University Rotterdam. The overall judgement of the committee is that the quality of the programme is positive, and therefore **meets the standard**.

Intended learning outcomes

Based on the interviews and the examination of underlying documentation, the committee concludes that the intended learning outcomes tie in with (inter)national requirements for this field. All intended learning outcomes are covered in the programme and the intended learning outcomes are aligned with the Dublin descriptors. The programme's research driven orientation is very well reflected in the intended learning outcomes. In addition, the programme has an explicit quantitative approach to research. The programme covers both econometric and operations research and focuses on developing and applying methodology. The committee assesses that the intended learning outcomes **meet the standard**.

Teaching-learning environment

The committee concludes that the programme enables students to realise the intended learning outcomes. The intended learning outcomes are translated into learning goals which are stipulated in the course guide and syllabus.

The research orientation of the programme is reflected in its structure and content. The programme is tied in with the research of the lecturers involved and research skills are addressed throughout the programme. The small-scale third-year seminars prepare students for their bachelor thesis. The literature used is adequate and up-to-date. The programme is quite demanding, and the level of the third-year seminar is very high.

The programme manages to attain a sense of small-scale by means of the tutor groups in the first two years and the seminars in the third year.

The international name of the programme is appropriate as Econometrics is an international field of study and work and students are prepared for a career in an international context. The international

character of the programme is reflected in the international character of the economic field studied, the international profile of the staff involved and the international students attending (the international track). The programme has a language policy in place for lecturers. In addition, lecturers involved are experienced in English-language teaching to students from diverse backgrounds.

The legal enrolment criteria are applicable to the programme. The programme has a sufficient tutoring for students in place; the first year mentoring groups contribute significantly to this. Lecturers are competent, qualified, enthusiastic and active in research. The committee is positive about the teaching assistants and supports the continuous investment in their didactical training.

Students are informed about the programme through the online learning environment which is clearly structured and informative. The committee values the role of the student representatives in the programme's quality assurance process. The committee concludes that the programme **meets this standard**.

Student assessment

An adequate system of assessment is in place. The quality assurance of the assessment system is solid and effective measures are taken to guarantee the validity, reliability and transparency of the assessments. These include using assessment specification tables, the four-eye principle, assessment criteria and written feedback. The level of the different assessments studied by the committee was sufficient. An appropriate variety in forms of assessment is used, and in most courses two forms of assessments are used.

The examination board is active in safeguarding the quality of the assessments and in preventing plagiarism. The examination board annually checks the

quality of the theses and other assessments. The committee concludes that the programme **meets this standard**.

Achieved learning outcomes

The programme has an adequate thesis process in place. In assessing students bachelor thesis two examiners are involved and a rubric is used.

Based on the studied theses, the committee concludes that the level of the graduates is high and that students regularly achieve more than the required bachelor's level. The committee appreciates the format of the bachelor thesis, where students build upon and extend an already published academic paper.

The quantitative approach to research that is addressed in the intended learning outcomes and pro-

gramme, is reflected in the studied theses. The techniques applied in the studied bachelor thesis sometimes go far beyond the contents of the bachelor courses. The committee is of the opinion that the final written feedback in the thesis evaluation form is quite limited. The committee concludes that the programme **meets this standard**.

Recommendations

In order to bring the programme to an even higher level of quality in the future, the committee recommends the following:

- to align the content of the syllabuses and course guides;
- to be more sensitive towards intercultural differences between students and lecturers and to ensure that these differences are addressed in the programme.

All standards of the NVAO assessment framework (2018) are assessed positively; hence the committee awards a positive recommendation for the accreditation of the bachelor programme in Econometrics and Operations Research of Erasmus University Rotterdam. The committee concludes that the overall assessment of the programme **meets the standard**.

On behalf of the entire assessment committee,
Utrecht, March 2023

Peter Schotman
Chair

Titia Buising
Secretary

Introduction

This report reflects the site visit of the bachelor programme in Econometrics and Operations Research of Erasmus University Rotterdam. The programme aims to deliver graduates that are all-round econometricians and operations research specialists.

The institute

The programme is part of Erasmus School of Economics (ESE) of Erasmus University Rotterdam (EUR). The mission of EUR is to make a positive impact on societal challenges. EUR strives to understand and make progress towards solving complex societal challenges, with alignment in its core activities of education and research and in close cooperation with local and global partners.

ESE offers three bachelor programmes, with two English tracks, and four master programmes. For each master programme a pre-master programme is offered. Currently 6700 students are enrolled in ESE and approximately 155 FTE of lecturers are employed.

ESE comprises four academic departments: Applied Economics, Business Economics, Econometrics, and Economics. The departments provide the education of the different bachelor and master programmes. Each department is headed by a Department Director and supported by a secretariat. The Programme Management Education consists of the Programme Director, the three Bachelor Programme Managers, the Programme Manager Educational Innovation, Head Student Affairs, and the three Policy Officers Education. The Programme Management Education meets every two weeks to discuss and decide on current education matters.

ESE is currently developing a new strategic plan 2023-2027, including an adjusted educational vision and a renewed vision on assessment.

