



Economics Doctoral Programs Still Elide Entrepreneurship

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[LINK TO ABSTRACT](#)

The theoretical firm is entrepreneurless—the prince of Denmark has been expunged from the discussion of Hamlet.

—William Baumol, “Entrepreneurship in Economic Theory” (1968)

Many academics and policymakers regard entrepreneurship as a vital topic, often considering it a driving force behind job creation and economic growth. But thinking about entrepreneurship mostly takes place outside of mainstream economics. In his article “The Place of Entrepreneurship in ‘The Economics That Might Have Been,’” Sidney Winter (2016) aptly defines mainstream economics as the “unflinching application of the combined postulates of maximizing behavior, stable preferences, and market equilibrium.” Theories of economic change that define the entrepreneur, such as those proposed by Joseph Schumpeter, Frank Knight, Israel Kirzner, or Deirdre McCloskey and Arjo Klamer have not found a receptive audience in that dominant strand of economics. The entrepreneur represents interpretive asymmetry, variation, and novelty. A richer body of economic theory could explore the factors that make for interpretive creativity and its consequences, such as market innovation and economic growth. But the entrepreneurial element is difficult to formalize mathematically and was thus pushed out of view as such formalization became increasingly dominant from the 1930s onwards (Baumol 1968; 2006; Blaug 1986; Barreto 1989; Hébert and Link 1989; 2007;

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Winter 2016). Ever since, mainstream economics has elided the entrepreneur—and, here, we show that it continues to do so.

This article updates a study by Johansson (2004), who, treating the academic year 2003–2004, studied the prevalence of *entrepreneur* and related words in the subject index of leading English-language textbooks assigned in microeconomics, macroeconomics, and industrial organization courses within economics doctoral programs in Sweden. The present study treats the academic year 2014–2015, and it examines textbooks used in top economics doctoral programs in Sweden and the United States. We use the subject index of the textbooks to determine the presence of entrepreneurship. In addition, we conduct a qualitative analysis of how the concept of the entrepreneur is used when it is mentioned. We also study the prevalence of the term *entrepreneur* (including *entrepreneurship*, etc.) in articles used in said courses. Finally, we examine the full course program to see if any courses in entrepreneurship are offered.

We find that most textbooks still do not use the entrepreneur as a theoretical concept. A few of the more recent textbooks do give greater exposure to the entrepreneur. But the few textbooks that refer to the entrepreneur do not define the concept theoretically (with one or two arguable exceptions). For instance, they use *entrepreneur* synonymously with *borrower*, or they leave the concept undefined entirely. Hence, even textbooks that cover entrepreneurship to some degree do not offer well-recognized definitions such as introducing new combinations (Schumpeter), creative destruction (also Schumpeter), making judgmental decisions under conditions of uncertainty (Knight), discovering of opportunities (Kirzner), or rhetorical leadership in communicating a vision to associates (McCloskey and Klammer). The root word *entrepreneur* appears in 27 out of 515 articles examined, but there is no article that covers the economic function of the entrepreneur. Further, we found that only one of the universities studied offers an economics course in entrepreneurship. We conclude that doctoral candidates in economics rarely encounter meaningful theories about the entrepreneur's economic function in their core training.

Theoretical background

Many definitions of *entrepreneur* have been proposed within economics, three of which dominate contemporary discourse:³

3. See, e.g., Hébert and Link 1989; 2007. They suggest a “synthetic” definition incorporating historical themes of entrepreneurship, such as risk, uncertainty, innovation, perception, and change, and entrepreneurial activities, such as coordination, arbitrage, ownership, speculation, innovation, and resource alloca-

- Schumpeter (1934/1912) defined the entrepreneur as the economic actor who engages in *innovation*, which is the introduction of new ways of employing existing productive means. Such innovation involves *invention*, which is the novel combination of factors of production and is the distinctive activity of actors known as inventors. Schumpeter also distinguished innovation from financing, the activity of economic actors known as capitalists. He classified innovations into five broad categories: the introduction of a new good, the introduction of a new method of production, the opening of a new market, the conquest of a new source of supply of raw materials or half-manufactured goods, and the carrying out of a new organization. Creation and creativity are associated with Schumpeter's entrepreneur, partly because of his famous expression "creative destruction" (1950/1942, ch. 7). Schumpeter's definition of entrepreneurship is the most widely used.
- Knight (1921) held that the entrepreneurial function entails making judgmental decisions and bearing uncertainty.⁴
- Kirzner (1973) portrays the entrepreneur as a discoverer of opportunity. Kirzner frequently emphasizes entrepreneurship as the source of any means-ends framework within which optimization would be pursued (e.g., Kirzner 1973, 33; 1979, 131; 1985, 30).

Yet, two other characterizations also deserve inclusion here:

- Jean-Baptiste Say (1880/1821) viewed the entrepreneur as a coordinator managing the use of scarce economic resources. Say was one of the earliest contributors to theories on entrepreneurship, and arguably many laymen share his view on entrepreneurship.
- McCloskey and Klamer (1995) associate the entrepreneur with, first, envisioning a potentiality to be pursued, and then persuasively communicating that vision to prospective teammates and coordinating the team to actualize that vision.

