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Mergers and the market for organization capital

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Abstract

In this paper, mergers are an equilibrium outcome in which acquirers "marry" targets so as to gain access to their organization capital. Firms with lower learning costs about the new technology are not necessarily those that manage it best once it is mature. Since there are gains from trade, a market for organization capital can arise through mergers. This model generates a merger wave after a shock to technology and is consistent with several other stylized facts on mergers documented in the literature.

JEL classification: G34; L16; O33

Keywords: Mergers; Merger waves; Organization capital; Technological change

> "Our ideal acquisition is a small startup that has a great technology product on the drawing board that is going to come out 6 to 12 months from now. When we do that, we are buying engineers and the next-generation product. Then we blow out the product through our distribution channels and leverage our manufacturing and financial strengths."
>
> John T. Chambers, Cisco's CEO, in Rifkin [48].

1. Introduction

Mergers occur in waves. This is the best-known and most puzzling fact about mergers. [1] New evidence that merger activity clusters not only in time but by industry seems to favor the interpretation that merger waves are the result of industry-level shocks, namely technological

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[1] According to Brealey and Myers [12, p. 1015], "how can we explain merger waves?" is one of the 10 unsolved problems in Finance.

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shocks. [2] In this paper, I develop an equilibrium model in which mergers are a way for acquirers to obtain knowledge about a new technology and a merger wave is an equilibrium outcome that follows a technological shock. [3]

Empirical evidence shows that a discrete technological change is associated with a productivity drop early on, and then a gradual rise in productivity, as a by-product of the production process, that eventually slows down. This suggests the existence of learning that is firm specific and tied to the technology as well. Prescott and Visscher [44] call the stock of such learning organization capital.

Mergers are a way for a firm to acquire the organization capital of another. A merger may arise if there is a gain to trading the organization capital. Gains from trade exist if for some firm the cost of external acquisition of this capital is lower than the cost of internally developing it, while for other firm the long run benefits of the new technology are smaller than the gains it obtains from the transfer of its organization capital. In the model, such gains from trade may arise because managers differ in their ability. With the old technology, a firm run by a manager with high ability has larger profits than a firm run by a low ability manager. The new technology imposes a reduction in profits in the short run, though it leads to higher profits in the long run. Hence, the opportunity cost of adopting the technology at an early stage is higher for the firm with high managerial skills. However, the firm with the best manager is the one that gains more from the new technology once it is " mature." Therefore, a firm with low managerial skills has a comparative advantage at developing and learning about a new technology, because it loses relatively less. But once the technology is mature this firm is not the one that can benefit the most from it, so there are gains from trade and room for a market. After the technological shock, some firms adopt the new technology whereas others prefer to wait and to get the new technology through acquisition of the early adopters. Mergers occur clustered in time—i.e., " wave"—and they are an equilibrium outcome in which acquirers "marry" targets to gain access to their organization capital. In this setting, an equilibrium exists, is unique for non-zero transactions, and efficient. [4]

This paper is closely related to recent work by Jovanovic and Rousseau [29,30] on mergers and merger waves and, to some extent, with literature on entrepreneurship by Arrow [6], and Holmes and Schmitz [24]. As in Jovanovic and Rousseau [30], I develop a competitive model in which mergers occur as a consequence of a technological shock. However, there are two main differences: first, in their model the only objective of takeovers is to acquire physical capital, i.e., mergers are simply used-capital trades, whereas in this paper intangible assets—organization capital—play a crucial role [5] ; second, their approach disregards the issue of the identity of the firms merging by overlooking the fact that mergers may be seen as an outcome of a matching process. Together, these two ingredients—intangible assets and matching—provide a micro-foundation for the *ad hoc* adjustment cost of capital Jovanovic and Rousseau [30] invoke to get a protracted merger wave: this cost is just foregone profits if intangible assets (organization capital) were to

[2] Nelson [42] and Gort [17] were among the first to document merger waves. Mitchell and Mulherin [41], Andrade et al. [1], and Andrade and Stafford [2] document that merger activity comes in waves and is clustered by industry. Harford [21] found evidence that favors "neoclassical" theories of merger waves.

[3] For example, Arora and Gambardella [4], and Higgins and Rodriguez [22] confirm that acquisition of technological capabilities is an important reason for mergers in the biotechnology and pharmaceutical industries. For a more thorough discussion of this issue see Section 5.

[4] Allocations are uniquely defined; prices are uniquely defined for non-zero transactions.

[5] Hall [20] documents a rise in the importance of intangible assets in the 1990s. Jovanovic and Braguinsky [27] develop a model in which acquirers buy *projects* from targets—their model seems to have some of the flavor of trade in intangible assets.