The programme

The programme in Econometrics and Operations Research is a three-year full-time bachelor programme, amounting to 180 EC. The programme consists of two tracks: the Dutch track (Bachelor Econometrie en Operationele Research) and the international track (International Bachelor Econometrics and Operations Research). Apart from the instruction language, the tracks are similar.

At ESE, students can combine their bachelor programme with other bachelor programmes and thus prepare for a double degree. Students of the foregoing bachelor programme can combine their programme with Economics and Business Economics or Philosophy. The double degree studies are not accredited; the individual bachelor programmes are accredited separately.

The programme has an international orientation. According to the self-evaluation report, this is reflected in the international student body, teaching by international academic staff, the topics addressed and the network of exchange partners. The first and second year of the Dutch track are offered both in Dutch and in English. The third-year courses are taught in English and Dutch students join the international students in the specialisation. The language of instruction in the international track is English. The international track consists mostly of international students.

The ESE bachelor programmes all follow the same structure: a combination of basic knowledge and skills in the first two years, followed by specialisation in the third year. The latter is organised in a

minor, electives, exchange or internship. The programme is finalised with the bachelor thesis. The programme in Econometrics and Operations Research also offers an Educational minor in Mathematics, which enables students to obtain a limited second-degree teaching qualification in Mathematics.

In the previous accreditation process recommendations were made (for all bachelor programmes) to intensify and increase coherence in the students' skills training, to improve the information provided to students and to inform students more clearly and comprehensively about the thesis process and the thesis assessment. More specific for the foregoing bachelor programme, it was recommended to try and offer more opportunities for international exchange for students. The committee noted that ESE acted on these recommendations by implementing a new academic skills programme and a new digital learning and working environment (see also standard 2). In this environment the information about exchange, thesis and internships is centralised and accessible for all students. In addition, the thesis process has been streamlined for all bachelor and master programmes (see also standard 3). Regarding the opportunities for international exchange for students of the bachelor programme in Econometrics and Operations Research, ESE invested in employing a head of Communication, Internationalisation, Marketing & Alumni. Moreover, it invested in expanding the international exchange network. The self-evaluation report notes that this has led to an increase in outgoing exchange from 52 students in 2016 to 79 students in 2019.

The assessment

Erasmus University Rotterdam assigned AeQui to perform a quality assessment of its bachelor programme Econometrics and Operations Research. In close co-operation with the programme management, AeQui convened an independent and competent assessment committee. A preparatory

meeting with representatives of the programme was held to exchange information and plan the date and programme of the site visit.

In preparing for the site visit, the assessment committee studied the self-evaluation report on the programme and reviewed a sample of student work. The findings were input for discussions during the site visit.

The site visit was carried out on 3 and 4 November 2022 according to the programme presented in attachment 2. No use was made of the (online) open consultation hour. The committee carried out its assessment in relation to, and in consideration of, the cluster of programmes in which this programme is placed. The contextualisation of the programme within its cluster was conducted by the complete committee during the preliminary meeting and the final deliberations. The knowledge required for this was present in the committee.

The committee assessed the programme in an independent manner; at the end of the visit, the chair of the committee presented the initial findings of the committee to representatives of the programme and the institution.

In this document, the committee is reporting on its findings, considerations and conclusions according to the 2018 NVAO framework for limited programme assessment. A draft version of the report was sent to the programme management; its reactions have led to this final version of the report.

The programme will initiate and plan a development dialogue in the course of 2023. The results of this development dialogue will have no influence on the assessment presented in this report.

1. Intended learning outcomes

The committee concludes that the intended learning outcomes have been adequately concretised with regard to content, level and orientation and meet international requirements. The intended learning outcomes reflect the Dublin descriptors. The programme is very clearly research driven, which is also reflected in the intended learning outcomes. The committee concludes that the programme meets the criteria for this standard.

Findings

All ESE bachelor programmes share the same ambition: creating a solid, broad foundation of knowledge and skills, a critical approach, specialisation, and application of acquired knowledge and skills. In addition, the programmes aim for a strong scientific and methodological approach. Research and education are strongly connected in ESE's educational vision. ESE aims to prepare students for a successful career in business, government or academia.

The bachelor programme in Econometrics and Operations Research focuses on the application of mathematical and statistical techniques to answer economic questions. The programme not only addresses areas like mathematics, economics, statistics, econometrics and business economics, but also computer programming to learn how to build models and implement mathematical techniques. The four different majors in the third year allow students to specialise.

ESE notes that the research driven orientation of the programmes enables them to quickly incorporate new developments in economics, econometrics and operations research in the curriculum. The research driven orientation is also reflected in the intended learning outcomes. The intended learning outcomes address, for example, the ability to analyse and apply theories and research methods; to define a problem statement and to formulate and operationalise associated research questions and hypotheses; to select and use appropriate quantitative research methods and construct a suitable model; to apply common econometric and operations research techniques;

to collect data; to execute the modelling cycle and adjust the model; and to draw conclusions regarding the problem statement defined. In addition, abstract reasoning, logical reasoning and the ability to use academic research to approach and solve practical problems are addressed in the intended learning outcomes.