We find two elements common to all the treatments above. The first of these commonalities is that an interpretive dimension to entrepreneurship is evident. Whether new interpretations are created (Schumpeter) or discovered (Kirzner), they remain somewhat unsettled and open-ended, thus involving uncertainty

tion: "The entrepreneur is someone who specializes in taking responsibility for and making judgmental decisions that affect the location, form, and the use of goods, resources or institutions" (1989, 47).

4. Risk concerns random events with known probability distributions, while uncertainty concerns random events with unknown probability distributions. Risk is insurable, while uncertainty is not.

(Knight), and requiring communication and persuasive leadership to actualize the potentialities (McCloskey and Klamer). Such matters clearly bear on issues such as resource allocation, ownership, and the theory of the firm (see, e.g., Shane and Venkataraman 2000; Rocha and Birkinshaw 2007; Acs et al. 2009; Kirzner 2009, Henrekson and Johansson 2008; Henrekson and Sanandaji 2014; Audretsch et al. 2015; Foss and Klein 2015; Elert and Henrekson 2016). The second commonality is that the entrepreneurship theorists listed above all consider the entrepreneur an economic actor who is defined according to the economic function that she carries out. The idea is parallel to saying that a lender lends, a professional football player plays football, and so forth.

For our investigation, the particular definition of *entrepreneur* is not critical. Determining whether *any* definition or discussion of the concept is present is sufficient. As such, in our investigation of textbook indexes we searched not only for *entrepreneur* but also for the Schumpeterian terms *innovation* and *invention*. We also searched for the term *institution*, as a substantial literature has found connections between societal institutions and the prevalence of entrepreneurship (North and Thomas 1973; Rosenberg and Birdzell 1986; Acemoglu and Robinson 2012). Institutions affect entrepreneurs' motivation and direct entrepreneurial activities toward productive, unproductive, or destructive use (Baumol 1990). Institutions also mediate the interplay between invention and innovation. New ideas and inventions lead to little economic development unless institutions facilitate their commercialization.

How we conducted our investigation

Conceptual frameworks are formed by key concepts that, in turn, form a terminology. The formulations that a theory deems important can be understood by studying the prevalence of different concepts and their meanings within the framework of said theory. Textbooks are of particular interest because they generally present established theory. Prominent textbooks tend to be authored by scholars with a strong position within their field.

Doctoral economics programs at U.S. universities generally start with mandatory courses the first year, followed by elective courses the second year, and thereafter writing of the thesis. The first-year courses include econometrics, macroeconomics, and microeconomics. Some universities also require mathematics courses as part of the program. Swedish programs are similar, with mandatory first-year courses in econometrics, macroeconomics, microeconomics, and mathematics, followed by elective courses and writing of the thesis.

The mandatory courses in microeconomics and macroeconomics represent a theoretical core that all doctoral students are expected to know, and we therefore investigate the content of the textbooks and articles used in such courses, seeking to gauge the importance of the concept of entrepreneurship in those courses. Furthermore, we include elective courses in industrial organization, which treats competition, industrial structure, and, possibly, entrepreneurship. We assume that the presence of many page listings for *entrepreneur* in a textbook's subject index or many instances where the word is used in an article indicates that the entrepreneur's economic function plays a prominent role in the field or theory covered, while few or no listings or uses would indicate that entrepreneurship is not considered important for, or at least has not yet been incorporated into, that particular field or theory. Such an approach was suggested by Baumol: "Contrast all this with the entrepreneur's place in the formal theory. Look for him in the index of some of the most noted writings on value theory, in neoclassical or activity models of the firm. The references are scanty and more often they are absent" (1968, 66). Johansson (2004) performed a similar study of leading English-language textbooks in microeconomics, macroeconomics, and industrial organization used in Swedish doctoral programs in economics.

As explained above, we consider the keywords *entrepreneur*, *invention*, *innovation*, and *institutions* in our manual review of textbook indexes. In our analysis of assigned articles, using electronic or manual text search, we consider only *entrepreneur*. We include all variants of each term, e.g., *entrepreneurial* and *entrepreneurship*, and we count the number of unique pages where the term is referenced in the index. For example, if a textbook index contains references to "entrepreneurship and human capital, 236–237" and "entrepreneurship and capital allocation, 237," we record two pages as mentioning entrepreneurship. Also, when we find references to *entrepreneur*, we conduct a qualitative analysis of how the term is used.⁵ We also investigate whether or not textbooks and articles that mention entrepreneurship make reference to Schumpeter, Knight, or Kirzner.

We investigated the top ten doctoral programs in economics in the United States:⁶ Harvard University, the Massachusetts Institute of Technology (MIT),

5. In a related study, Phipps et al. (2012) state that the entrepreneur is almost entirely absent in most introductory textbooks in economics. They make a qualitative analysis of the theoretical treatment of the entrepreneur in three introductory textbooks that include a substantial discussion of entrepreneurship; the three textbooks are McConnell and Brue (2008), Baumol and Blinder (2009), and Samuelson and Nordhaus (2010). Diamond (2007a) examines 27 United States microeconomic principles textbooks for references to "Schumpeter" and "creative destruction." In another study, he searches for "Schumpeter" in books sold by Amazon to study the extent to which business practitioners, government policymakers, and voters are exposed to Schumpeter's theory about creative destruction (Diamond 2007b).

