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- Spulber, D. F. 2009. *The Theory of the Firm: Microeconomics with Endogenous Entrepreneurs, Firms, Markets, and Organizations*. Cambridge: Cambridge University Press.
- . 2010. “Tacit Knowledge with Innovation and Entrepreneurship.” Northwestern University. Working Paper.
- . “The Innovator’s Decision: Entrepreneurship versus Technology Transfer.” In *Handbook of Research on Innovation and Entrepreneurship*, edited by D. Audretsch, O. Falck, S. Heblich, and A. Lederer. Northampton, MA: Edward Elgar.
- Teece, D. J. 1986. “Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing, and Public Policy.” *Research Policy* 15:285–305.
- . 2006. “Reflections on ‘Profiting from Innovation’.” *Research Policy* 35: 1131–46.
- Tilton, J. E. 1971. *International Diffusion of Technology: The Case of Semiconductors*. Washington, DC: Brookings Institution.
- Torrise, S. 1998. *Industrial Organisation and Innovation: An International Study of the Software Industry*. Cheltenham, UK: Edward Elgar Publishing.
- Vohora, A., M. Wright, and A. Lockett. 2004. “Critical Junctures in The Development of University High-Tech Spinout Companies.” *Research Policy* 33:147–75.
- Winter, S. G. 1984. “Schumpeterian Competition in Alternative Technological Regimes.” *Journal of Economic Behavior and Organization* 5 (3–4): 287–320.
- Zanchettin, P. 2006. “Differentiated Duopoly with Asymmetric Costs.” *Journal of Economics & Management Strategy* 15 (4): 999–1015.
- Zucker, L., M. Darby, and J. Armstrong. 1998. “Geographically Localized Knowledge: Spillovers or Markets?” *Economic Inquiry* 36:65–86.
- Zucker, L. G., M. R. Darby, and M. B. Brewer. 1998. “Intellectual Human Capital and the Birth of U.S. Biotechnology Enterprises.” *American Economic Review* 88 (1): 290–306.

## Comment Luis Cabral

Let me start by saying that I enjoyed reading the chapter.

Instead of going through the details of the chapter, I thought it might be more useful to put the main results into perspective, mainly in terms of the Industrial Organization (IO) literature on innovation. Moreover, I would like to take a further step back and talk about several literatures that I think are related to this chapter (although that link has not always been explored as much as it should):

- The literature on innovation, invention, adoption, and so forth
- The productivity literature
- The literature on entry and entrepreneurship

Traditionally, the productivity literature has been largely concerned with measurement issues. The entry and entrepreneurship literature in turn has

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done a lot of things, but not always focused on the issue of innovation per se. For example, a lot has been written on the determinants of entry, how entry rates vary across industries, and so forth, but normally not focusing on innovation issues.

So I think that we have three different strands of literature that really are asking for a little more bridging. (In fact, some of that bridging has been done. For example, the new growth theory provides a link between the innovation box and the productivity box. The recent work on productivity accounting provides a link between the productivity box and the entry box [e.g., when it shows that a large fraction of industry productivity increase results from firm turnover].)

Dan's chapter, I think, is a very useful addition to the effort to bridge the entry/entrepreneurship and the innovation boxes. There are many people working on entrepreneurship and entry, and there are many other people working on innovation; but the link between the two has not always been there. In addition to making this link, Dan's chapter also points to a series of interesting issues that we can and should work on so as to bring the two literatures together. I will later comment on some of these.

The chapter deals with an issue that has been studied in the IO literature extensively: the relation between incumbency, entry, and innovation incentives. I like to think of this literature in terms of two principles. The first principle is "if it ain't broke, don't fix it." This is the Arrow et al. idea that if a monopoly is not being challenged, then there is little incentive to innovate. By innovating the monopolist would just cannibalize itself. The second, opposite, principle is "fix it before it's broken." This corresponds to the idea of preemption, the idea that if there is a challenger out there (a potential entrant) then the incumbent should do what it takes to avoid competition, including innovating or buying innovation that would otherwise be acquired by the potential entrant. Which of the two principles applies depends on whether we are in a situation of uncontested monopoly ("if it ain't broke, don't fix it" applies) or contested monopoly ("fix it before it's broken" applies).

Let me give you two examples (I have been in business school for too long; you always must give examples). The video game industry is to some extent a series of uncontested monopolies, a situation when innovation entails considerable self-cannibalization. There is a case about Nintendo in the 1980s with precisely these features. As for the case of a contested monopoly, two examples that come to mind are Xerox and plain paper photocopying and a case that I think has received relatively less attention, Eli Lilly and synthetic insulin.