The intended learning outcomes are based on the description of an economics degree programme as described in the Subject-specific Reference Framework for Economics (January 2016). The intended learning outcomes are the same for both tracks. The programme presented an overview that explains the translation of the Dublin descriptors into the intended learning outcomes. The programme also outlined the relation between the intended learning outcomes and the different components of the programme (for both tracks).

In 2021 ESE conducted a benchmark analysis for all programmes. This analysis was aimed at reviewing the validity of programmes, as well as the positioning and profiling relative to national and international peers, including the evaluation of the intended learning outcomes. The self-evaluation report notes that this led to reformulating and updating the intended learning outcomes of the bachelor programmes to make the intended learning outcomes more concise and future-proof. And in doing so to be able to better anticipate the developments in the School's and University's educational vision.

Input from the professional field is gathered through Advisory Boards, which mainly include

alumni. The Advisory Boards are directly connected to ESE's master programmes. Recommendations are discussed by ESE's Programme Management and, if applicable, used to improve the bachelor's programme as well, to ensure a good connection between the bachelor and master programmes. Lecturers noted during the site visit that input from the advisory board usually reflects lecturers own ideas about current developments.

Considerations

Based on the interviews and the examination of underlying documentation, the committee concludes that the intended learning outcomes tie in with (inter)national requirements for this field.

Based on an overview of the relation between courses and intended learning outcomes, the committee notes that all intended learning outcomes are covered. The programme also pro-

vided insight in the alignment between the intended learning outcomes and the Dublin descriptors.

The committee notes that the programme's research driven orientation is very well reflected in the intended learning outcomes. The programme also maintains an explicit quantitative approach to research.

Discussion with lecturers about the broad scope of the programme confirmed that the programme covers both econometric and operations research and that the programme focuses on developing and applying methodology.

Based on the interviews and examination of the underlying documentation, the assessment committee establishes that the intended learning outcomes **meet the standard**.

2. Teaching-learning environment

The committee concludes that the programme enables students to realise the intended learning outcomes. The programme's focus on creating a solid, broad foundation of knowledge and skills and offering room for a critical approach and specialisation is reflected in the set-up of the programme. In addition, the focus on research and methodology is reflected in the content and set-up of the programme. The committee notes that the content of different course documents such as course guide and syllabi can be more aligned. The programme is quite demanding. The level of the third-year seminar is very high and could as well be part of the master's programme. Small-scale teaching is realised by means of tutor groups in the first two years and the seminars in the third year. The committee appreciates the third-year seminars. These allow for in-depth discussions that prepare students for their bachelor thesis and a master programme. The tutorials are led by student teaching assistants that are recruited, selected and trained by ESE Tutor Academy. Students value the involvement of teaching assistants. The committee encourages the programme to be more sensitive towards intercultural differences between students and lecturers and to ensure that these differences are addressed in the programme. The staff is international, competent, enthusiastic and involved. Lecturers are active in research as well. The committee notes that the legal enrolment criteria are applicable to the programme. The committee concludes that the programme meets the criteria for this standard.

Findings

As mentioned in the introduction, the programme offers a combination of basic knowledge and skills in the first two years, followed by specialisation in the third year. The curricula of the Dutch and the international track are the same.

The programme is organised in five teaching blocks, consisting of seven weeks of teaching and one week of exams per block. The first two years provide students with an introduction in all major areas of econometrics and operations research in a fixed curriculum. Students acquire basic knowledge of mathematics, statistics, microeconomics, and macroeconomics. Moreover, the first year includes courses such as Introduction to Programming, Linear Programming and Probability Theory. Course credits are either 4 EC or 6 EC.

The second year consists of more advanced courses especially in the areas of econometrics and operations research. Examples are the Combinatorial Optimisation, Econometrics 1 and 2, and the Introductory Seminar Case Studies courses. In addition, students follow courses such as Programming, Simulation, Markov Processes

and Time Series Analysis. In the second-year course credits comprise 4 EC, and the seminar comprises 8 EC.

The third year offers students the opportunity to specialise and to broaden and deepen their knowledge and skills. This can be done in the first two blocks by means of a minor (12/15 EC), electives (12/9 EC), an internship (12 EC) or an exchange (24 EC). In the third and fourth block, students follow major courses and seminars, to deepen their knowledge in their specialisation. Students can choose from four major specialisations (20 EC each): Business Analytics and Quantitative Marketing, Econometrics, Quantitative Finance and Quantitative Logistics and Operations Research.

The third year is finalised with the bachelor thesis (10 EC). This is elaborated on in standard 4.

ESE developed an Academic Skills programme for all bachelor programmes (4 EC). This currently consists of communication (feedback, discussion, presenting), writing (literature review), research (collecting and describing data), reflection (critical

reflection on own work), and collaboration. Programmes can add skills that are particularly relevant for their academic field. The academic skills programme is part of the second year. ESE aims to further fine-tune the skills programme and to incorporate more skills assignments in the second year and to extend skills training into the third year.

