

F530 – Venture Capital and the Economics of Innovation

Lecture 1 - Introduction and Overview

- Economic Growth as Evolutionary Process
- Innovation and Uncertainty
- Creative Destruction
- Who innovates?
- Who finances innovation?
- Frontier and Followers

Readings: **W. H. Janeway, *Doing Capitalism in the Innovation Economy* (2nd edition) (Cambridge University Press, 2018), pp. 1-10, 55-64, 77-101**; J. A. Schumpeter, *Business Cycles: Theoretical, Historical and Statistical Analyses of the Capitalist Process*, 2 vols. (London: McGraw-Hill, 1939), vol. I, pp. 72-129; J. A. Schumpeter, *Capitalism, Socialism and Democracy* (London, Allen & Unwin, 2010 [1943]), Part II: "Can Capitalism Survive", pp. 51-120; **J. M. Keynes (1973 [1936]), *The Collected Writings of John Maynard Keynes*, vol. VII: *The General Theory of Employment, Interest and Money*, Cambridge, England: Macmillan for the Royal Economic Society, pp. 147-165**; C. Perez, *Technological Revolutions and Financial Capital: The Dynamics of Bubbles and Golden Ages* (Cheltenham UK: Edward Elgar, 2002), pp. xvii-xix, 3-35, 71-126; **R. Zeckhauser, "Investing in the Unknown and Unknowable," *Capitalism and Society*, Vol. 1: Issue 2, Article 5 (2006).**

Lecture 2 - Formal Models of Growth and Innovation

- Models of Economic Growth
- Accounting for Technical Change
- Endogenizing Innovation
- Ignoring Market Risk
- What the Models Leave out

Readings: **P. Aghion and Howitt, P., *The Economics of Growth* Cambridge MA: MIT Press, 2009), Introduction and chapters 4 and 5.**

Lecture 3 – What Venture Capitalists Do

- The canonical venture capital model
- Launching projects *versus* building businesses
- The limited scope of VC investments
- The biotechnology paradox
- VCs versus Entrepreneurs
- Managing Uncertainty

Readings: **Janeway, *Doing Capitalism in the Innovation Economy*, pp. 144-152**; U. Akcigit, Dinlersoz, E., Greenwood, J. Penciakova, V/., "Synergizing Ventures, NBER Working Paper 26196, 8-2019; **M. R. Kerr, Nanda, R., Rhodes-Kropf, M., "Entrepreneurship as Experimentation," *Journal of Economic Perspectives*, 28:3, Summer 2014, pp. 25-48**; R. E. Hall and Woodward, S., "The Burden of the Nondiversifiable Risk of Entrepreneurship," *American Economic Review* 100 (2010), pp. 1163-1194; **P. Gompers, Gornall, W., Kaplan, S. N., Strebulaev, I. A., "How Do Venture Capitalists Make Decisions?" available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2801385&download=yes**

Lecture 4 - Evaluating Venture Capital Performance

- The stylized facts of venture capital
 - Skewness of returns
 - Persistence of returns
 - Correlation of returns with the Stock Market
- The Unicorn Bubble
- The dual dependency: Speculation and the State

Readings: **National Venture Capital Association Yearbook 2019**, pp. 5-10, available at <https://nvca.org/wp-content/uploads/2019/08/NVCA-2019-Yearbook.pdf>; R. S. Harris, Jenkinson, T. and Kaplan, S. N., "Private Equity Performance: What Do We Know?", *Journal of Finance* vol. 69: 5, (October 2014) pp. 1851–1882; R. S. Harris, Jenkinson T., Kaplan S. N., Stucke, R., "Has Persistence Persisted in Private Equity? Evidence from Buyout and Venture Capital Funds," available at <http://ssrn.com/abstract=2304808> ;; M. D. McKenzie and Janeway, W. H., "Venture capital funds and public equity markets," *Accounting and Finance*, 51:3 (2011), pp. 764–786; Pitchbook and NVCA, Venture Monitor, 3Q 2019, available at https://nvca.org/wp-content/uploads/2019/10/3Q_2019_PitchBook_NVCA_Venture_Monitor-1.pdf .

Lecture 5 - The Failure of "Market Failure"

- Knowledge as public good with dynamic increasing returns
- Inability to calculate, let alone capture, returns to innovation
- Appropriation of returns *versus* free dissemination
- Conflict between "static" and "dynamic" efficiency
- Vannevar Bush: the myth of the "The Endless Frontier"
- "Mission-oriented" funding: the Defense Department and the NIH
- Sponsoring sectors *versus* picking winners
- National Systems of Innovation: the search for political legitimacy
- Effectiveness *versus* efficiency: the dangers of measurement

Readings: R. R. Nelson, "The Simple Economics of Basic Scientific Research," *Journal of Political Economy*, 67(1959), 297-306; K. Arrow, "Economic Welfare and the Allocation of Resources for R&D," in K. Arrow (ed.), *Essays in the Theory of Risk-Bearing* (New York: American Elsevier, 1971 [1962]), pp. 144-163; N. Bloom, Schankerman, M., and Van Reenen, J., "Identifying Technology Spillovers and Product Market Rivalry," *Econometrica* 81:4 (2013), 1347-1393;, pp. 117-233; B. Lucking, Bloom, N., and Van Reenen, J., "Have R&D Spillovers Changed?" NBER Working Paper 24622 May 2018; Janeway, *Doing Capitalism*, pp. 211-231;.