6. According to *U.S. News and World Report's* rankings of "Top Graduate Schools in Economics," accessed February 9, 2016 ([link](#)).

Princeton University, the University of Chicago, Stanford University, the University of California at Berkeley, Northwestern University, Yale University, the University of Pennsylvania, and Columbia University. We also covered all economics doctoral programs in Sweden with a full course program: Göteborg University, Uppsala University, Lund University, Umeå University, Stockholm University, and the Stockholm School of Economics.⁷

Treating the academic year 2014–2015, we retrieved general information on doctoral programs from their websites. Gathering the syllabi was not trivial, as most universities publish these documents on closed internal websites. Hence we usually used email requests to obtain textbook and article data, and some courses in the U.S. are excluded due to repeated non-replies to our requests.⁸ The textbooks and articles included in our survey are those that are used as core or required reading in the course; if no textbooks or articles are required reading, optional textbooks and articles are included.⁹ In this way we identified 37 unique textbooks, all of which we examined, and 532 other unique assigned readings, 515 of which we were able to access and search.¹⁰

Results for thirty-seven textbooks

Tabulations for the 37 textbooks in microeconomics, macroeconomics, and industrial organization are shown in Table 1.

Andreu Mas-Colell et al. (1995) is by far the most used textbook, as it is taught in 21 courses. The second and third most used are Lars Ljungqvist and Thomas Sargent (2012) and Hal Varian (1992), which are taught in 12 and 10 courses, respectively. Most textbooks are only used in one course. Eighteen textbooks are only used at U.S. universities, while 11 textbooks are used only at Swedish universities. Textbook usage over time is seemingly somewhat stable. Johansson

7. Stockholm University and the Stockholm School of Economics jointly operate the Stockholm Doctoral Course Program in Economics, Econometrics and Finance (SPDE). Several other Swedish universities offer Ph.D.s in economics, but these programs do not provide a full course program. Instead, they cooperate with universities that do. Dalarna University, Jönköping University, Karlstad University, Linköping University, Linnaeus University, Södertörn University, and Örebro University cooperate within the Swedish Graduate Program in Economics (Swegpec) to offer a complete course program.

8. All Swedish courses are included. A list of included/excluded courses is available from the authors upon request.

9. Some courses do neither assign required or optional articles.

10. The gross number of non-textbook assigned readings in the syllabi we examined was 595. Of the 595, 63 were not unique (i.e., duplicates), and another 17 were book chapters or other items we could not locate and subject to electronic a search. The full listing is available in a downloadable spreadsheet ([link](#)).

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(2004) identified 19 textbooks, 13 of which are still used, sometimes in a revised edition.

TABLE 1. Frequency with which four terms appear in thirty-seven textbooks

Textbook	Book topic	No. of courses using book		Unique pages where topic mentioned			
		U.S.	Swe.	Entrepreneur	Innovation	Invention	Institution
Acemoglu (2009)	Macro	3	2	20	53	0	83
Aghion and Howitt (2009)	Macro	0	1	36	105	0	28
Bewley (2009)	Macro	1	0	0	0	0	0
Blanchard and Fischer (1989)*	Macro	1	1	0	0	0	0
Bolton and Dewatripont (2005)	Micro	2	0	60	0	0	0
Carlton and Perloff (2005)	Industrial organization	1	0	0	4	9	0
Cooley (1995)	Macro	2	0	0	0	0	0
Dixit and Pindyck (1994)	Investment theory	1	0	0	0	0	0
Feldman and Serrano (2006)	Macro	0	1	0	0	0	0
Fudenberg and Tirole (1991)	Game theory	2	0	0	0	0	0
Gali (2008)	Macro	2	2	0	0	0	0
Gibbons (1992)*	Game theory	1	0	0	0	0	0
Hart (1995)	Contract theory	1	0	0	2	0	0
Jehle and Reny (2011)*	Micro	1	0	0	0	0	0
Kreps (2012)	Micro	4	1	0	0	0	0
Krusell (2014/2007)	Macro	0	4	na	na	na	na
Laffont and Martimort (2002)*	Micro	0	1	0	0	0	0
Ljungqvist and Sargent (2012)*	Macro	8	4	0	3	0	0
Luenberger (1969)*	Optimization	1	0	0	0	0	0
Mas-Colell et al. (1995)*	Micro	14	7	1	0	0	0
McAfee and Lewis (2009)	Macro	0	1	na	na	na	na
Myerson (1991)	Game theory	1	0	0	0	0	0
Obstfeld and Rogoff (1996)*	Macro	0	2	0	0	0	0
Osborne and Rubenstein (1994)	Game theory	1	0	0	0	0	0
Pissarides (2000)*	Macro	0	1	0	0	0	0
Romer (2012)*	Macro	3	1	3	0	0	10
Rubinstein (2007)	Micro	1	0	na	na	na	na
Salanié (2005)	Contract theory	0	1	0	0	0	1
Salanié (2011)	Taxation	0	1	1	0	0	0
Stokey and Lucas (1989)*	Macro	7	0	0	0	0	0
Sorensen & Whitta-Jacobsen (2010)	Macro	0	1	0	0	0	6
Tirole (1988)*	Industrial organization	6	0	0	7	0	0
Tirole (2006)	Corporate finance	1	0	0	0	0	0
Uribe and Schmitt-Grohé (2014)	Macro	1	0	na	na	na	na
Varian (1992)*	Micro	2	8	0	0	0	0
Vives (1999)	Industrial organization	0	1	0	0	0	0
Wickens (2012)	Macro	2	0	0	0	0	0
Totals:		70	41	121	174	9	128

Notes: *Covered in Johansson (2004). na = no index is available.