In the second year of the bachelor programme in Econometrics and Operations Research the academic skills course is connected with the Econometrics 2 course and the Introductory Seminar course. In the third year, academic skills are incorporated in the major courses.

In addition to academic skills, the bachelor programme also offers a Career Skills programme (2 EC) in the third year. This provides students with career orientation and career preparation. The site visit made clear that students can choose from 16 modules, including business English, project management, programming for economics, etc. The Career Skills programme includes the MentorMe platform: a platform where students can connect with one of the ESE alumni for help and advice regarding various career related matters.

The focus on research is reflected in the academic skills training and in the Introductory Seminar Case Studies course in block 5. In the latter course students are introduced to research in Econometrics and Operations Research. Research skills are also addressed in the third-year major and seminars.

The programme provides exposure to practice by means of guest lectures in major courses, given by alumni or professional connections of the staff. The programme notes that the study association has an important role in bridging the gap between theory and practice by organising activities that involve the professional field.

The students the committee met with noted that the programming languages learned in the bachelor programme do not match those used

in the master programme. Aligning this would be beneficial for students entering the EUR master programme.

Students appreciate the demanding character of the programme and especially the first block. This first period, with courses in analysis and statistics, sets the bar for the whole programme.

Learning environment

The programme ties in with ESE's ambition to offer research oriented education. The ESE educational vision also emphasises an academic community of students and lecturers to create, disseminate and apply scientific knowledge; face-to-face contact and interaction between students and lecturers; and the use of technology as a means, not an end in itself.

For all bachelor programmes, ESE offers a combination of lectures, small-scale tutorials in the first year, online exercise materials, exercise lectures and skills training in the first two years. The first two years consist of 15 to 21 contact hours per week. In the first two years, small-scale tutorials and guidance and skills groups are organised. These groups consist of a maximum of 30 students. In the first year, a guidance programme is organised, with a maximum of 15 students per group. The first year tutorials are mandatory. The tutorials are led by student teaching assistants under supervision of a Teacher of the Tutor Academy. ESE aims for the tutorials to be interactive and to discuss and practice the more complicated matters of the specific course.

In the third year, lectures and small-scale seminars are used. In the latter research articles are discussed and active participation and interaction is expected of students. The seminars comprise of groups of a maximum of 24 students.

The students the committee met with are in general positive about the different teaching formats used in the bachelor programme. In addition, the teaching assistants are appreciated; it is easier to ask questions to a teaching assistant.

Students value the third-year seminars; the seminars focus on applying the learned knowledge and skills. The seminars are held by the lecturers, teaching assistants are not involved.

It became clear during the site visit that as part of blended learning, lectures are recorded. These recordings are made available to students when the attendance level is about 70%. The 70% attendance rule is currently an experiment and not mandatory, the committee learned. The students the committee met with value the recordings. It allows them to review certain parts in preparing for their exams. They also noted that nearly all lectures are recorded.

The site visit also revealed that impact learning is a university wide strategic theme. For the ESE programmes this implies that students will be enabled during their studies to get more in touch with practice and to have an impact there. Moreover, in this way students are even more confronted with contemporary issues.

Regarding the international track, the site visit revealed that students groups (for tutorials and academic skills) are currently mixed randomly. In doing so, the programme wants to ensure that students work together with other students from different backgrounds. Students noted that implicitly this also creates awareness in dealing with different cultures.

With respect to addressing cultural diversity, it was noted by the programme management that this is also the responsibility of the study associations. In addition, this is part of the mentoring programme. It was mentioned that internationalisation was mainly focused on students international career. In the future, cultural diversity will be addressed more actively.

Discussion with management on social safety revealed that this is currently part of the strategy sessions with the departments in which the core values including a safe working environment is

discussed. It is part of the mentoring programme and an ESE confidant is available.

Incoming students

The legal enrolment criteria apply to the programme. International applicants must also show proficiency in the English language (with a TOEFL/IELTS test). Prospective students are provided with a Study Check. Part of this Study Check is the provision of a advice based upon students' math skills. The programme notes in the self-evaluation report that mathematical skills are a crucial determinant of study success in economics and econometrics. Students can be requested to take an additional online course to improve their mathematics skills.

Staff

In line with the educational vision, academic staff members are involved in both research (40% of time) and teaching (60% of time). About 80% of ESE's academic staff is affiliated with Tinbergen Institute (TI) or the Erasmus Research Institute of Management (ERIM), or both. The self-evaluation report states that the combination of research and teaching ensures that new developments (such as data science) in the field of economics and econometrics are incorporated in teaching.

Within ESE over 40% of the academic staff (excluding PhD-candidates) has a non-Dutch nationality. ESE employs lecturers from 34 different countries. Lecturers must have at least C1 level of English, based on the Common European Framework of Reference for Languages (CEFR). ESE has its own language policy and offers language courses.

ESE's Service Level Agreement Education, which is updated yearly, describes the basic requirements for each course, including guidelines for contact hours, group size, active learning elements and interactive education, as well as lecturers' qualifications, examinations, and language requirements for education in the different phases of the Dutch and English programmes.