Dan's chapter is very much in the contested monopoly tradition. I gave you two examples of contested monopoly and only one of uncontested. I am not sure this precisely reflects the relative importance of each case in the real world. What I am sure of, however, is that we can find many examples—perhaps most examples—where there is some degree of contestability. So

I think the framework considered by Dan is a useful framework of reference. (There are a lot of papers looking at other reasons why we might have persistence or lack of persistence of monopoly; for example, organizational inertia.)

One of Dan's contributions to the innovation under contested monopoly tradition is to consider the case when there is product differentiation. In fact, it is somewhat surprising that this has not been given much attention in the previous literature. Dan also considers the distinction between product and process innovation. Finally, Dan considers various cases of possible transferability of technology and product innovation between the innovator and an incumbent firm. Together, this leads to a wealth of possible cases and results.

Although there are many cases to consider, the main result under contested monopoly is that the equilibrium solution is the one that maximizes joint profits, what Gilbert and Newbery (1982) refer to as the efficiency effect. So, in general, product differentiation favors entry to the extent that it leads to higher profits when incumbent and entrant compete in the market. In other words, the greater the degree of product differentiation, the more likely the equilibrium corresponds to entry. For the same reason, more drastic innovation tends to favor entry.

But lest you think the chapter is simply a series of trivial results, the chapter shows that the comparative statics with respect to product innovation may actually be nonmonotonic. The point is that joint profits may actually be nonmonotonic with respect to the degree of product differentiation.

In sum, there are several results in this chapter, some fairly intuitive, and some quite surprising. Ultimately, they all go back to Gilbert and Newbery's efficiency effect, though the way that works is not always obvious.

One general comment that I have is that, there being so many cases, it would be interesting to have examples to illustrate the various cases. For instance, what are good examples of situations when there is transferability and situations when there is no transferability?

Moreover, although Dan considers quite a number of different cases, there is one that is missing and I think is quite relevant: the case when the innovation has a product advantage with respect to the incumbent but a significant cost disadvantage. I suspect this is a fairly common situation, one where the assumptions of transferability are particularly important.

A more general comment is, how much of what is in this chapter is about entry, and how much of it is about entrepreneurship? I have to confess that I am not exactly sure what entrepreneurship is. This is a theory chapter, and in theory chapters you do not always make that sort of distinction. To go back to the Eli Lilly example, suppose that Eli Lilly did not buy the synthetic insulin patent from Genentech. Then several things could happen: Genentech could have entered as Genentech, or they could have sold their patent to Pfizer, or somebody who worked for Genentech could have left the firm and started a firm on his or her own. Which of these classifies as

entrepreneurship and which of these classify as just entry? I'm not sure. In other words, what is so special about entrepreneurship?

I am a bit of an outsider to the literature on entrepreneurship. If you didn't know it before I started it is probably obvious by now. But being an outsider can be an advantage. What I see as an outsider is that there is a big elephant in the entrepreneurship literature room that seems to go unnoticed. There is a general perception that entrepreneurship and entry are good for innovation. Talk to any politician, policymaker, or even any academic, and they will tell you that it is obviously true. But is there a good theory for that? Let me just give you an example. Suppose you have two worlds that differ in terms of institutions that may or may not facilitate transfer technology between an entrepreneur and an incumbent. In world A, with poor technology transfer conditions, you have a lot of entrepreneurship and a lot of entry. In world B, with favorable technology transfer conditions, you have a lot less entry and entrepreneurship. Is it clear that the incentives to innovate are higher in the world where there is greater entrepreneurship and there is more entry? Not at all, because as this model suggests, entry and entrepreneurship may be precisely a response to inefficiencies, which in turn may actually reduce the innovation incentives.

Dan's chapter does not solve this issue, but it sort of forces it, which I think is an important step forward. I would be interested in seeing the results for the reasons that I just explained; that is, at a theoretical level it is not clear that more entry is associated to more innovation. And by the way, the same thing is true for the entry-productivity connection. Empirically, we know that a lot of the industry productivity increases result from firm turnover. However, it is not at all obvious that entry is generally good in terms of increasing productivity: there is good turnover and there is bad turnover. And again, if you do a comparative study across countries (as I am currently doing) in terms of barriers to entry, industry turnover and productivity growth, one finds that the relation between entry and productivity is not that clear because in some countries there's a lot of turnover for the wrong reasons (high barriers to survival), not by the right reasons (selection by productivity).

In summary, I think this is a very good chapter, an important addition to this connection between the innovation and the entrepreneurship literatures. The chapter provides a series of interesting results, but it also asks a lot of interesting questions. I look forward to the next developments in this research program, in particular the one that takes one step back and looks at innovation incentives by entrepreneurs.

## References

- Gilbert, R. and D. Newbery. 1982. "Preemptive Patenting and the Persistence of Monopoly." *American Economic Review* 72:514–26.