Lecture 6 – The Banality of Bubbles

- The historical record: 1690s-1990s
- Distinguishing Bubbles: Equity Bubbles vs. Credit Bubbles
- Unpacking the "Super-Bubble" of 1982-2008
- Lessons from the literature: "How long can you afford to be wrong?"
- Reasoning about (ir)rationality

Janeway, *Doing Capitalism*, pp. 155-204; O. Jorda, Schularik, M. and Taylor, A. M., "Leveraged Bubbles," (NBER Working Paper 21486, August 2015) C. P. Kindleberger and Aliber, R. Z. (2005), *Manias, Panics and Crashes: A History of Financial Crises*, 5th edition. Basingstoke, England: Palgrave Macmillan, pp. 1-122; J. A. Scheinkman, *Speculation, Trading and Bubbles* (Columbia University Press, New York NY, 2014), pp. 7-40, 63-87. H. Shin, *Risk*

and Liquidity (Oxford University Press, 2010), pp. 1-27, 96-131 and 152-170; A. Shleifer and R. Vishny, "The Limits of Arbitrage," *Journal of Finance*, 52, no. 1 (1997), pp. 32–55

Lecture 7 - The Necessity of Bubbles

Keynes' Bridge/Tobin's Q

Market Valuation of Financial Assets/Reproduction Cost of Real Assets

Financing Risk and Financing Constraints

Financing Innovation at the Frontier: London versus New York

Hot Markets and Cool Stuff

Readings: G. M. Angelotos, Lorenzoni, G. and Pavan, A., "Beauty Contests and Irrational Exuberance: a Neoclassical Approach", NBER Working paper, No., 15883, 2010; J. R. Brown, Fazzari, S. M. and Peterson, B.C., "Financing Innovation and Growth: External Equity and the 1990s R&D Boom," *Journal of Finance*, 64(1) 2009, pp. 151-185; **Janeway, *Doing Capitalism*, pp. 205-237**; Nanda, Ramana and Matthew Rhodes-Kropf, "Financing Risk and Innovation," Harvard Business School Working Paper 11-013, December 22, 2011; **Nanda, R. and M. Rhodes-Kropf, "Investment Cycles and Startup Innovation," *Journal of Financial Economics*, 110, no. 2 (November 2013): 403-418**; J. Tobin and Brainard, W.C., "Asset Markets and the Cost of Capital", Cowles Foundation paper no. 440, reprinted in *Private values and Public Policy: Essays in Honor of William Fellner* (Amsterdam: North-Holland, 1977) pp. 235-262.

Lecture 8 – Exploring New Economic Space

"What is this stuff good for?" – Market Risk

Railroads: mail order = "the killer app"

Electrification: street lights and street cars, amusement parks, flexible manufacturing, home appliances...and...and...and

ICT: data processing, data analytics, office automation, CAx, ERP, customer self-service, social media, digital services and...and...and

Dynamics of General Purpose Technologies

Who explores: large enterprise or new firm?

Large Enterprises: innovator's dilemma

New Firms: entrepreneurs and their financiers

The Hybrid Schumpeter Mark III Model

Readings: **B. DeLong (2003), "Profits of Doom", *Wired* 11.04.**); **T. Bresnahan, "General Purpose Technologies" in Hall and Rosenberg (2010), pp. 761-791; Chandler (1977), pp. 207-283;** D. E. Nye, *Electrifying America: Social Meanings of a New Technology* (Cambridge MA: MIT Press, 1992), pp. 1-28, 381-391; A. Arora, Cohen, W. M., and Walsh, J. P., "The Acquisition and Commercialization of Invention in American Manufacturing: Incidence and Impact," NBER Working paper 20264, June 2014.

Lecture 9 - Historical Sources of Technological Innovation

Lecture 10 - The Path to the Frontier

Lecture 11 - The Digital Revolution and the State

The Defense Department's commitment to computing

The Internet, the Cloud and Beyond

Readings: K. R. Fabrizio and Mowery, D., "The Federal Role in Financing Major Innovations: Information Technology during the Postwar Period," in Lamoreaux and Sokoloff, pp. 283-316; **Janeway, *Doing Capitalism*, pp. 294-316**; K. E. Kushida, Murray, J., and Zysman, J., "Diffusing the Fog: Cloud Computing: From Scarcity to Abundance," *Journal of Industry, Trade and Competition* 11:3 (2011) pp. 209-237 available at <http://link.springer.com/article/10.1007/s10842-011-0106-5>; **D. C. Mowery, "Military R&D and Innovation," in Hall and Rosenberg, pp. 1219-1256.**

Lecture 12 - Leadership of the Next New Economy