Educational achievements and course evaluations are discussed in the annual performance and development interviews with faculty members. A good teaching performance is a requirement to get tenure. To this end, teaching performance is assessed by class visits, reviews from peers and the course evaluation. For the bachelor programme in Econometrics and Operations Research, class visits are held systematically, the committee learned during the site visit.

90% of ESE staff obtained a university teaching qualification. Individual training is available as well as so called micro-labs. The latter are two-to-four-hour workshops on various topics, such as assessment, delivery of teaching and innovating education. In addition, the ESE Innovation Hub provides lecturers with support in using digital tools, including interactive elements in large-scale plenary lectures, in enhancing personal online learning or in building the Canvas pages. ESE also organises so called Education Afternoons, in which lecturers share their best practices with educational innovation. Examples are dealing with free-riding behaviour, how to integrate sustainability in courses and how to stimulate peer feedback. New lecturers are mentored by a senior lecturer. ESE employs about 155 FTE of lecturers.

The self-evaluation report notes that the increased student numbers could cause a peak workload for thesis supervisors in academic years 2023-2024 and 2024-2025. One of the measures to reduce the workload has been the initiation of a thesis working group in 2021 to further optimise thesis and supervision processes with special attention to workload reduction for academic supervisors and support staff.

During the site-visit the committee discussed the increasing workload of lecturers. The renewed thesis and supervision process is expected to reduce the workload. The introduction of a tenure track for lecturers can also reduce the general workload. Tenured lecturers have a PhD and sometimes a small research appointment.

For the foregoing programme, it was confirmed by lecturers that the workload is quite high. To decrease the workload budget has been made available to hire new colleagues. In addition, the third-year seminars have been restructured this academic year: from 4 students working on new research projects each year to 24 students working on recurring themes and topics.

The aforementioned student teaching assistants are recruited, selected and trained by the ESE Tutor Academy. The self-evaluation report notes that the number of teaching assistants is growing due to the increase in student numbers: 350 teaching assistants were hired in 2020-2021. For the large courses in the first two years lecturers provide the lectures, whereas the teaching assistants provide the tutorials. The site visit made clear that the teaching assistants receive didactical training and practice their interactive teaching skills with their colleagues. During their tutorials, they are visited by a teacher from the Tutor Academy at least once. Lecturers organise regular meetings with teaching assistants and the tutor academy teacher to discuss the content of the course and the tutorials.

The site visit made clear that for the foregoing programme, lecturers are actively involved in the selection of their teaching assistants. In addition, lecturers meet with the teaching assistants on a weekly basis. This ensures that lecturers are aware of the problems students are experiencing and adjust their lectures accordingly.

The site visit learned the committee that first and second year lecturers discuss the content of the programme and courses during yearly meetings and between teaching blocks to ensure the coherence of the programme. In addition, a document is currently being prepared in which lecturers will indicate the topics covered in their lectures. Students the committee met with value the approachability of their lecturers. Students also indicated that their lecturers' English proficiency is good.

Mentoring and student information

Mentoring is in the first-year part of the guidance programme. This programme is intended to develop study skills, preparing and guiding students in studying at ESE. At the start of the programme students are allocated to a mentor (senior student) and a mentor group (maximum of 15 students). Students follow two onboarding modules and have mentor sessions on, for example, study skills and exam preparation.

First year students receive a provisional study advice after the first and second block. Subsequently, students meet with their mentor or study adviser (depending on the credits obtained) to discuss their study progress. Students can also request personal support from one of the study advisers and sign up for a "study buddy" programme to find students to study together with.

A binding study advice (BSA) of 60 EC applies to all new first-year bachelor students. ESE also has a compensation system in place which permits students to compensate at most three insufficient marks (grades between 4.5-5.4) in the first and second year in three compensation clusters.

ESE study advisers are available for guidance and for discussions regarding students' individual study planning, study progress and delay, study and learning methods, personal circumstances etc. ESE organises different workshops and webinars on topics such as dealing with stress, uncertainties, time management, connecting communication and collaboration etc.

The site visit revealed that the programme committee does not discuss (the evaluation results of) individual courses (unless there are big issues). It was also noted that each course is evaluated. The response rate is, however, very low. Improvements for the latter are currently being developed and piloted in 2023.

Student representatives gather feedback from their classmates and discuss this with the lecturers involved. This takes place halfway through the course and at the end of the course. The student

representatives are supported in this by the programme committee. Students noted that the programme acts upon their feedback.

Considerations

The committee concludes that the programme enables students to realise the intended learning outcomes. The intended learning outcomes are translated into learning goals which are stipulated in the course guide and syllabus. In reviewing courses on the digital learning environment and the accompanying syllabus and course guide, the committee noticed, however, that the information provided in these can be different. Moreover, the syllabi studied show different structures and design and are not always in line with the course guide. The committee recommends the programme to align the content of these documents.

The research orientation of the programme is reflected in its structure and content. The programme is tied in with the research of the lecturers involved and research skills are addressed throughout the programme. The small-scale third-year seminars prepare students for their bachelor thesis. The committee observes that adequate and up-to-date literature is used in the programme.

