

Prof. Dr. KASIRGA YILDIRAK

Professor of Risk

President of Nature Based Solutions Association (Türkiye)

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Contact

Title	Prof. Dr.
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Academic Experience

Period	Position	Institution
2018 – present	Professor of Risk, Actuarial Sciences (Department Chair; Member of the Senate 2022–2023)	Hacettepe University, Türkiye
2018 – 2021	Faculty, Graduate School of Health Economics & Pharmacoeconomics	Hacettepe University, Türkiye
2013 – 2018	Associate Professor of Econometrics, Actuarial Sciences (Department Chair)	Hacettepe University, Türkiye
2003 – 2018	Faculty / Affiliated Faculty, Financial Mathematics Program	Middle East Technical University, Türkiye
2010 – 2013	Assistant Professor of Economics	Trakya University, Türkiye
2000 – 2004	Research Assistant, Department of Economics	Middle East Technical University, Türkiye
1996 – 1999	Tutor, Disability Center	North Carolina State University, USA
2012	Research Visitor	Concordia University, Canada
2004	Post-Doctoral Research Visitor	T.U. Kaiserslautern, Germany
2003 – 2006	Doctoral Research Visitor	École Nationale Supérieure des Télécommunications, France

Project Experience

Period	Location	Organization	Role	Description
2025 –	Rome, Italy / Somalia	FAO Investment Centre	Climate Finance Expert	Designed Somalia's NDC 3.0 Investment Plan & Financing Strategy; built CAPEX/OPEX costing models and a Costing Assumption Matrix; mapped access modalities for the GCF, AF and LDCF using grants and blended-finance structures for fragile states; supported government fiduciary readiness.
2025	Türkiye	FAO	Climate Finance Expert	Assessed natural-capital impacts for the Gediz River Basin water-resources project using InVEST water-yield, sediment-delivery and nutrient-retention models; quantified nature-based-solution benefits to inform climate-resilient investment and NbS-linked finance.
2025	Ankara, Türkiye	Ministry of Agriculture & Forestry	Head, Agricultural Risk & Disaster Management Working Group	Led the working group under Türkiye's IV. Agriculture Council; authored the national strategy report integrating climate-risk governance, nature-based solutions and financial instruments.
2024 – 2025	Polatlı, Türkiye	Polatlı Municipality & Tohum Association	Climate Risk & Sustainability Consultant	District climate-adaptation strategy using NGFS/IPCC/TCFD scenarios; 103 prioritised actions across agriculture, water, energy, health, biodiversity and infrastructure with stakeholder engagement.
2024 –	Istanbul, Türkiye	Bank of China	Climate Related Financial Risks Expert	IFRS S2 / TCFD / NGFS climate physical- and transition-risk methodology; scenario analysis and stress testing; alignment of climate risk to the credit portfolio; heat maps, WACI and financed-emissions metrics; ESG risk management and BRSA submission.