Johansson (2004, 526–527) found few references to the terms investigated, e.g., only two references to the entrepreneur across the 19 books. He also argued that, when references were made, “the meaning and significance of the ideas are lost, diluted, or distorted, compared to entrepreneurship-rich and institution-rich theories.” He concluded that “[i]t is quite obvious that economists have eradicated entrepreneurship and institutions from core PhD training” (ibid., 527).

Similar to Johansson (2004), we observe that concepts related to entrepreneurship and institutional economics are relatively scarce in core subject textbooks in doctoral economics programs. Our conclusions are similar for the United States and Sweden, which is expected given the similarity of the Swedish and U.S. course and program structures.¹¹

Twenty-one of the 37 textbooks do not include any references in the subject index to the investigated concepts. “Entrepreneur” is mentioned in the index of six books. Three of those concern macroeconomics: Daron Acemoglu (2009), Philippe Aghion and Peter Howitt (2009) and David Romer (2012). The other three are Mas-Colell et al. (1995) on microeconomics, Patrick Bolton and Mathias Dewatripont (2005) on contract theory, and Bernard Salanié (2011) on taxation.

Compared with the results of Johansson (2004), the main difference is found in the introduction of Acemoglu (2009) and Aghion and Howitt (2009) as course literature. Acemoglu (2009) contains extensive coverage of institutional economics and a moderate amount of discussion of the role of entrepreneurship in economic development. It is in use at three U.S. schools (MIT, Stanford, and the University of Pennsylvania) and two Swedish doctoral programs (SDPE and Uppsala). Aghion and Howitt (2009) includes an extensive discussion of Schumpeterian growth models and institutional economics and is in use in one Swedish program (SDPE).¹²

The most widely used textbook, Mas-Colell et al. (1995), makes one reference to “entrepreneurs,” in an exercise:

Entrepreneurs go to banks to borrow the cash to make the initial outlay (assume for now that they borrow the entire amount). A loan contract specifies an amount R that is supposed to be repaid to the bank. Entrepreneurs know the type of project they have, but the banks do not. In the event that a project yields profits of zero, the entrepreneur defaults on her loan contract, and the bank receives nothing. Banks are competitive and risk neutral. The risk-free

11. The four textbooks that do not contain a subject index have been excluded from the analysis. After examining them, we conclude that they do not cover entrepreneurship theories. Thus, excluding them does not have an impact on our conclusions.

12. Philippe Aghion received the Global Award for Entrepreneurship Research in 2016 ([link](#)).

rate of interest (the rate the banks pay to borrow funds) is r . Assume that...
(Mas-Colell 1995, 475)

The entrepreneur is not mentioned at all in the fundamental function of Schumpeterian, Knightian, or Kirznerian theory, and these scholars are not included in the text's reference list. Instead, the entrepreneur represents a generic borrower. The terms *innovation*, *invention*, and *institutions* are absent in the subject index.

Salanié (2011) makes one reference to “entrepreneurial capital,” where he writes:

Returns to capital are notoriously risky, unlike the model in this chapter in which r and $F_K(t+1)$ were nonrandom. This matters most in that different individuals may be better in investing their assets, and risky returns to capital may also be driven partly by the effort of the investors. The risky returns show up, in particular, in entrepreneurial capital. Entrepreneurial effort generates returns that are highly idiosyncratic, and that are only partly appropriated by entrepreneurs (e.g., because of spillover effects of new knowledge, or the limited duration of patents). The returns to entrepreneurial capital could be subsidized then at least relative to other forms of capital income. (Salanié 2011, 150)

There is no further discussion of the “entrepreneur,” and the term is not mentioned before or after this passage. No references are made to the other concepts investigated. Hence, there is no definition of the entrepreneur that assigns her a distinct economic function that distinguishes the entrepreneur from other actors. Neither Knight nor Kirzner are used as references. The text does not refer to any of Schumpeter's work relevant to entrepreneurship, only invoking him for a commonplace insight on political realism (Schumpeter 1949, 208; quoted in Salanié 2011, 172).