The committee concludes that the programme is quite demanding, which is valued by the students the committee met with. The committee is of the opinion that level of the third-year seminar is very high and could as well be part of the master's programme. The committee notes that broader ethical and societal issues around the use of models in policy making are addressed in the course Ethics in Econometrics.

The committee values that the programme manages to attain a sense of small-scale by means of the tutor groups in the first two years and the seminars in the third year. The committee also recognises and encourages the discussions within ESE about blended learning and the availability of online lectures.

ESE prepares students for careers in an international context. The international character of the programme is reflected in the international character of the economic field studied, the international profile of the staff involved and the international students attending (the international track). The committee therefore concludes that the international name of the programme is appropriate. The programme has a language policy in place for lecturers. In addition, the committee establishes that the lecturers involved are experienced in English-language teaching to students from diverse backgrounds.

The committee notes that the broad diversity of the student body is not actively used for educating students about diversity, cultural differences and cultural competencies. The committee supports ESE's intention to establish a special committee on diversity that will investigate how to benefit more of this diversity, as well as to further strengthen staff and student's intercultural competencies.

The legal enrolment criteria are applicable to the programme. The programme has a sufficient tutoring for students in place. The first year mentoring groups contribute significantly to this.

Lecturers are competent, qualified and enthusiastic. The committee appreciates the international character of the staff and that lecturers are active in (international) research. The committee is also positive about the teaching assistants and supports the continuous investment in their didactical training.

Students are informed about the programme through the online learning environment. The short demonstration during the site visit showed that the online learning environment is clearly structured and informative.

The committee values the role of the student representatives in the programme. The student representatives have a quick and informative role in the programme's quality assurance process.

Based on the interviews and examination of the underlying documentation, the committee establishes that the programme **meets this standard**.

3. Student assessment

The committee concludes that the programme has an adequate assessment system in place. The intended learning outcomes are at the basis of this system. Effective measures are taken to guarantee the validity, reliability and transparency of the assessments, by using assessment specification tables, the four-eyes principle, assessment criteria, and written feedback. The examination board is effectively organised and safeguards the quality of the assessments and theses in an active manner. The committee values the random checks of the quality of assessments and theses and the initiative regarding the quality of assessments within learning lines. The committee concludes that the programme meets the criteria for this standard.

Findings

ESE's vision on assessment is leading for the programme's assessment policy and system. Alignment between the content and level of the learning objectives and the assessment at course level is an important premise in the vision. The vision is translated in ESE's examination policy that describes the framework in which exams are developed and taken. This framework is worked out in detail in an Examination Protocol that provides guidelines and direction for lecturers with regard to examinations.

To guarantee the reliability and validity of exams, lecturers are expected to carry out peer review in the construction of exams. In addition, all exams are required to have assessment criteria to enhance the reliability and to ensure independence in the grading process. And assessment specification tables are used to provide insight into how a course is assessed.

Depending on the content and objectives of a course, one or more types of assessment are used, such as (mid-term) assignments, weekly (online) tests, mid-term tests, written examinations with open questions, written examinations with multiple choice questions, and oral examinations. Assignments include presentations, solving cases, the writing of (group or individual) papers, and group discussions. The different types of assessment are indicated in the assessment specification tables of courses and in the assessment

overviews on programme level. The latter also includes the weighting of the different assessments used in the courses.

The set-up of assessment of courses is described in the course guide. During a block, students are provided with a sample examination, including indications of the answers. An inspection opportunity is obligatory for each exam.

In recent years, the programme increased the variation in forms of assessment. In several first and second year courses (for example, Introduction to Analysis and Statistics) midterms and assignments have been introduced. This serves a dual purpose: to enhance the alignment between the learning objectives and their assessment, and to lower the pressure on students from putting most of the grade weight onto the final written examination.

The requirements for examinations and grading are formalised in the Rules and Regulations of the Examination Board and in the aforementioned Service Level Agreement Education.

The self-evaluation report states that the use of digital test software has increased in the past years, also due to the Covid-19 pandemic. The programme notes that this software also makes grading of written exams more efficient. The self-evaluation report also notes that due to increasing student numbers possible capacity limits for on-campus examination might lead to alternative forms of assessment in the future.

Examination board

The ESE examination board is responsible for safeguarding the quality of examinations and the final qualifications attained of all the ESE bachelor and master programmes. All academic departments and programmes are represented in the board. The examination board uses systematic monitoring and random checks to safeguard the quality of examination. This includes sample surveys of assessments and theses. The examination board documents its activities in an annual report. The Examination Monitor is used to monitor the quality of the assessments. The Examination Monitor provides a quick scan based on pass rates and distortions in grade distributions (also compared to previous years).

At the end of every block, the examination board reviews a) a summary of the pass rates, mark distribution and average course scores (derived from the student course evaluations) for all courses; b) student opinions on the exam based on questions regarding the exam in the course evaluations and c) analysis data for all multiple-choice exams of the first two years. If needed, the examination board will review the quality of an exam in more detail.