Period	Location	Organization	Role	Description
2024 –	Ankara, Türkiye	FAO	Value Chain Risk Expert	Increasing the sustainability and resilience of agriculture/food systems through nature-based solutions; design of a blended-finance mechanism and private-sector engagement strategy.
2023 – 2024	Eskişehir, Türkiye	FAO	Team Leader & Risk Expert	Nature-based solutions: sustainability and impact analysis for projects under the Land Degradation Neutrality project.
2023 – 2024	Kütahya, Türkiye	FAO	Team Leader & Risk Expert	Nature-based solutions: implementing permaculture gardening for women in Yayalababa village under the Land Degradation Neutrality project.
2023	Çamlıca, Manisa	PDC	Permaculture Designer Certificate Project	Passive and active water harvesting, compost preparation, food-forest design, zone planning, sector analysis, herb spirals and wind-break design.
2022 – 2023	Ankara, Türkiye	FAO	Value Chain Risk Analyst	Risk identification, scoring and vulnerability assessment for the wheat value chain; policy recommendation; agri-food finance; innovative green-finance impact.
2022 – 2023	Ankara, Türkiye	Eximbank – Insurance Analytic Dept.	Project Director	Aggregate loss distribution; counterparty and credit-risk scoring; reinsurance pricing; economic impact and incentive prioritization; country rating; ratemaking; buyers' portfolio loss; export-credit and supply-chain risk management.
2022 – 2023	Ankara, Türkiye	FAO – Union of Chambers & Commodity Exchanges (LOA)	Risk Expert	Agricultural value-chain risk management; innovative agricultural finance; finance- and market-based risk tools (agricultural and weather-index insurance, microfinance, contract farming, commodity exchanges, futures markets, warehouse-receipt systems).
2022 – 2023	İstanbul, Türkiye	TSKB Foundation	Risk Expert	Estimation of the actuarial technical interest rate.
2021 – 2022	İstanbul, Türkiye	Sigortam.net	Project Leader	Automated consumer–policy recommendation system development.
2021 – 2026	İstanbul, Türkiye	Efes Pilsen	Consultant	Prediction of the number of broken deposit bottles/containers in the beer supply chain.
2019 – 2021	Ankara, Türkiye	Turkish Science Foundation	Project Director	Actuarial hail risk map for agricultural products; vulnerability analysis; aggregate loss distribution; economic impact of the insurance system; parametric disaster insurance.
2017 – 2019	İstanbul, Türkiye	Agricultural Insurance Pool (TARSİM)	Project Director	Risk clusters for 120+ products and 5 perils (flood, drought, hail, fire, landslide); vulnerability analysis; portfolio loss model; risk regions; majorization and prioritization of risks; climate shocks and reinsurance pricing; cost-effectiveness analysis.
2016 – 2021	İstanbul, Türkiye	General Directorate of Insurance / Insurance Association	Project Director	Computation of actuarial technical interest for insurance policy claims.
2015 – 2016	Ankara, Türkiye	Gen. Directorate of Agricultural Research & Policies	Project Director	Evaluation of efficiency and gap analysis for agricultural insurance and natural-disaster risk management.
2015 – 2016	Ankara, Türkiye	General Directorate of Insurance / Insurance Association	Project Director	Preparation of life (mortality) tables for the insurance sector.
2010 – 2012	Ankara, Türkiye	UNDP–FAO (MDGF-1680, LOA with METU)	Coordinator	Risk assessment of drought and flood on agricultural losses; drought forecasting; drought/flood insurance products; algorithm for the micro-insurance burden on government; Bayesian crop-yield estimation for rain-fed wheat; socio-economic impact analysis.
2009 – 2010	Ankara, Türkiye	General Directorate of Insurance / Insurance Association	Expert Scientist	Morbidity tables and associated morbidity risk modeling and management; disease-epidemiology statistics and actuarial computations forming the basis of a monitoring system.
2009 – 2010	Ankara, Türkiye	FAO	Consultant	Evaluation of the drought risk assessment and early-monitoring system; stakeholder meetings; gap analysis; reporting to FAO/UNDP; moderator for international trainings and global meetings.
2005 – 2018	Ankara, Türkiye	Central Bank of Turkey (TCMB)	Lecturer & Project Supervisor	Financial-risk, interest-rate and derivative modeling; credit-risk index for Turkish markets and industries; FX trading rules; Bayesian VAR for macro-level default risk; verification of the NSS yield curve for markets and treasury.

Period	Location	Organization	Role	Description
2012	Istanbul, Türkiye	Anadolu Bank (Risk Dept.)	Consultant	Implementation of McKinsey's Credit Portfolio View model.
2012	İstanbul, Türkiye	FinansBank (Risk Dept.)	Consultant	Implementation of the CreditRisk+ model.
2010	Istanbul, Türkiye	FIBA Bank (Risk Dept.)	Consultant	Modeling global credit-risk rating and portfolio model.
2009 – 2010	Istanbul, Türkiye	VakıfBank (Retail Banking)	Consultant	Repayment plans for hybrid credit products and a plan for assessing their risk; counterparty and market risk for special-project loans with irregular repayment schemes.
2007 – 2010	Istanbul, Türkiye	Merit Rating	Consultant	Web-based software for automatic computation of financial ratios, cash flows and balance sheets; web-based credit-rating and scoring system; preparation and monitoring of rating templates.
2007 – 2008	Istanbul, Türkiye	Turkish Bank (Risk Dept.)	Risk Consultant	Historical-simulation-based market-risk modeling and programming to evaluate unaccounted risk mechanisms in managerial decision-making.
2004 – 2010	Ankara, Türkiye	School of Banking & Finance, Ziraat Bank	Lecturer	Courses offered: Basel II Capital Accord, Market Risk, Credit Risk, Financial Derivatives.
2004 – 2006	Ankara, Türkiye	HalkBank (Risk Dept.)	Consultant	Market- and credit-risk modeling and programming; credit rating; validation of risk models; credit-portfolio deterioration monitoring; on-site evaluation questionnaires mapped into risk groups; best-practice reference guide.
2003 – 2004	Ankara, Türkiye	VakıfBank (Risk Dept.)	Supervisor	Monte Carlo and historical-simulation market-risk software; yield-curve and short-rate modeling and simulation; derivative and bond pricing.
2002 – 2013	Türkiye	Various banks	Risk Modeling Consultant & Lecturer	Pioneering credit- and market-risk modeling across major Turkish banks; CreditMetrics, KMV, CreditRisk+ and VaR systems; web-based credit scoring; BDDK regulatory compliance; extensive risk training through METU and sector academies.