Romer (2012) relates William Baumol's (1990) and Kevin Murphy et al.'s (1991) arguments that society's incentive structure allocates talent toward different uses. He refers to “entrepreneurship” in one paragraph:¹³

Murphy, Shleifer, and Vishny provide a general discussion of the forces that influence talented individuals' decisions whether to pursue activities that are socially productive. They emphasize three factors in particular. The first is the size of the relevant market: the larger is the market from which a talented individual can reap returns, the greater are the incentives to enter a given activity. Thus, for example, low transportation costs and an absence of barriers

13. Another index page cite is to page 127, which does not mention entrepreneurship but rather patents in the context of endogenous growth.

to trade encourage entrepreneurship; poorly defined property rights that make much of an economy's wealth vulnerable to expropriation encourage rent-seeking. The second factor is the degree of diminishing returns. Activities whose scale is limited by the entrepreneur's time (performing surgeries, for example) do not offer the same potential returns as activities whose returns are limited only by the scale of the market (creating inventions, for instance). Thus, for example, well-functioning capital markets that permit firms to expand rapidly tend to promote entrepreneurship over rent-seeking. The final factor is the ability to keep the returns from one's activities. Thus, clear property rights tend to encourage entrepreneurship, whereas legally sanctioned rent-seeking (through government or religion, for example) tends to encourage socially unproductive activities. (Romer 2012, 120–121)

No explicit reference is made to any distinct function of entrepreneurs that makes them different from other economic actors, for instance, surgeons. Furthermore, the quotation implies an oppositional relationship between entrepreneurship and rent-seeking. Hence, the author overlooks the distinction between productive and unproductive entrepreneurship, which is surprising considering that Romer also refers to Baumol (1990). The very point of Baumol (1990) is to expand Schumpeter's concept of entrepreneurship to include unproductive and destructive activities, and he particularly singles out rent-seeking as an unproductive entrepreneurial activity.¹⁴ Innovation and invention are not mentioned in Romer's subject index. Schumpeter, Knight, and Kirzner are not in the reference list. Four references are made to institutions. The only reference to entrepreneurship is that provided in the quotation above.

Bolton and Dewatripont (2005) make the most references to “entrepreneurs,” using the term extensively over 60 pages. The entrepreneur is again treated as a borrower who borrows from an investor. Innovation and invention are not included in the subject index. Neither Schumpeter nor Kirzner appear in the reference list. Knight is included, but his distinction between risk and uncertainty is not made clear in the text. On the contrary, the concepts of risk and uncertainty are treated synonymously and are used interchangeably. No reference is made to institutions.¹⁵

Aghion and Howitt (2009) make the second-most references to “entrepreneur,” using it across 36 pages. They develop an alternative model of endogenous growth in which growth is generated by a random sequence of quality-improving innovations. It is called “Schumpeterian” because it attempts to model the process

14. Productive activities create wealth; unproductive activities redistribute it; and destructive activities (e.g., war enterprises) destroy wealth.

15. One reference to institutional design reads: “Institutional design. See organizational design.” Organizational design concerns itself with the design of workflows in a business context.

that Schumpeter (1950/1942) termed “creative destruction,” i.e., a process in which a new innovation challenges and—if successful—replaces previous structures. The model, a general equilibrium model, assumes that one final good is produced by perfectly competitive firms using labor and a single intermediate product as inputs. The intermediate product is produced by a monopolist in each period. A new agent is introduced:

In each period there is one person (the “entrepreneur”) who has an opportunity to attempt an innovation. If she succeeds, the innovation will create a new version of the intermediate product, which is more productive than previous versions. (Aghion and Howitt 2009, 87)

If innovation succeeds, the entrepreneur becomes a monopolist and receives the monopoly profit from the improved productivity of the intermediate good. This basic setup is then developed in a number of ways, for instance, allowing for general purpose technologies, the effect of trade liberalization on innovation and growth or the environmental impact of innovation. Aghion and Howitt’s presentation of the entrepreneurial function suggests that productivity growth is driven by entrepreneurs’ decisions. But the entrepreneur is simply defined as the agent who makes the research decision and who subsequently obtains the monopoly profit from research investment (note that ‘research’ in this context is a broad term that encompasses many different activities). No distinction is made between invention and innovation, and these activities are combined into a single research-and-development decision. The inventor’s function is consequently not recognized. New combinations are not mentioned, and different types of innovations and their relative importance are not discussed. The one reference to Schumpeter (1934/1912) concerns the importance of financing for firms.¹⁶ It is perhaps telling that Aghion and Howitt (1992), which first outlined the “creative destruction” model of growth, never mentioned the entrepreneur or entrepreneurship.¹⁷

Acemoglu (2009) treats the causes of growth and particularly the role of institutions and secure property rights in the generation and application of new technology. Technology is not limited to production and production processes; it is instead given a broad meaning that refers to general advances in knowledge. The “entrepreneur” is introduced as follows:

16. The model can be reconciled with the late Schumpeter, rather than the early Schumpeter. The earlier Schumpeter (1934/1912) emphasized entrepreneurship and the role of new ventures in introducing novel ideas into the economic system. The late Schumpeter (1950/1942) emphasized large firms and economies of scale in production and research and development.

17. Aghion and Howitt have developed the Schumpeterian growth framework further since the publication of their textbook (for overviews of their current work on entrepreneurship, see Aghion 2017; Aghion et al. 2015a; b). Hence, future updates to the textbook might incorporate a richer view of entrepreneurship.

