האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM

The Hebrew University of Jerusalem

Syllabus

Financial Innovations for Economic Development - 55721

Last update 10-10-2021

HU Credits: *3*

Degree/Cycle: *2nd degree (Master)*

Responsible Department: *Business Administration*

Academic year: *0*

Semester: *1st Semester*

Teaching Languages: *English*

Campus: *Mt. Scopus*

Course/Module Coordinator: *Prof. Glenn Yago*

Coordinator Email: *glenn@jerusaleminstitute.org.il*

Coordinator Office Hours:

Teaching Staff:
Prof Glenn Yago

Course/Module description:
This course will focus on the means and methods of finance applied to social, economic, and environmental challenges facing developing economies. Financial innovations give rise to new intermediaries (e.g., community venture capital, permanent capital facilities, revolving loan funds, social investment banks, business development companies, venture investment trusts, etc.), new types of instruments (e.g., blended finance structured finance, microfinance, social, environmental and development impact bonds, green bonds, diaspora bonds, catastrophic risk bonds, royalty trusts, community investment notes, and risk pooling finance mechanisms and facilities), and new services, platforms or techniques (e.g., ETFs, impact investing, public-private partnerships, financial intermediary facilities, international finance facility for immunization, product development partnerships, value-chain financing) to create jobs, build communities, and enable capital formation and economic growth.

Course/Module aims:
These sessions will survey the application of innovative financing emerging through new products and services, new processes and operations and organizational forms in addressing problems as diverse as entrepreneurial finance, renewable energy, environmental finance, global health, accelerating medical solutions, regional development, affordable housing, urban revitalization and infrastructure. Through case studies and reviews of financial policies, programs and product innovation, students will discover why capital structure matters in aligning diverse interests into new business models for sustainable social and economic change. Students will work through problem sets for innovative financing structures for development projects and enterprises. Students will acquire and apply data gathering, economic, and financial analytical skills to identify specific market failures in developing economies enabling them to apply appropriate financial tools to bridge capital gaps for project and enterprise finance. This would include the ability to identify innovation-led growth targets (e.g., increased crop yields, reduction of disease incidence, lower credit access costs), choose a coherent, time and risk-balanced portfolio of development initiatives required to meet a measurable and tangible development target (e.g., prevention, diagnostics, treatment for global health; job creation and sustainable income and wealth formation); differentiate business, market and technological opportunities for a development target (e.g., on-grid, off-grid, and/or undergrid renewable energy); evolve, accelerate, extend and scale sustainable development business models; and identify criteria for replication (capitalizing external networks, motivate and reward repeating, positive-sum economic development strategies). We will discover why capital structure matters in aligning diverse interests into new business models

for social and economic change to address Sustainable Development Goals for 2030. Students will research practical applications to financing challenges for economic development.

Learning outcomes - On successful completion of this module, students should be able to:

Working knowledge of the means and methods for building capital structures for SME development, environmental finance, agriculture and food, water, climate change, river restoration, culture and eco-tourism and other project finance development including urban revitalization

Attendance requirements(%):

100

Teaching arrangement and method of instruction: Lectures by professor and student presentation based on literature and case study reviews.

Course/Module Content:

COURSE UNIT OVERVIEW

I. Introduction to Finance Toolkit and Innovative Finance (October 21)
II. Structural Changes in Capital Markets and Development Finance (October 28)
a. Global Trends
b. What is Financial Innovation? From Structured to Blended Finance

III. Why and How does Capital Structure Matter? (November 4)

IV. Entrepreneurial Finance (November 4)

a. Lifecycle of Finance
b. Business Finance and Capital Structure
c. Equity, Debt finance, and Hybrid Debt Instruments
d. SME Finance

V. Impact Investment and Social Finance: Social Impact Bonds and Beyond (November 25)

a. Pay for performance contracting
b. Full-spectrum Asset Class Product and Program Development Finance

c. Risk-Return-Impact: Metrics

VI. Financing Ideas: Science and Tech Finance (December 2)

a. From Venture Capital Models to Research Bond Obligations
VII. Project Finance Mechanics 1 (December 9)
a.Infrastructure Projects
b.Urban Revitalization
VIII. Project Finance Mechanics 2 (December 16)
a. Housing
b. Cultural Heritage and Tourism

IX.Environmental Finance (December 23)
a. Solid Waste
b. Rivers
c. Biodiversity and Ecosystem Services

X.Development Finance—Blended Finance (Case Study Applications) (December 23)

XI. Development Finance-Energy (Case Study Applications) (December 30)

XII. Development Finance—Food-Water Nexus (Case Study Applications) (January 6)

XIII. Development Finance –Global Health (January 13)

XIV.Project Implementation Plan Presentations by Student Teams (January 20)

<u>Required Reading:</u>
I. Introduction to Finance and Financial Innovations (October 21)

Reference Resource throughout course: Miken Institute 5-Minute Finance

***Required Readings for Lectures*
**For Student Presentations*

*1. **Allen, Franklin and Yago, Glenn. "Financing the Future: Market-Based Innovations for Growth". Upper Saddle River, New Jersey: Pearson/Wharton School Publishing, 2010:*
a. Chapter 1: The Evolution of Finance;
b. Chapter 2: A Framework for Financial Innovation: Managing Capital Structure.
2. Madsberg, S. and Keohane, G., Rockefeller Foundation (eds.), The Innovative Finance Revolution, Special Issue of Foreign Affairs, February 2017.