Education

Year	Degree	Field	Institution
2004	Ph.D.	Economics (Dissertation in Financial Mathematics)	Middle East Technical University, Türkiye
1999	M.A.	Economics	North Carolina State University, USA
1996	M.S.	International Business	Southern New Hampshire University, USA
1992	B.S.	Economics	Ankara University, Türkiye

Research Interests

- 1) Data-driven risk modeling; scoring and rating algorithms
- 2) Sustainability computing and sustainable finance
- 3) Prioritization and majorization for climate-related risks
- 4) Finance and insurance analytics
- 5) Climate Finance
- 6) Statistical and machine learning implementations
- 7) Numerical methods applied to finance
- 8) Non-life insurance portfolio modeling
- 9) Derivative pricing
- 10) Computational risk
- 11) Financial engineering
- 12) Economic evaluations of health interventions
- 13) Counterparty risk modelling

Membership of Professional Bodies

- Nature Based Solutions Association — President (Türkiye)

- Turkish Economic Association
- Turkish Society of Actuaries
- GARP, Risk Professionals — Türkiye
- Permaculture Research Institute
- Ecosystem Services Partnership

Publications

- Özalp, M. A., Şahin, Ş., & Yıldırak, K. (2026). Modeling heterogeneity and serial correlation of non-life insurance policyholders using a GLM–HMM framework. *Journal of Applied Statistics*, 1–34.
- Aydın, A., Köroğlu, F., Thomas, E. A., Salvinelli, C., Polat, E. P., & Yıldırak, K. (2026). Carbon Farming in Türkiye: Challenges, Opportunities and Implementation Mechanism. *Sustainability*, 18(2), 891.
- Yildirim, A. D., & Yıldırak, K. (2026). Sustainability Auditing in State-Owned Agricultural Enterprises: A TIGEM Pilot on the Energy–Water Nexus. *Sustainability*.
- Nevruz, E., Yıldırak, K., & SenGupta, A. (2025). Majorization ordering of dependent aggregate claims clustered by statistical machine learning. *Expert Systems with Applications*, 127279.
- Yıldırak, K., & Seyhun, Ö. K. (2025). Refining ESG models: embedding natural capital valuation beyond box-ticking compliance towards confronting planetary boundaries. *IFC Bulletins chapters*, 63.
- Şimşek, G., & Yıldırak, K. (2025). Moral Hazard Analysis for Crop Yield Insurance Using Loss Prevention Model. *Sosyoekonomi*, 33(63), 87–102.
- Demirdag, B., Yıldırak, K., & Yokus, A. (2025). A New Perspective for Financial Option Pricing with New Dynamic Solutions of the Black–Scholes Equation. *Computational Economics*.
- Lazoglu, C., Kemahli, M. N. C., Ozbek, I. Y., Yıldırak, S. K., Mumusoglu, S., & Yarali, H. (2025). Lifetime fiscal impact of IVF-born singletons in Turkey: a female age-stratified analysis. *Reproductive BioMedicine Online*, 105167.
- Şimşek, G., & Yıldırak, K. (2025). Crop Yield Insurance Analysis for Turkey: Spatiotemporal Dependence. In *Quantitative Risk Management in Agricultural Business* (pp. 173–196). Cham: Springer Nature Switzerland.
- Taskin, Z. I., & Yıldırak, K. (2025). Improving Machine Learning Algorithms with CoClust-Based Feature Selection on Big Data: A Comparative Analysis. In *Directional and Multivariate Statistics* (pp. 411–439). Singapore: Springer Nature Singapore.
- İlhan Taskin, Z., Yıldırak, K., & Aladag, C. H. (2023). An enhanced random forest approach using CoClust clustering: MIMIC-III and SMS spam collection application. *Journal of Big Data*, 10(1), 38.
- Nevruz, E., Atici, R. Y., & Yıldırak, K. (2022). Actuaries Climate Index: An Application for Turkey. *Journal of Statistical Research (TURKSTAT)*, 12(2), 14–25.