Consider the problem of a single entrepreneur with a risk-neutral objective function

$$\sum_{t=0}^{\infty} \beta^t c(t)$$

This entrepreneur's consumption is given by the income he generates in that period (there is no saving or borrowing). If the entrepreneur uses an idea of quality $a(t)$, he can then produce income equal to

$$y(t) = a(t)$$

at time t . At $t=0$, the entrepreneur starts with $a(0)=0$. From then on, at each date, he can either engage in production using one of the techniques he has already discovered or spend that period searching for a new technique. Let us assume that each period in which he engages in such a search he gets an independent draw from a time-invariant distribution function $H(a)$ defined over a bounded interval $[0, a]$.

Therefore the decision of the entrepreneur at each date is whether to search for a new technique or to produce with one of the techniques he has discovered so far. Since there is no saving or borrowing, the entrepreneur simply consumes his current income $c(t)=y(t)$. (Acemoglu 2009, 556–557)

The framework is similar to that presented in Aghion and Howitt (2009). Acemoglu refers to both early and late Schumpeter, but he presents no explicit definition of the entrepreneur and does not discuss the entrepreneur's economic function in any depth. Acemoglu does occasionally distinguish between invention and innovation in the text, without defining the terms explicitly. Institutions and their importance for entrepreneurship and economic growth are discussed at length.

While innovation is covered in a few textbooks in macro and industrial organization, invention is never mentioned in the index of those books, with the exception of Carlton and Perloff (2005), indicating that the distinction between coming up with a novel idea and commercializing that idea is not made.

Only five books refer to institutions in their indexes. Acemoglu (2009) and Aghion and Howitt (2009) have many references to the topic, 83 and 28 respectively. Acemoglu particularly emphasizes institutional factors as fundamental in explaining economic growth. Romer (2012) refers to institutions on 10 pages, Salanié (2005) on one, and Peter Sørensen and Hans Whitta-Jacobsen (2010) on six.

None of the 37 textbooks clearly defines the entrepreneur or the entrepreneur's economic function.¹⁸ Acemoglu (2009) and Aghion and Howitt (2009) are

18. This is in line with Ferrarini et al., who in their investigation of Advancement Placement (AP) course exams in microeconomics and macroeconomics, conclude that: "The vitally important roles of secure

partial exceptions to this rule, as their Schumpeterian growth models relate the entrepreneur to innovation and creative destruction, although without getting into deeper theoretical discussions with regard to the entrepreneur's economic function. The examined textbooks also do not cite previous works on the history of the thought on entrepreneurship such as Mark Blaug (1986), Humberto Barreto (1989), or Robert Hébert and Albert Link (1989). All textbooks fall well within the mainstream paradigm of equilibrium modeling. Acemoglu (2009), for instance, closes the substantive portion of his first chapter with this paragraph:

Our next task is to systematically develop a series of models to understand the mechanics of economic growth. I present a detailed exposition of the mathematical structure of a number of *dynamic general equilibrium models* that are useful for thinking about economic growth and related macroeconomic phenomena, and I emphasize the implications of these models for the sources of differences in economic performance across societies. Only by understanding these mechanics can we develop a useful framework for thinking about the causes of economic growth and income disparities. (Acemoglu 2009, 23, our emphasis)

According to Barreto (1989), Baumol (2006), Hébert and Link (2007), Winter (2016), Milo Bianchi and Magnus Henrekson (2005), and others, economists are not able to 'fit' the entrepreneur into equilibrium models. The main potential challenge to this argument is posed by Schumpeterian growth models, particularly if they develop in a way that enables them to capture more aspects of the entrepreneurial function. We observe a development over time, where the entrepreneur is not found in older textbooks (as covered in Johansson 2004) but tends to be included in more recent ones. One possible explanation for this finding is that growth theory has undergone a development from exogenous growth to endogenous growth and then tentatively to Schumpeterian growth models. If this interpretation is correct, we will expect the entrepreneur to make more frequent appearances in future textbooks.

We turn now to the 515 articles that were assigned in the courses examined and that we were able to search. Twenty-seven of these articles mentioned *entrepreneur* or a variation (*entrepreneurial*, etc.). These mentions sometimes referred to the entrepreneur as an important actor in an economic model. However, there was no discussion of the entrepreneur's economic function. None of the articles that mention the entrepreneur refers to Kirzner. Robert Lucas's "Understanding Business Cycles" (1977) is the only article that refers to the entrepreneur and also

property rights, dynamic competition, entrepreneurship, and innovation as sources of growth and prosperity are almost totally ignored by AP economics" (2011, 71).

refers to Knight. Lucas speaks of the entrepreneur in the role of employer; the article does not refer to Schumpeter (1939) or the role of entrepreneurs and creative destruction in causing business cycles. The only article that cites Schumpeter while also mentioning entrepreneurship is Margaret Levenstein and Valerie Suslow (2006). Their paper makes a single use of “entrepreneurs” (in a quotation) and also references Schumpeter (1950/1942). The article does not however refer to Schumpeter’s concepts of entrepreneurship. We provide a list of the non-textbook items found on the syllabi, indicating the articles that we examined, plus a list of those that mention the entrepreneur or that cite Schumpeter, in a downloadable spreadsheet ([link](#)).

