
RoME: Firms and Innovation

Academic Year 2025–2026

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Academic Year 2026-2027: The papers we cover can change relative to the syllabus below. But not the content of the course, nor its structure. For any questions, contact me.

1 Course Overview

This course explores two seminal and closely interrelated topics in macroeconomics: firm dynamics and innovation. We will study key models and empirical facts related to firm entry and exit, the distribution of firm size and age, and firm growth. We will then examine a key driver of such dynamics: innovation. Throughout, we pay special attention to how the decisions of innovative firms shape economic growth.

2 Logistics

- **Schedule:** Three 90-minute classes per week (two lectures and one assignment review session). The assignment review sessions will also be an opportunity to work on the numerical solution of the models we study in the lectures.
- **Grading:** Problem sets (30%) + Participation (10%) + final exam (60%).
 - *Problem sets:* Students may work individually or in pairs. In the latter case, please indicate your coauthor. Each student must submit their own copy by email. Please use “RoME Firms and Innovation: Pset - - submission” as the subject of your email (replace - - with the problem set number). Please double-check your submission files, as incorrect files will not count as a valid submission. Late submissions within 24 hours of the deadline will incur a 50% penalty. After 24 hours, submissions will no longer be accepted. Exceptions may apply only in cases of extenuating circumstances, such as family or medical emergencies.
 - *Participation:* Students are encouraged to actively participate during classes, especially during the assignment review sessions on Fridays. In these sessions, students may be asked to go to the board to discuss how to solve problems, present their derivations, and work through solutions with the class.
 - *Exam:* individual and closed-book; will take place between March 16th-25th.
- **Location:** Via Abruzzi 10, in the (raised) ground-floor classroom.
- **Office Hours:** By appointment.

3 Course Schedule

Table 1: Class-by-class schedule (tentative)

Date & time	Session	Topic
Fri, Jan 16 (16:30–18:00)	Lecture 1	Introduction; firm dynamics (stylized facts)
Mon, Jan 19 (11:00–12:30)	Lecture 2	Firm dynamics: Hopenhayn model; optimal stopping (exit) theory
Wed, Jan 21 (11:00–12:30)	Lecture 3	Firm dynamics: Hopenhayn model; optimal stopping (exit) theory
Fri, Jan 23 (14:45–16:15)	Review / numerics	Problem Set #1 discussion
Mon, Jan 26 (11:00–12:30)	Lecture 4	Firm dynamics: Melitz model; Luttmer model
Wed, Jan 28 (11:00)	PSet #1 Due Date	Submit by email no later than 11:00
Wed, Jan 28 (11:00–12:30)	Lecture 5	Firm dynamics: Melitz model; Luttmer model
Fri, Jan 30 (14:45–16:15)	Review / numerics	Problem Set #2 discussion
Mon, Feb 2 (11:00–12:30)	Lecture 6	Innovation and innovative firms (stylized facts)
Wed, Feb 4 (11:00–12:30)	Lecture 7	Innovation and firm dynamics: the Klette–Kortum model
Mon, Feb 9 (11:00–12:30)	Lecture 8	Innovation and firm dynamics: the Klette–Kortum model (continued)
Wed, Feb 11 (11:00–12:30)	Lecture 9	Klette–Kortum: recent developments
Fri, Feb 13 (14:45)	PSet #2 Due Date	Submit by email no later than 14:45

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Date & time	Session	Topic
Fri, Feb 13 (14:45–16:15)	Review / numerics	Problem Set #3 discussion
Mon, Feb 16 (11:00–12:30)	Lecture 10	Klette–Kortum: recent developments (continued)
Wed, Feb 18 (11:00–12:30)	Lecture 11	Step-by-step innovation models
Fri, Feb 20 (14:45)	PSet #3 Due Date	Submit by email no later than 14:45
Fri, Feb 20 (14:45–16:15)	Review / numerics	Problem Set #4 discussion
Mon, Feb 23 (11:00–12:30)	Lecture 12	Application: green technology transition and innovation (to be confirmed)
Wed, Feb 25 (11:00–12:30)	Lecture 13	Application: development, institutions, and trade (to be confirmed)
Fri, Feb 27 (14:45)	PSet #4 Due Date	Submit by email no later than 14:45
Fri, Feb 27 (14:45–16:15)	Conclusion	More applications; open questions; exam guidance (to be confirmed)