*3. **Khraisha and Keren Arthur, “Can we have a general theory of financial innovation proceses? A conceptual review”, Financial Innovation (2018)4:4*
4. Shiller, Robert, “Tackling the World Economy,” Harvard Business Review (January – February 2012).
5. Myers, Stewart. “Capital Structure,” Journal of Economic Perspectives. 15/2 Spring 2001:81-102.
6. Kerr, William R. and Nanda, Raman “Financing Innovation,” Annual Review of Financial Economics, 7/1:445-462.
7. “Integrating nature and knowledge into economics,” Popular Science Background, Nobel Prize in Economic Sciences, 2018.
8. Levine Aghion, Peter Howitt, and Ross Levine, “Financial Development and Innovation-Led Growth,”, in T. Beck and R. Levine, Handbook of Finance and Development, London: Elgar, 2018
9. Economic Growth, Technological Change, and Climate Change, Scientific Background Paper, Economic Sciences. Nobel Prize, 2018.
10. Understanding Development and Poverty Alleviation, Scientific Background Paper, Economic Sciences, Nobel Prize, 2019

II. Structural Changes in Capital Markets (October 28)
*1. **Yago, Glenn and Steven Zecher, “Reinventing Israeli Capital Markets,” Financial Innovations Lab Report, Milken Institute, 2014.*
2. Yago, Glenn, Steven Zecher, and David Denker, “Israel’s Bridge to Developing Economies: Financing Innovation for Sustainable Development,” Policy Brief, Jerusalem Institute for Policy Research-Milken Innovation Center, January 2018.
*3. *Freiberg, David, DG Park, George Serafeim, and T. Robert Zochowski. "Corporate Environmental Impact: Measurement, Data and Information." Harvard Business School Working Paper, No. 20-098, March 2020. (Revised July 2020.)*
*4. *Barder, Owen and Talbot, Theodore, “Guarantees, Subsidies, or Paying for Success? Choosing the Right Instrument to Catalyze Private Investment in Developing Countries,” Working Paper 402, Center for Global Development, May 2015*
*5. *Patrick Bolton and Frederic Samama, Capital Access Bonds: Contingent Capital with an option to Convert,” Economic Policy, April, 2012.*
*6. *Case Study: Levi, Retsef, Manoj Rajan, Somya Singhvi, Yanchong Zheng, The impact of unifying agricultural wholesale markets on prices and farmers’ profitability , Proceedings of the National Academy of Sciences Feb 2020, 117 (5) 2366-2371; DOI: 10.1073/pnas.1906854117*
*7. *Case Study: Viability of Gender Bonds in SSA: A Landscape Analysis and Feasibility Assessment, FSDAfrica/UN Women, September 2020.*
*8. *Case Study: Biau, Carole, “Common Capital Market Infrastructure for East Africa: Options for Way Forward,” Milken Institute, Center for Financial Markets, January 2018.*
*9. *Schellhase, John and Woodsome, Jim “SMEs and Public Equity Financing: A New Dataset of SME Boards in Emerging Market and Developing Economies,” Milken Institute, August 2, 2017.*
.

III/IV.Entrepreneurial Finance – Why Capital Structure Matters (November 4)

*1. **Allen, Franklin and Yago, Glenn. "Financing the Future: Market-Based Innovations for Growth". New Jersey: Wharton School Publishing, 2010:*
a. Chapter 3: Innovations in Business Finance;
b. Appendix: The Black-Scholes Formula.
*2. **Allen, Franklin, Xian Gu and Julapa Jagtiani, "A Survey of Fintech Research and Policy Discussion," Working Papers Research Department, WP 20-21, Federal Reserve Bank of Philadelphia, June 2020.*
*3. **Ayyagari, Meghana, et.al., SME Finance, Policy Research Working Paper 8241, World Bank Group, Development Research Group, November 2017.*
*4. *New Horizons in African Finance: Reducing Risk and Mobilizing Financing on a New Scale, African CEO Forum and Internatioinal Finance Corporation, 2016. See Case Studies on: Azito Enegy, Eobank, Cargil SIB on Cocoa Loans, Bayport (Bond Markets),Nutrition, Education (Bridge Academies), and Helios (Private Equity).*
*5. * IFC SME Ventures: Investing in Private Equity in Sub-Saharan African Fragile and Conflict-Affected Situation, IFC and Cross-Boundary Ventures, October 2018.*
6. Alibhai, Salman; Bell, Simon; Conner, Gillette. 2017. "What's Happening in the Missing Middle?: Lessons from Financing SMEs." World Bank, Washington, DC.
*7. *Irving, Jaqueline, Schellhase, John and Woodsome, Jim "Can Stock Exchanges Support the Growth of Small and Medium-Sized Enterprises? Lessons from India, South Africa, and Jamaica," Milken Institute, July 2017.*
8. Yago, Glenn, "Development Finance Case Studies: Innovative Finance for Sustainable Development Goals," Milken Innovation Center-Jerusalem Institute, 2018:
1: Aspada, India & Bangladesh
9. "Stimulating Investment in Emerging-Market SMEs," Financial Innovations Lab Report, Milken Institute, 2009.
10. Case Study: Chu, Michael, and Tahilyani, Rachna, "Aspada: In Search of the Right Structure for Impact Investing," Harvard Business School Case 314-099, April 2014 (Revised July 2014).