Also, we find that, with rare exceptions, courses in entrepreneurship are absent in both countries. In the U.S., only Harvard University offers an elective doctoral-level economics course in entrepreneurship. The University of Chicago, Stanford, and Berkeley offer courses in the related area of innovation and creativity. In Sweden, only Jönköping University offers courses in entrepreneurship. Jönköping is also the only Swedish economics Ph.D. program to offer a course in innovation. These courses are not economics courses, and they are taught by teachers in management and business administration.¹⁹ This reflects that entrepreneurship is a flourishing field of research in business programs.²⁰

Concluding remarks

Coverage of entrepreneurship is rare in textbooks and articles that are used in core doctoral courses in economics. When used, the concept is generally not given a clear definition that is grounded in established definitions, such as the entrepreneur’s role in creatively introducing new combinations of factors of production (Schumpeter), discovering opportunities (Kirzner), or bearing uncertainty (Knight). We also conclude that the Schumpeterian division of the economic development process into invention and innovation is not used in core economics textbooks. While innovation is occasionally discussed, invention is not. When entrepreneurship is omitted, not differentiating between the two is logical. The entrepreneur is the link between a novel idea (invention) and its commercialization

19. Considering the importance of institutions it may be interesting to note that only MIT, Stanford, Berkeley, and Yale offer various courses in institutional economics. In Sweden, only Lund University offers a course related to institutional economics, although it focuses only on institutions in the Chinese economy.

20. Entrepreneurship is often used synonymously with starting a new business in this literature, which is not a use compatible with the most commonly used theories of entrepreneurship (Henrekson and Sanandaji 2014).

(innovation), and clarifying a distinction between these activities is difficult if the entrepreneurial function is absent. Neglect of entrepreneurship partly explains the strong emphasis on research and development as the primary determinant of growth in growth modeling.

Most textbooks do not refer to institutions, with the exception of Acemoglu (2009) and Aghion and Howitt (2009), who give this concept significant attention. Issues related to entrepreneurship, the institutional context, and the interplay of the two are generally left out or considered peripheral. This picture is confirmed by our analysis of course offerings. Some elective courses in entrepreneurship, institutional economics, and innovation exist in economics doctoral programs, but they are scarce.

The few textbooks that include the entrepreneur do not clearly define her economic function, do not recognize the difference between invention and innovation, and do not provide a nuanced discussion of different types of innovations.²¹ Hence, current textbooks lack many of the basic insights that, for instance, Schumpeter (1934/1912) provided us.

However, some signs indicate that the entrepreneur is once again receiving serious attention in economics. Two of the newer macroeconomics textbooks—again Acemoglu (2009) and Aghion and Howitt (2009)—include a more ambitious treatment of entrepreneurship than earlier textbooks. The extent of the coverage given to the entrepreneur's economic role is still limited in many ways, but the presence of serious attempts to model the role of entrepreneurship in the growth process may point to a renewed interest in the topic.

In response to our analysis it might be argued that textbooks in microeconomics, macroeconomics, and industrial organization are not the occasion for rich learning about economic processes that lie outside of the optimizing-agent approach. But we have also examined assigned articles, and again mention of entrepreneurship is scant.

In their quest for economic insight, doctoral students interested in the causes of economic development may look beyond their university training. A little entrepreneurship can make a world of difference.

21. More specifically, there is a heavy focus on technological innovation, and little attention is paid to non-technological forms of innovation, or to the dispersion and adaptation of innovations to new markets.

Appendix: Course textbooks by university and course

Harvard	
Econ 2010a (Micro)	No reply
Econ 2010b (Micro)	Mas-Colell et al. (1995); Bolton & Dewatripont (2004); Hart (1995); Tirole (2006)
Econ 2010c (Macro)	Stokey & Lucas (1989); Dixit & Pindyck (1994)
Econ 2010d (Macro)	Blanchard & Fischer (1989); Gali (2008); Cooley (1995)
Econ 2610 (IO)	No textbook
Economics 2611 (IO)	No textbook
MIT	
14.121 (Micro)	Mas-Colell et al. (1995); Kreps (2012)
14.122 (Micro)	Tirole (1988)
14.451 (Macro)	Stokey & Lucas (1989)
14.452 (Macro)	Acemoglu (2009)
14.271 (IO)	Tirole (1988)
14.272 (IO)	No textbook
14.273 (IO)	No textbook
Princeton	
Eco 501 (Micro)	Gibbons (1992)
Eco 502 (Micro)	Mas-Colell et al. (1995); Bolton & Dewatripont (2004)
Eco 503 (Macro)	Ljungqvist & Sargent (2004); Stokey & Lucas (1989)
Eco 504 (Macro)	Ljungqvist & Sargent (2012)
Eco 541 (IO)	No textbook
Eco 542 (IO)	No textbook
U. of Chicago	
Econ 30100 (Micro)	No reply
Econ 30200 (Micro)	No reply
Econ 30300 (Micro)	Mas-Colell et al. (1995); Jehle & Reny (2011); Myerson (1991)
Econ 33000 (Macro)	No reply
Econ 33100 (Macro)	No reply
Econ 33200 (Macro)	No reply
Econ 40101 (IO)	Tirole (1988); Carlton & Perloff (2005)
Econ 40201 (IO)	No textbook
Econ 40301 (IO)	No textbook
Stanford	
Econ 202 (Micro)	Mas-Colell et al. (1995); Kreps (2012); Varian (1992)
Econ 203 (Micro)	Mas-Colell et al. (1995); Fudenberg & Tirole (1991); Tirole (1988)
Econ 204 (Micro)	Mas-Colell et al. (1995); Kreps (2012); Varian (1992)
Econ 210 (Macro)	Stokey & Lucas (1989); Ljungqvist & Sargent (2012); Luenberger (1968)
Econ 211 (Macro)	Acemoglu (2009)
Econ 212 (Macro)	Ljungqvist & Sargent (2012)
Econ 257 (IO)	Tirole (1988); Vives (1998)
Econ 258/259 (IO)	No textbooks
Econ 260 (IO)	No textbooks