During the site visit, the committee met with representatives of the examination board. It became clear that a two-year project has been set up on strengthening the safeguarding function of the examination board. A new colleague focused on coordinating all safeguarding activities will be hired. The examination board recently started a pilot in which assessments within a specific learning line are monitored. This will be expanded next year to other learning lines; lecturers of the courses involved will discuss their assessments. Regarding the statistical analysis of assessments, it was remarked that also student evaluations and evaluations by lecturers prove useful insights in the quality of assessments.

In the discussion about preventing and detecting plagiarism it was noted that students as well as lecturers are informed about the interpretation of plagiarism and group work. Moreover, lecturers

are expected to discuss this with their students. The Thesis Workflow Process supports lecturers and students in this.

During the Covid-19 pandemic ESE used proctoring for the online exams. The students and representatives of the examination board the committee met with are very positive about this. Students noted that this ensures the value of their exams. Representatives of the examination board remarked that online exams and proctoring will be possible for students who, for example, due to chronic illness, cannot come to campus for an exam.

Considerations

The committee concludes that an adequate system of assessment is in place. The quality assurance of the assessment system is solid and effective measures are taken to guarantee the validity, reliability and transparency of the assessments. These include using assessment specification tables, the four-eye principle, assessment criteria and written feedback.

In general, the level of the different assessments studied by the committee was sufficient. The committee also notes that an appropriate variety in forms of assessment is used. And that in most courses two forms of assessments are used (during and at the end of the course).

The examination board is active in safeguarding the quality of the assessments. The examination board annually checks the quality of the theses and other assessments. The committee supports the pilot in which the assessments within learning lines are monitored; this can contribute to improving the overall quality of the assessments. The committee also values the continuation of online exams for students that otherwise would not be able to take the exam on campus.

Based on the interviews and examination of the underlying documentation, the committee establishes that the programme **meets this standard**.

4. Achieved learning outcomes

Based on the studied documents and the interviews, the committee concludes that graduates of the bachelor programme regularly achieve more than the required level and the intended learning outcomes. The committee concludes that the overall academic quality of the studied theses is high and in general agreed with the grades given. The committee appreciates the format of the bachelor thesis, where students build upon and extend an already published academic paper. The committee notes that the quantitative approach to research that is addressed in the intended learning outcomes and programme is reflected in the studied theses. In addition, the committee concludes that the techniques used sometimes go far beyond the contents of the bachelor courses. The committee also observed that the final written feedback in the thesis evaluation form is quite limited. The committee concludes that the programme meets the criteria for this standard.

Findings

The programme is finalised with the bachelor thesis. In this thesis, students demonstrate the knowledge and skills learned in the programme and that they can set-up, execute and present in writing a scientific research project. With the thesis, students show that they have achieved all intended learning outcomes. In particular, students demonstrate that they are able to:

- formulate a research question in econometrics and operations research, based on relevant scientific concepts and theories.
- apply concepts, theories, research techniques and methods from the field of econometrics and operations research to the research topic.
- adequately process the data collected;
- analyse the results of the methods;
- draw conclusions based on the results with respect to the research question; and
- provide a written research report in a logical and coherent manner.

Students are expected to combine a topic of their chosen major with the research skills learned. The thesis is a report based on the replication and extension of a published academic paper. The academic paper functions as the starting point of students' own research. Based on this paper students formulate their own research question, which should deviate from the reference paper. A thesis proposal is an obligatory part of the bachelor thesis process.

The site visit learned that the bachelor thesis process has a strict structure, with fixed deadlines for handing in the proposal and the first and second draft of the thesis. It was noted by lecturers that the set-up of the thesis, in which students are provided with a topic (based on their preferences) and academic paper to build up on, also creates focus for students.

As mentioned in the introduction, the thesis process has changed in recent years for all bachelor and master programmes. This includes improving the online system used (Thesis Workflow) for guidance and handing in thesis and assessment, the introduction of fixed deadlines for handing in the thesis, the introduction of a Canvas Thesis Hub for each programme (to provide information centrally and timely), the introduction of thesis manuals for students and for supervisors, and the option for students to join a thesis group. In addition, thesis rubrics have been implemented and requirements of thesis supervisor's and second assessor are formalised in the aforementioned Service Level Agreement Education.

Regarding the deadlines for the bachelor thesis it was noted that students usually meet the deadlines due to their enrolment in a master programme in the next academic year.

The thesis is assessed by a thesis committee consisting of the thesis supervisor and a second assessor. Through the Thesis Workflow System supervisors can keep track of students' progress, to communicate with students and to assess the thesis. Feedback is given regularly, both verbally in the supervision sessions and in writing via the Thesis Workflow.

The programme notes that most students of the Dutch track continue their studies in a master programme; in the past year 90% continued with the ESE master programme in Econometrics and Management. 60-65% of the students from the international track continued their studies in this master programme.

The programme involves alumni through a newsletter, social media platforms and a special website. In addition, alumni are invited for events and some are member of one of the Advisory Boards for the master programmes (see also standard 1). Alumni are also involved in the beforementioned MentorMe platform.