V. Impact Investing and Social Finance (November 18)

*1.**Building a Social Capital Market in Israel. Financial Innovations Lab Report, Milken Institute, Dec 2012.*
*2.**Creating Impact: The Promise of Impact Investing, International Finance Corporation, World Bank Group, 2019.*
*3.**Emily Gufstafson-Wright, et. al., What is the Size and Scope of the Impact Bonds Market, Global Economy and Development, Brooking Institution, July 2020. See further reports in this series of evaluations on measuring the success of impact bonds here.*
4.Gray, Jacob et. al., "Great Expectations: Mission Preservation and Financial Performance in Impact. Investing," Wharton Social Impact Initiative, Wharton School, University of Pennsylvania, October 7, 2015.
5. Lee, Christopher, Ragini Chawla and Aron Betru, Priming the SDG Markets: Can

International Donors and impelementrs Create an Impact Investment Pipeline, Milken Institute, 2020.
5.Lars Hultkranz and Elin Vimefall, "Social Investment Funds in Sweden: Status and Design Issues" Scandinavia Journal of Public Administration, 21/3/ (2017).
6.Nysrand, Camilla, et. al., "Economic Return on Investment in Parent Training Programmes for the Prevention of Child Externalising Behaviour Problems," Administration and Policy in Mental Health and Mental Health Services Research, 2019.
*7. *Case Study A. Fraser, et.al., Evaluations of the Social Impact Bond Trailblazers in Health and Social Care, Final Report, Policy Innovation Research Unit, July 2018: 51-79.*
8. Case Study "Working Towards a Harmonized Framework for Impact Reporting for Social Bonds," International Capital Market Association, June 2018.

Measuring Impact

1. Ronald Cohen and George Serafaim, "How to Measure a Company's Real Impact," Harvard Business Review, September 3, 2020.
2. Practical Impact: GIF's approach to impact measurement, Global Innovation Fund, June 2019.
3. "Green and Social Bonds: A High-Level Mapping to the Sustainable Development Goals," International Capital Market Association, June 2018. (N. B. See and click on Spreadsheet Supplement for full Mapping)
4. Friede, Gunnar, et al., "ESG and Financial Performance: Aggregated Evidence from more than 200 Empirical Studies," Journal of Sustainable Finance and Investment, 5:4, 210 – 233, 2015.
*5. *Case Study Addy, Chris, et. al., Calculating the Value of Impact Investing, Harvard Business Review, January-February, 2019.*
6. Financial Innovation Lab Case Summaries, Milken Innovation Center-Jerusalem Institute, 2019.

VI. Financing Ideas: Science and Tech Finance (November 25)

*1. **Allen, Franklin and Yago, Glenn. "Financing the Future: Market-Based Innovations for Growth". Upper Saddle River, New Jersey: Pearson/Wharton School Publishing, 2010:Chapter 7: Financing Cures*
*2. **Seidl da Fonseca R., Pinheiro-Veloso A. (2018) The Practice and Future of Financing Science, Technology, and Innovation. Foresight and STI Governance, vol. 12, no 2, pp. 6–22. DOI: 10.17323/2500-2597.2018.2.6.22*
*3. **Reinventing Business through Disruptive Technologies: Sector Trends and Investment Opportunities in Emerging Markets, IFC 2019.*
4. Lach, Saul, Zvika Neeman and Mark Schanakerman, Government Financing of R&D: A Mechanism Design Approach," Discussion Paper Series DP12199, Centre for Economic Policy Research, June 2020.