- Hagens, A., Inkaya, A. C., Yıldırak, K., Sancar, M., Van der Schans, J., Acar-Sancar, A., Unal, S., Postma, M., & Yegenoglu, S. (2021). COVID-19 vaccination scenarios: A cost-effectiveness analysis for Turkey. *Vaccine*.
- Tugac, S., & Yıldırak, K. (2022). Wind Speed and Wind Direction Prediction: An Implementation of a Deep Learning Algorithm Enriched by SWT and Circular PCA. *Florence Nightingale Directional Statistics Volume*, Springer, Singapore.
- Nevruz, E., & Yıldırak, K. (2019). Spatiotemporal Interpolation through an Extension of Differential Evolution Algorithm for Agricultural Insurance Claims. *Journal of Computational and Applied Mathematics*.
- Ozalp, A. M., Yıldırak, K., Aladag, H. C., Zor, I., & Unal, N. (2019). Prognostic Performance of Artificial Neural Networks by Using MIMIC-III Clinical Database. *Int. Conf. on Data Science, Machine Learning and Statistics*.
- Ozalp, A., Yıldırak, K., & Yolcu-Okur, Y. (2019). Optimal investment strategy and liability ratio for insurer with Lévy risk process. *Hacettepe Journal of Mathematics and Statistics*.
- Nevruz, E., Yıldırak, K., & SenGupta, A. (2017). Multivariate Stochastic Prioritization of Dependent Actuarial Risks in Agricultural Insurance. *ASTIN / AFIR-ERM Colloquium*, Panama City.
- İscanoglu Çekiç, A., & Yıldırak, K. (2017). Credit Scoring by Using Generalized Models: An Implementation on Turkey's SMEs. *Journal of Economics, Finance and Accounting*, 4, 98–105.
- Evkaya, O., Yıldırak, K., & Kestel, S. (2017). Assessment of Index-based Drought Insurance. *Ekonomik Yaklaşım*, 28, 1–18.
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- Gunay, S. G., & Yıldırak, K. (2016). Choosing the Appropriate Amount of Mortgage Loan: Risk Based Decision Making. *International Journal of Economics and Finance*, 8, 12–29.
- Yıldırak, K., & Selcuk-Kestel, A. S. (2015). Adjusting SPI for crop specific agricultural drought. *Environmental and Ecological Statistics*, 22(4), 681–691.
- Yıldırak, K., Kalaylıoğlu, Z., & Mermer, A. (2015). Bayesian estimation of crop yield function: drought based wheat prediction model for TIGEM farms. *Environmental and Ecological Statistics*, 22(4), 693–704.
- Yıldırak, K., & Gulseven, O. (2012). Indemnity Payments in Agricultural Insurance: Risk Exposure of EU States. *Actual Problems of Economics*, 127(1), 373–380.
- Yıldırak, K., & Ekinci, C. (2013). Review of Market Risk Computation Techniques (Ch. 17). In *Rethinking Valuation and Pricing Models*. Elsevier.
- Ekinci, C., Yıldırak, K., & Taylan, A. S. (2013). High-Frequency Performance of Value at Risk and Expected Shortfall: Evidence from ISE30 Index Futures (Ch. 18). In *Rethinking Valuation and Pricing Models*. Elsevier.

- Yildirak, K., & Suer, O. (2013). The Importance of Qualitative Factors in Firm Default: Evidence from Turkey. *Actual Problems of Economics*.
- Kurum, E., Yildirak, K., & Weber, G. W. (2012). A Classification Problem of Credit Risk Rating Investigated and Solved by Optimization of the ROC Curve. *Central European Journal of Operations Research*.
- Altinsoy, G., Erol, I., & Yildirak, S. K. (2010). Time-varying Beta Risk of Turkish Real Estate Investment Trusts. *METU Studies in Development*, 37, 83–114.
- Weber, G. W., Taylan, P., Yildirak, K., & Görgülü, Z. K. (2010). Financial Regression and Organization. *DCDIS-B*, 17, 149–174.
- Uner, S., Cakir, B., & Yildirak, K. (2010). Do we adequately respect the potential of routine primary health care services in reducing neonatal mortality in developing countries? The example of the Denizli cohort. *Cah. Socio. Demo. Med.*, 50(4), 477–500.