4 Topics

4.1 Firm Dynamics: stylized facts and models

This part of the course covers key stylized facts and foundational models of firm dynamics. In this process, we will also learn analytical and numerical techniques used to solve models with fixed costs and endogenous exit.

References (references marked with * denote core readings) Hopenhayn (1992)*; Melitz (2003)*; Luttmer (2007); Stokey (2009, Ch. 6); Jovanovic (1982); Lucas (1978); Atkeson and Kehoe (2005); Boehm, Oberfield, and Waseem (2024); Haltiwanger, Jarmin, and Miranda (2012); Chen (2023); Ayerst, Nguyen, and Restuccia (2025).

4.2 Innovation as a driver of firms' productivity dynamics

We will study the economics of ideas and innovation and their role in shaping firm dynamics. We will cover key stylized facts on innovative firms and examine the patent system, its limitations, and recent measures developed to quantify innovation using patent data.

References Griliches (1957, 1987, 1990, 1998); Cohen (2010); Kogan, Papanikolaou, Seru and Stoffman (2017); Bloom, Schankerman and John Van Reenen. (2013); Akcigit and Kerr (2018); Ewens and Marx (2024); Marx and Fuegi (2020, 2022). Kelly, Papanikolaou, Seru, and Taddy (2021). Arts, Hou, and Gomez (2021), Kalyani (2024); Romer (1990); Aghion and Howitt (1992); Grossman and Helpman (1991); Jones (1995, 2005, 2019); Acemoglu (2009).

4.3 Modeling Innovative Firms: the Klette and Kortum Model and Recent Developments

This part of the course connects the previous two topics by bringing models of firm dynamics to data on innovative firms. We focus on the Klette and Kortum (2004) model as a central framework for studying innovation-driven firm growth and aggregate outcomes using micro-level evidence. We then examine a set of influential recent contributions that shed new light—both empirically and theoretically—on the dynamics of innovative firms.

References Klette and Kortum (2004)*; Aghion, Akcigit and Howitt (2014)*; Akcigit and Kerr (2018); Akcigit (2023); Berlingieri, De Ridder, Lashkari and Rigo (2024); Peters (2020).

4.4 Step-by-Step Innovation Models

This part of the course extends the models studied in the previous topic by relaxing the assumption that entrants and incumbents can innovate and immediately catch up with the technological frontier. Instead, innovation is modeled as a step-by-step process, in which firms advance through successive quality improvements. To catch up with the frontier—or to continue pushing it forward—firms may need to undertake multiple innovation steps over time. This framework allows the models to connect more closely to strategic competition, firm heterogeneity, and innovation decisions observed in the data.

References Aghion, Harris, Howitt and Vickers (2001)*; Aghion, Akcigit and Howitt (2014)*; Aghion, Harris and Vickers (1997); Acemoglu (2009, Section 14.4); Aghion, Bloom, Blundell, Griffith and Howitt (2005).

4.5 Applications

In this final session, we study (time permitting) a wide range of applications of the key models and tools developed in the previous topics. The applications include the transition to green technologies, international trade, development and institutions, among others.

References Acemoglu, Akcigit, Hanley, and Kerr (2016); Akcigit, Ates and Impullitti (2023); Atkeson and Burstein (2010); Melitz and Redding (2023); Peters and Zilibotti (2023); Choi and Shim (2024); Akcigit, Alp and Peters (2021); Akcigit, Baslandze and Lotti (2023); Akcigit and Van Reenen (2023).

5 References

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