*1. *Tincq, B., Cunha Brito, M. and Sinet, L. The Frontiers of Impact Tech: Moonshots worth taking in the 21st Century. Paris: Good Tech Lab, 2019.*
*2. **"New Biomedical Financial Models," Financial Innovations Lab Report, Milken Innovation Center-Jerusalem Institute, 2019.*
*3. *Case Study*Hull, John C. and Lo, Andrew W. and Stein, Roger, Funding Long Shots (October 25, 2017). Rotman School of Management Working Paper No. 3058472. Available at SSRN: https://ssrn.com/abstract&eq;3058472 or http://dx.doi.org/10.2139/ssrn.3058472*
*4. *Case Study: Vu, Jonathan T., et.al, "Financing Vaccines for Global Health Security," Med RXIV, March 2020. See also non-technical summary in "The Challenging Economics of Vaccine Development in the Age of COVID 19, and What can be done about it", Global Forum 2020.*
*5. *Case Study *Gaddy, Benjamin, Sivaram, Varun, and O'Sullivan, Francis, "Venture Capital and Cleantech: The Wrong Model for Clean Energy Innovation," MIT Energy Initiative Working Paper, July 2016.*
*6. *Lo, Andrew W. and Pisano, Gary P. "Lessons From Hollywood: A New Approach to Funding R&D," MIT Sloan Management Review, Winter 2016.*
*7. *Forman, Sandra M., Lo, Andrew W., Shilling, Monica and Sweeney, Grace K. "Funding Translational Medicine via Public Markets: The Business Development Company," Journal of Investment Management, 13/4 (2015): 9-32.*
*8. **Fagnan, David, N., Yang, Nora, McKee, John C. and Lo, Andrew W. 2015, "Financing translation: Analysis of the NCATS rare-diseases portfolio," Science Translational Medicine 7, 263 – 276 (Case Study).*
9. Fagnan, David E., Fernandez, Jose Maria, Lo, Andrew W., and Stein, Roger M. "Can Financial Engineering Cure Cancer," American Economic Review, 2013, 103(3): 406-411.
10. Debonneuil, Edouard, Eyraud-Loisel, Anne and Planchet, Fredirc, "Can Pension Funds Partially Manage Longevity Risk by Investing in a Longevity Megafund?," Risks, July 8, 2018: 2-27.
*11. Case Study * Lo, Andrew W. and Naraharisetti, Sourya, 2014, "New Financing Methods in the Biopharma Industry: A Case Study of Royalty Pharma, Inc.," Journal of Investment Management 12, 4-19.*

VII. Project Finance Mechanics 1 (December 2)

Urban Revitalization –
Public Finance Innovations

1. *"The Public Wealth of Cities: How to Turn Around Cities Fortune by Unlocking Public Assets," Citi GPS: Global Perspectives and Solutions, March 2018.*
2. Godnar, Gordon and B. Comer, Project Finance Teaching Note," Wharton School, Universityof Pennsylvania, 1996. UPDATE: Dovrak, Paul, "Put a fence around It: Project finance explained," Windpower engineering and Development, April 11, 2016.
*3.**Huxley, Joe, "Value Capture Finance, Making Urban Development Pay Its Way,"*

Urban Land Institute, 2009.
*4..**Asset Backed Securitization," Stern School of Business, NYU, 2016.*
*5. Case Study*Satterhwaite, David "The Impact of Urban Development on Risk in Sub-Saharan Africa's cities with a focus on small and intermediate Urban Centers," International Journal of Disaster Risk Reduction, 26 (2017) 16-23.*
*6. *"New Perspectives on Climate Finance for Cities: Finance Solutions for New and Emerging Infrastructure Approaches to Urban Climate Mitigation and Adaptation," Siemens-Citi-C40 Cities..*
7. Case Study: "Hartford County Metropolitan District," Moody's Credit Opinion, July 2018.

Housing

*1. **Allen, Franklin and Yago, Glenn. "Financing the Future: Market-Based Innovations for Growth". New Jersey: Wharton School Publishing, 2010:*
a. Chapter 4: Innovations in Housing Finance.
*2. **Allen, Franklin, James R. Barth, and Glenn Yago, Fixing the Housing Market: Financial Innovations for the Future:*
a. Chapter 1, "Housing Crises Go Global: The Boom, The Bust and Beyond," 1-68;
b. Chapter 4: "Housing in Emerging Markets," 103-138;
c. Chapter 5: "Future Innovations in Housing Finance," 139-170, New Jersey: Wharton School Publishing/Pearson, 2012.
*3. **"Toward Affordable Housing in Israel," Financial Innovations Lab Report, Milken Innovation Center-Jerusalem Institute, October 2013.*
4. "Financing Green Building in Residential Development," Financial Innovations Lab Report, Milken Innovation Center-Jerusalem Institute, March 2017.

Community Development

*1. **"Capital Access in Israel's Underserved Market," Financial Innovations Lab Report, Milken Innovation Center-Jerusalem Institute, March 2015.*
2. "Expanding the Market for Community Investment in the United States". Milken Institute, USSIF, Initiative for Responsible Investment, July 2013.