Considerations

The committee concludes that the programme has an adequate thesis process in place. In assessing students bachelor thesis two examiners are involved and a rubric is used.

To assess whether students achieve the required bachelor level and the intended learning outcomes, the committee studied 15 theses, representing the four majors. Based on this, the committee is of the opinion that the level of the graduates is high and that students regularly achieve more than the required bachelor's level. The committee agreed with the grades given. The committee appreciates the format of the bachelor thesis, where students build upon and extend an already published academic paper.

In general, the committee concludes that the quantitative approach to research that is addressed in the intended learning outcomes and programme, is reflected in the studied theses. The topic is often replication and extension of a published research paper. The techniques applied in the studied bachelor thesis sometimes go far beyond the contents of the bachelor courses. The committee is of the opinion that the final written feedback in the thesis evaluation form is quite limited.

Based on the interviews and examination of the underlying documentation, the assessment committee establishes that the programme **meets this standard**.

Attachments

Attachment 1 Assessment committee

prof.dr. P.C. (Peter) Schotman	Peter Schotman is Professor of Empirical Finance at Maastricht University School of Business and Economics and research fellow of the Network for Studies on Pensions, Aging and Retirement (Netspar) in The Netherlands.
prof.dr. N. (Niels) Hermes	Niels Hermes is Professor International Finance and chair of the department Economics, Econometrics and Finance at the Faculty of Economics and Business of Groningen University.
em.prof.dr. E. (Eelke) de Jong	Eelke de Jong was Professor International Economics at Radboud University Nijmegen until October 2021.
prof.dr.ir. P.M.G. (Paula) van Veen-Dirks	Paula van veen-Dirks is Professor Management Accounting, co-chair of the department Accounting and director of the research group Accounting at Groningen University.
prof.dr. H. (Henk) Vording	Henk Vording is Professor Tax Law at Leiden University and permanent visiting professor at Peking University School of Law.
J. (Judith) Kikkert BSc	Student of the MSc Management, Economics & Consumer studies at Wageningen University & Research

The assessment committee was supported by drs. T. (Titia) Busing, external NVAO-certified secretary.

All committee members and the secretary have signed a declaration of independence. The assessment committee has been submitted to, and validated by, NVAO prior to the site visit.

Attachment 2 Programme of the assessment

Thursday 3 November

09.00 – 09.15	Welcome to the panel by the Dean
09.15 – 10.15	Dean, Vice-Dean Education, Programme Director, Programme Manager Econometrics, Programme Manager education innovation
10.15 – 10.30	Break
10.30 – 11.30	Lecturers bachelor and master Economics
11.30 – 11.45	Break
11.45 – 12.45	Students/Alumni bachelor and master Economics
12.45 – 13.30	Lunch break
13.30 – 14.30	Lecturers bachelor and master Econometrics
14.30 – 14.45	Break
14.45 – 15.45	Students/alumni bachelor and master Econometrics
15.45 – 16.00	Break
16.00 – 17.00	Examination Board (all programmes)
17.00 – 17.30	Private discussion of the panel
17.30 – 18.00	Closure of the day with Vice-dean, Programme Director, Policy Officer

Friday 4 November

09.00 – 10.00	Lecturers bachelor and master Fiscale Economie
10.00 – 10.15	Break
10.15 – 11.15	Students/Alumni bachelor and master Fiscale Economie
11.15 – 11.30	Break
11.30 – 12.30	Lecturers MSc Accounting, Auditing and Control
12.30 – 13.15	Lunch break
13.15 – 14.15	Students/alumni MSc Accounting, Auditing and Control
14.15 – 16.00	Break and drafting preliminary findings and preparing oral panel report
16.00 – 16.30	Feedback of the panel and closure by the Dean
16.30 – 18.00	Drinks in Paviljoen

Attachment 3 Documents

- Self-evaluation report
- Teaching and Examination Regulations Bachelor programmes ESE 2022-2023
- Rules and Regulations of the Examination Board 2022-2023
- Subject-specific reference framework Economics 2016
- Student Chapter Bachelor Econometrics and Operations Research
- ILOs and Dublin Descriptors - BSc Econometrics and Operations Research
- Relation ILOs and courses Bachelor Econometrics and Operations Research
- Overview Teaching Staff BSc and MSc Econometrics and Operations Research
- 2022-05 ESE Organisation Charts 2022
- Overzicht oude en nieuwe eindtermen bachelor
- Annual Report Examination Board ESE 2021
- Examination Policy ESE, 08-2022
- Examination Protocol ESE
- Assessment Specification Table, format 08.2022
- Assessment overviews Bachelor 2022-2023
- ESE Policy Proctoring - October 2021
- Flowchart proctoring - October 2021
- Service Level Agreement Education 2022-2023
- ESE Language Policy
- Annual Report 2021-2022 PC
- Thesis Supervision Manual 2021-2022
- Overview ESE Bachelor skills education 2022-2023
- ESE's Double Studies 2022-2023
- Student Thesis Manual
- Theses of 15 students