University of Gdańsk

Subject card

Subject name and code	Financial Econometrics, PG_00177494		
Field of study	Informatics and Econometrics		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2026/2027
Education level	Master's studies	Subject group	Obligatory subject group in the field of study Optional subject group Subject group related to scientific research in the field of study
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	3	ECTS credits	7.0
Learning profile	academic	Assessment form	
Conducting unit	Department of Econometrics -> Faculty of Management -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Sabina Nowak	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	30.0	30.0	0.0	0.0	75

E-learning hours included: 0.0

Learning activity and number of study hours

Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	75	4.0	96.0	175

Subject objectives

Introduce students to essential financial econometric models for forecasting the rates of return on financial instruments and analyzing their volatility and risk.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[IiEMU2_U03] The student is able to obtain and verify data from properly selected sources and to collect, process, and visualize it using modern econometrics, informatics or statistics tools.	The student obtains cross-sectional and time-series financial data from databases, verifies their correctness, visualizes them, and uses them to build econometric models.	[SU2] presentation/project/paper/ report [SU5] implementation of a problem task
[IiEMU2_W02] The student comprehends advanced theoretical and practical concepts in econometrics, informatics, or statistics, which are essential for a deeper understanding of economic and social phenomena.	The student identifies and discusses financial econometrics issues related to asset pricing, forecasting rates of return, and risk in the financial market.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report
[IiEMU2_U01] The student can creatively and profoundly analyze complex social and economic processes using structured knowledge, econometrics, informatics, or statistics tools.	The student selects and constructs appropriate models from financial econometrics to analyse and interpret phenomena occurring in financial markets.	[SU2] presentation/project/paper/ report [SU4] test/exam - oral or written [SU5] implementation of a problem task
[IiEMU2_W05] The student possesses advanced knowledge and understanding of informatics, statistics, and econometrics techniques and tools used to acquire, process, or visualise data to aid in decision-making and verify research hypotheses.	The student recognizes appropriate methods for processing financial data at different frequencies to analyze issues related to financial market volatility.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report

<table>
<tr><td>Subject contents</td><td>1. Prices and rates of return on financial instruments and their properties. Types of price changes, properties of logarithmic rates of return and their rescaled counterparts (stationarity, distribution, autocorrelation, clustering of volatility, calendar effects). Modelling rates of return on various types of financial instruments: statistical description, rates of return models, determining the shape of the distribution tail, modelling the middle part of the distribution, skewness and kurtosis, and distribution of absolute rates of return.
2. Can rates of return on financial instruments be predicted? The random walk hypothesis and its significance in finance. Empirical analyses of rates of return on various types of financial instruments. Measures of predictability of rates of return.
3. Transaction rules: moving average, channel, filter, statistical. Empirical analyses of the effectiveness of transaction rules for various financial instruments.
4. Asset portfolio and its characteristics. Efficient frontier of portfolios for multiple risky assets (and risk-free assets). Optimal portfolio for a risk-averse investor. Portfolio diversification.
5. Estimating and forecasting the risk of financial instruments and portfolios: value at risk for a single instrument and portfolio, value at risk using simulation and stress testing, and value at risk for a credit portfolio.
6. Market equilibrium, factor asset pricing models, and problems of specification, estimation, and validation of asset pricing models.
7. Effectiveness of investing in equity instruments evaluation. Measures of investment effectiveness based on asset pricing models.
8. Interest rates and their types. Theories of the term structure of interest rates (expectations hypothesis, liquidity preference, market segmentation, preferred habitats). From theory to practice: verification of the expectations hypothesis based on a perfectly predictable spread model, changes in the long-term rate, cointegrated vector autoregressive model.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Students should be introduced to market efficiency theory, rational expectations, and asset pricing models. Basic knowledge of dynamic econometrics and practical data exploration skills are essential.</td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Written exam</td><td>51.0%</td><td>30.0%</td></tr>
<tr><td>Credit for labs: team project with presentation</td><td>51.0%</td><td>30.0%</td></tr>
<tr><td>Credit for tutorials: written test</td><td>51.0%</td><td>40.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>P. Best, Wartość narażona na ryzyko. Dom Wydawniczy ABC, Kraków 2000.

M. Doman, R. Doman, Modelowanie zmienności i ryzyka. Oficyna Wolters Kluwer Business, Kraków 2009.

M. Osińska, Ekonometria finansowa. Polskie Wydawnictwo Ekonomiczne, Warszawa 2006.</td></tr>
<tr><td>Supplementary literature</td><td>K. Cuthbertson, D. Nitzsche, Quantitative Financial Economics. Stocks, Bonds and Foreign Exchange. Wiley, Chichester 2004.

H. Levy, The Capital Asset Pricing Model in the 21st Century, Cambridge University Press, 2012.

J.C. Francis, D. Kim, Modern Portfolio Theory: Foundations, Analysis, and New Developments, Wiley, 2013.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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