VIII. Project Finance Mechanics 2 (December 9)

Regional Development and Project Finance – Infrastructure, Culture, Tourism

*1. **Case Study Arezki, Rabbah, et.al., "From Global Savings Glut to Financing Infrastructure," Economic Policy, April 2017: 221-261.*
*2. **Chou, Ben, et.al., "State Revolving Funds to Build Climate-Resilient Communities," NRDC Issue Paper, June 2014.*

*3. **“Innovative Finance to Address Africa’s Infrastructure Needs,” Financial Innovations Lab, Milken Institute, May 2016.*
*4. **“New Models for Financing Infrastructure in Asia,” Financial Innovations Lab, Milken Institute, April 30, 2017.*
*5. *Hansen, Kenneth and Molle, Anthony, “World Bank Guarantees for Private Projects,” Norton Rose Fulbright, April 12, 2016.*
*6. **Yago, Glenn and Zecher, Steven, “Strengthening Israel’s Regions: Creating New Capital Sources for Economic Development in Israel in the Negev and Galilee,” Milken Innovation Center-Jerusalem Institute, 2015.*
*7. *Case Study Tourism Tax in Jerusalem: Promoting Tourism Development, Milken Innovation Center Policy Brief, September 2, 2019.*
*8. *Stanish, Charles S. and Levy, Thomas “Cyber-Archaeology and World Cultural Heritage,” American Academy of Arts and Sciences, Spring 2013.*
*9. *Case Study: Levy, T. E., et. al., “At-Risk Heritage and Virtual Reality Visualization for Cyber-Archaeology; The Mar Saba Test Case,” in Forte, M. and H. Murtiera, Digital Cities: Between History and Archaeology,Oxford University Press, 2020*
*10. *Licciardi and Amitahmasebi, Rana (eds.) “The Economics of Uniqueness: Investing in Historic City Cores and Cultural Heritage Assets for Sustainable Development,” World Bank, 2012: Chapter 4—Economic Valuation of Cultural Heritage: 75-106.*

IX. Environmental Finance)December 16)

Relevant Weblink for this section: Environmental Finance (www.environmental-finance.com), UN Environment Program-Finance Initiative (https://www.unepfi.org/)
Watch Video: The Price on Nature (Richard Sandor): https://www.youtube.com/watch?v&eq;rW-ovT6z5e8

*1. **Allen, Franklin and Yago, Glenn. Financing the Future: Market-Based Innovations for Growth. New Jersey: Wharton School Publishing, 2010:*
a. Chapter 5: Environmental Finance: Innovating to Save The Planet.
*2. **World Bank Outlook 2050: Strategic Directions Note: Supporting countries to Meet Long-Term Goals of Decarbonization*
3. , 2020: 48-78 (Advancing Cross-Cutting Solutions---focus for project implementation plans).
*4. **Bolton, Patrick, et.al., The Green Swan: Central banking and financial stability in the age of climate change, Bank of International Settlements, Janauary 2020: 1-20;47-64.*
*5. **Bolton, Patrick, Xavier Musca and Frederic Samama, “Global Public Private Investment Partnerships: A Financing Innovation with Positive Social Impact”, Journal of Applied Corporate Finance, 32/1 (Spring 2020).*
*6. **Sandor, Richard, et.al., Sustainable Investing and Environmental Markets: Opportunities in a New Asset Class, World Scientific Publishing, 2014, Forward.*
a. Chapter 1: A Brief Survey of Environmental Asset Classes.
*7. *Litterman, Bob “What is the Right Price for Carbon Emissions?” Regulation, Summer 2013: 38-43:*

a. Litterman, Bob,“A Pragmatic Approach to Climate Change,” April 19, 2016;
b. Jones, Peyton, “Selling Stranded Assets: Profit, Protection and Prosperity,” International Endowments Network, June 17, 2015.

8. Case Study: “Converting Emerging Markets to Green Finance: Amundi and the IFC, Imperial College Business School, March 2020.
9. Case Study: DC Water Environmental Impact Bond, Goldman Sachs/Calvert Foundation, 2016
10. Case Study: Rose, Adam and Dan Wei, “Impacts of the Property Assesed Clean Energy (PACE) program on the economy of California,” Energy Policy 137 (2020.
11. Case Study: Brennan, M. Growing the US Green Bond Market: Lab 2, Milken Institute, Financial Innovations Lab Report, September 2020
*12. Case Study*Bisoonot, Jean and Samama, Frederic, “Climate Change: A Policy Making of Capital Markets’ Mobilization for Public Good," June 2017, Working Paper.*
13. Case Study: Green FinTech Blockchain and Energy Grid
Required reading: Deloitte. What is a blockchain (Canvas)
https://hbr.org/2017/03/what-initial-coin-offerings-are-and-why-vc-firms-care
https://hbr.org/2016/05/the-impact-of-the-blockchain-goes-beyond-financial-services

Suggested resources:
https://www.technologyreview.com/s/604227/blockchain-is-helping-to-build-a-new-kind-ofenergy-grid/
https://hbr.org/2017/03/how-utilities-are-using-blockchain-to-modernize-the-grid
Brooklyn Smart Grid – Blockchain-enabled:
http://www.politico.com/magazine/story/2017/06/15/how-a-street-in-brooklyn-is-changing-theenergy-grid-215268.
*14. Case Study *Andersson, Mats, Bolton, Patrick and Samama, Frederic, “Hedging Climate Risk,” Financial Analysts Journal, 72/3 (2016): 13-32.*
*15. Case Study *Lee, Thomas, “Fossil Fuel Stranded Assets: Efficient Market or Carbon Bubble?” Wharton Public Policy Initiative, April 12, 2017.*
*16. Case Study *Quesnel, Kim, Ajami, Naushua K. and Wyss, Noemi, “Tapping into Alternative Ways to Fund Innovation and Multipurpose Water Projects: A financing Framework from the Electricity Sector,” Stanford Woods Center for the Environment, Stanford University, February 2016..*
17. Case Study: Danish Climate Investment Fund, September 2017 (KIF and Convergence).
18. Case Study: The Great Lakes and St. Lawrence Blue Growth Fund Final Report, 2017