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UC Berkeley	
Econ 201A (Micro)	Kreps (2012); Mas-Colell et al. (1995); Rubinstein (2007)
Econ 202A (Macro)	Romer (2011)
Econ 201B (Micro)	Osborne & Rubenstein (1994)
Econ 202B (Macro)	Romer (2011); Galí (2008)
Northwestern	
Econ 410-1 (Micro)	No reply
Econ 410-2 (Micro)	Mas-Colell et al. (1995)
Econ 410-3 (Micro)	Mas-Colell et al. (1995)
Econ 411-1 (Macro)	Stokey & Lucas (1989); Ljungqvist & Sargent (2012)
Econ 411-2 (Macro)	No reply
Econ 411-3 (Macro)	Stokey & Lucas (1989); Ljungqvist & Sargent (2012)
Econ 450-1 (IO)	Tirole (1988); Vives (1998)
Econ 450-2 (IO)	No textbook
Econ 450-3 (IO)	No textbook
Yale	
Econ 500a (Micro)	Mas-Colell et al. (1995); Bewely (2007)
Econ 501b (Micro)	Fudenberg & Tirole (1991); Mas-Colell et al. (1995)
Econ 510a (Macro)	No reply
Econ 511b (Macro)	Ljungqvist & Sargent (2012); Romer (2011)
Econ 600a (IO)	No textbooks
Econ 601b (IO)	No textbooks
U. of Pennsylvania	
Econ 701 (Micro)	Mas-Colell et al. (1995)
Econ 703 (Micro)	Mas-Colell et al. (1995)
Econ 702 (Macro)	Ljungqvist & Sargent (2012); Stokey & Lucas (1989)
Econ 704 (Macro)	Acemoglu (2009); Cooley (1995)
Econ 781-001 (IO)	No textbook
Columbia	
G6211 (Micro)	No reply
G6212 (Micro)	No reply
G6215 (Macro)	No reply
G6216 (Macro)	Uribe & Schmitt-Grohé (2014)
G6253x (IO)	No textbook
G6254x (IO)	No textbook
G6255y (IO)	No textbook
Lund	
NEKN21 (Micro)	Varian (1992)
NEKP21 (Micro)	Mas-Colell et al. (1995)
NEKN41 (Macro)	Sørensen & Whitta-Jacobsen (2010)
NEKP42 (Macro)	Obstfeld & Rogoff (1996)
Jönköping	
Microeconomic Theory 1	Jehle & Reny (2011); McAfee & Lewis (2009); Varian (1992)
Microeconomic Theory 2	Feldman & Serrano (2006)
Microeconomic Theory 1	Romer (2011)
Microeconomic Theory 2	Obstfeld & Rogoff (1996)
Göteborg	
Microeconomics I	Varian (1992); Mas-Colell et al. (1995)
Microeconomics II	Varian (1992); Mas-Colell et al. (1995)
Macroeconomics I	Krusell (2014/2007); Ljungqvist & Sargent (2012)
Macroeconomics II	Krusell (2014/2007); Ljungqvist & Sargent (2012)

Stockholm	
Microeconomics I	Mas-Colell et al. (1995); Jehle & Reny (2011); Kreps (2012)
Microeconomics II	Mas-Colell et al. (1995); Laffont & Martimort (2002)
Macroeconomics I	Krusell (2014/2007); Acemoglu (2009); Aghion & Howitt (2009); Ljungqvist & Sargent (2012)
Macroeconomics II	Krusell (2014/2007); Ljungqvist & Sargent (2012); Pissarides (2000); Galí (2008)
Industrial organization	Cancelled
Uppsala	
Microeconomics I	Varian (1992); Mas-Colell et al. (1995)
Microeconomics II	Salanié (2011); Varian (1992); Salanié (2005); Mas-Colell et al. (1995)
Macroeconomics I	Wickens (2012); Acemoglu (2009)
Macroeconomics II	Galí (2008)
Umeå	
D9 (Micro)	Varian (1992)
D10 (Micro)	Varian (1992)
D22 (Macro)	Romer (2011)
D23 (Macro)	Blanchard & Fischer (1989)

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