Solid Waste and WASH (Water, Sanitation and Hygiene)

*1. *Blass, Vered, Heffer, Shiri, Yago, Glenn and Zecher, Steven, "Financing Solid Waste Disposal in Israel," Financial Innovations Lab Report, Milken Institute, November 2012.*

2. Hyun, Christopher, et. al., Sanitation for Low Income Regions: A Cross-Disciplinary Review, Annual Review of Environment and Resources, 2019. 44:287-318, 2019.

3. Hobbs, Shakira and Nicole Barclay, "Sustainability Approach: Food Waste to Energy Solutions for Small Rural Developing Communities," International Journal of Environmental, cultural, Economic and Social Sustainability: Annual Review, 2018.

4. Beckman, Sara, et.al., "Patagonia: Closing the Loop on Packaging Pollution," BerkeleyHaas Case Series, April 1, 2019.

River Revitalization and Smart Watershed Management

*1. *"Financing Kidron/Wadi El Nar River Revitalization," Financial Innovations Lab Report, Milken Institute, July 2013 (Case Study).*
2. "Revolving Fund for River Restoration". Financial Innovations Lab Report, Milken Institute, December 2009.
3. Maclean, Caitlin and Yago, Glenn, "Financial Innovations for Freshwater Revitalization: Transboundary Project Finance in Israel, Jordan, and the Palestinian Authority," Financial Innovations Lab Report, Milken Institute, December 2009.
4. Case Study: Walske, Jennifer M. and Laura D. Tyson, "Sanergy: Tackling Sanitation in Kenyan Slums," Berkeley Haas Case Studies, July 2016.

Biodiversity

*1. **Di Marco, Moreno, et.al., "Sustainable Development Must Account for Pandemic Risk," Proceedings of the National Academy of Sciences, February 25, 2020 177 (8) 3888-3892.*
*2. **Moving Mountains: Unlocking Private Capital for Biodiversity and Ecosystems," The Biodiversity Finance Initiative, Finance for Nature, UNDP, 2019.*
*3. **Case Study: Yago, Glenn, "Biodiversity Conservation in Israel," Financial Innovations Lab Report, Milken Institute, July 2012.*
*4. * Case Study Maclean, Caitlin, Creating Mechanisms for Conservation Finance in Southeast Asia, Financial Innovations Lab Report, Milken Institute, September 2015.*

X. Global Development Finance – Blended Finance (December 23)

*1. **Yago, Glenn and Allen, Franklin "Financing the Developing World," World Financial Review, September-October 2011:44-48*
2. Designing an Israeli Development Financing Platform: Towards Sustainable Development Goals, Financial Innovations Lab Report, June 2019.
3. Kamstra, Mark and Shiller, Robert J., "The Case for Trills: Giving the People and

their Pension Funds a Stake in the Wealth of Nations," Cowles Foundation Discussion Paper, No.1717, August 2009.
*4. **Denker, David, Yago, Glenn, and Zecher, Steven, "Israel's Bridge to Developing Economies:Financing Innovation for Sustainable Development," Policy Brief, Jerusalem Institute for Policy Research-Milken Innovation Center, January 2018.*
5. Lee, Chris, Aron Betru and Paul Horrocks, "Guaranteeing the Goals: Adapting Public Sector Guarantees to Unlock Blended Financing for the U. N. Sustainable Development Goals," Milken Institute and OECD, April 2018.
6. "Innovative Financing for Development: Scalable Business Models that Produce Economic, Social and Economic Outcomes," Global Development Incubator, September 2014.
*7. * Case Study Gustafsson-Wright, Emily, .et.al., "Impact Bonds in Developing Countries," Brookings and Convergence Finance, September 2017.*
*8. *Betru, Aaron, Huang, Ziyi, and Mueller, Jackson, "Leaving Transferred Money on the Table: Will Remittance-Linked Financial Products Add Value to Development Finance?", Viewpoints, Milken Institute, March 2017.*
*9. *Akkoyunlu, Sule and Stern, Maximillian "An Empirical Analysis of Diaspora Bonds," Graduate Institute-Geneva, Research Paper 3, 2012.*

XI. Global Development Finance -Energy (December 30)

*1. Case Study *Tonknogy, Bela et.al., "Blended Finance in Clean Energy: Experiences and Opportunities," Climate Policy Initiative, January 2018.*
2. Fuchs, Alan, Gertler, Paul J., Shelef, Orie, and Wolfram, Catherine D., "The Demand for Energy-Using Assets among the World's Rising Middle Classes," American Economic Review, Jun 2016, Vol. 106, No. 6: 1366-1401.
3. Case Study " Crossboundary Energy," Convergence, October 2016.
4. Lee, Kenneth et.al., "Electrification for 'Under Grid" households in Rural Kenya," Development Engineering, Vol 1. (June 2016): 26-35.

Case Studies for Catastrophic Risk and Climate Change

*1. **How Agricultural Index Insurance Can Promote Risk management and Resilience in Developing Economies, Feed the Future Innovation Lab for Markets, Risk and Resilience, University of California Davis, September 2019.*
2. "Financial Innovations for Catastrophic Risk: Cat Bonds and Beyond," Milken Institute, Financial Innovations Lab Report, Milken Institute, April 2008.
*3. *Case Study Syroka, Joanna and Wilcox, Richard, "Rethinking International Disaster Aid Finance," Journal of International Affairs, Spring/Summer 2006, 59/2.*
4. Beavogui, Mohamed, "Building Resilience Against Climate Change: African Risk Capacity," Africa Policy Review, 2018.

*5. **Yago, Glenn (ed.), “Development Finance Case Studies: Innovative Finance for Sustainable Development Goals,” Milken Innovation Center-Jerusalem Institute, 2017:*
a. Case Study 3: Ignite Power, Rwanda;
b. Case Study 5: Gigawatt Global, Rwanda;
c. Case Study 6: Sustainable Water Finance in California and Israel: Financing Tech Transfer.

Case Studies for Energy

1. Bonner, Dale, MacLean, Caitlin, “Public-Private Infrastructure Financing Solutions,” Financial Innovations Lab Report, Milken Institute, November 2014.
*2. **MacLean, Caitlin, Olderman, Katie “Innovative Financing Models for Energy Infrastructure in Africa,” Financial Innovations Lab Report, Milken Institute, May 2015.*
3. Hansen, Ulrich Elmer.,et.al., “Review of Solar PV market development in East Africa,” UNEP Riso Center, Technical University of Denmark, 2014.

XII. Development Finance: Food Water Nexus (January 6)

*1. **Accelerating Agritech Solutions in Israel, California, and Developing Economies, Financial Innovations Lab Report, Milken Innovation Center/Blum Lab, Jerusalem Institute, June 2020.*
*2. **Rosa, Lorenzo, et.al., “Closing the yield gap while ensuring water sustainabilityl,” Envronmental Research Letters, 13, 104001, 2018,*
*3. **Pathways to Prosperity: Rural and Agricultural Finance: State of the Sector Report,*
Feed the Future-USAID, ISF, Rural and Agricultural Finance Learning Lab. 2020.
*4. *Tam, Vikki and Chris Mitchell, “How Farmer-Allied Intermediaries can Transform Africa’s Food Systems,” Bain and Company, 2020.*
5. Cooley,Larry and Julie Howard, Scale Up Sourcebook: Innovations in Agriculture, Purdue University, 2018
6. Scherer, Jill, Yago, Glenn, and Zeidman, Betsy “Feeding the World’s Hungry: Fostering an Efficient and Responsive Food Access Pipeline”. Financial Innovations Lab Report, Milken Institute, 2009.
7. “Paying for Outcomes—Protecting Human and Animal Health in Sub-Saharan Africa,” Financial Innovations Lab Report, Milken Institute, February 2011.
8. Pay for Results in Development: A Primer for Practicitioners, USAID/Palladium, 2018
*9. **Yago, Glenn, “Development Finance Case Studies: Innovative Finance for Sustainable Development Goals,” Milken Innovation Center-Jerusalem Institute, 2017:*
a. Case Study 4:The Case of Aflatoxin and Maize Production Pay-for-Outcomes;
b. Case Study 2: Financing Kidron/Wadi El Nar Revitalization-Waste Water; Treatment and Regional Agriculture and Tourism Development.
*10. * Case Study Du, X., Lu, L., Reardon, T. and Zilberman, D., “The Economics of*

Agricultural Supply Chain Design: A Portfolio Selection Approach," American Journal of Agricultural Economics, 98/5 (10 October 2016):1377-1388.
*11. **Hartig, Peter, Jainzik, Michael and Pfeiffer, Klaus, "The Potential of Structured Finance to Foster Agricultural Lending in Developing Countries," in D. Koehn (ed.), Finance for Food: Toward New Agricultural and Rural Finance, 2014.*
*12. **"Financial Models for Water Sustainability," Financial Innovations Lab Report, Milken Innovation Center-Jerusalem Institute, April 2016.*
*13. * Case Study "Conducting A Feasibility Study for a Financing Facility for Cocoa Smallholders in Ghana," Convergence, Rabo Bank, Rainforest Alliance, May 2018 (Case Study).*
*14. * Case Study "Financing Fisheries Reform: Blended capital approaches in support of sustainable wild-capture fisheries," Environmental Defense Fund and Duke Nicholas Institute for Environmental Policy Solutions, January 18, 2018*
*15. * Case Study "Financing Sustainable Land Use: Unlocking business opportunities in sustainable land use with blended finance," KOIS Invest and Blended Finance Taskforce, January 2018 (Case Study).*
*16. * Case Study Fenichel, E.P., et. al., "Measuring the Value of Groundwater and other forms of Natural Capital," Proceedings of the National Academic of Science, December 31, 2015*
17. Revich, Jerry, et.al., "Precision Farming: Cheating Malthus with Digital Architecture," Goldman Sachs Equity Research, July 13, 2016.

XIII. Global Development Finance—Global Health –(January 13)

*1. **MacLean, Caitlin, "Innovative Financing for Global Health R&D," Financial Innovations Lab Report, Milken Institute, 2012.*
*2. * Paul Yager, Gonzalo J. Domingo, John Gerdes, Point-of-Care Diagnostics for Global Health, Annual Review of Biomedical Engineering 2008 10:1, 107-144*
3. Lorcan Clarke, et.al., "Development Impact Bonds Targeting Health Outcomes," Center for Global Development 133, December 2018
*4. **"Financing the Control of Tuberculosis," Financial Innovations Lab Report, Milken Institute, 2015.*
*5. **Chng, Belinda, MacLean, Caitlin, Singh, Harlin,"New Models for Financing Vaccination Programs in Southeast Asia," Financial Innovations Lab Report, Milken Institute, 2016.*
6. Grace, Cheri, "Developing New Technologies to Address Neglected Diseases: The Role of Product Development Partnerships and Advanced Market Commitments," DFID, 2012.
*7. * Case Study "The Utkrisht Impact Bond Case Study," Convergence: Blending Global Finance: January 2018*
XIII. Program Implementation Plan Team Presentations (January 20—Special Session)

Additional Reading Material:

Course/Module evaluation:
End of year written/oral examination 0 %
Presentation 35 %
Participation in Tutorials 0 %
Project work 65 %
Assignments 0 %
Reports 0 %
Research project 0 %
Quizzes 0 %
Other 0 %

Additional information:
REQUIREMENTS:

All readings are required. Together with attendance at the lectures and participation in structured discussions they will provide students with a tool kit to develop a concise proposal focused on financing a targeted development impact (the course's final project). This end of semester project will be a proposal for the application of an innovative finance product(s) to a project or program that would target a specific sector (agriculture/food, health, energy, or environmental), geography (developing/frontier economy); and/or technology transfer or development application related to the UN's sustainable development goals. This will require a description of the proposed project or program, milestones, project targets, outputs, inputs (including financial, technology and intellectual property inputs), identification and quantification of social, economic and/or environmental outcomes, proposed capital structure, sources and uses of funds and a targeted range of return on investment and social/environmental impact (including identification of potential avoided costs). This would include the identification of specific financial tools (bonds, notes, guarantees and credit enhancement, grants, performance based contracts, revolving loan funds or structured finance product, etc.) and how they might be applied to serve the development target.

Themes for these project proposals would include increasing food and agriculture (agricultural productivity, improve food quality and sustainability), global health (including diagnostics, primary care and community projects, treatment modalities and preventive medicine; bio based and sustainable solutions), energy (low carbon projects and climate change adaptation), and environmental finance (sustainable water, land and forest management, conservation and ecosystem services, biodiversity, drought prevention, carbon projects, etc.). Projects could include:

• SME finance for enterprise development (compare and contrast specific private

equity, revolving loan fund models, structured finance solution etc.);
• Environmental or energy infrastructure (use modern finance mechanisms such as risk pooling and risk transfer to create climate response systems to protect food security, technology transfer for water technology, water quality/recycling, distributed water treatment and production or on-grid, off-grid, or under-grid renewable energy project);
• Agricultural or food innovation (plant or soil science technology innovations, post-harvest, or supply chain finance models utilizing agricultural pull-mechanisms);
• Global health innovation (development impact bond, product development partnership, advanced market commitment applied to a vaccine, treatment modality, or preventive measure).

These project proposals would address a prospective practical development project and explicate the deployment of a development finance innovation.

The project proposal would address how innovative finance could design a capital structure for a project or development target that mobilizes:

1) new pools of private and public revenue streams;

2) new revenues options (e.g., tax, charges, fees, bond sales);

3) new incentives (frontloading and debt-based instruments, philanthropic/government guarantees, public-private partnerships, insurance, and other market-based mechanisms).

These projects can be completed as individual (or teams of two reflecting the team members' increased level of effort to meet this assignment's objective).

Guidelines and an example of such a project implementation proposal will be discussed in the first class on October 21.

Through the projects, students will demonstrate their ability to:

• Design and construct an innovative finance application (for either a proof of concept or beta site project) in a developing economy;
• Measure, analyze and report development impacts of an innovative finance project;
• Identify and develop how a development impact investment would benefit and expand capital access through the creative use of innovative financing tools;
• Assist a high-impact project to access flexible market and below-market financial tools;
• Identify how to structure the transaction and identify potential interested partners with aligned interests in the proposed project.