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Firm productivity, heterogeneity, sunk costs and market selection

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Abstract

The main objective of this paper is to explore whether or not patterns of entry and exit are systematically related to productivity differences at the firm level, as suggested by models of industry dynamics Hopenhayn, (1992) [Hopenhayn, Hugo (1992). Entry, Exit, and firm dynamics in long run equilibrium, Econometrica, 60, September, pp.1127-1150]. The comparisons of productivity distributions for entering, exiting and continuing firms are performed by non-parametric procedures and for a large scale firm-level panel data set of Spanish manufacturing firms. The main empirical findings can be summarized as follows. First, heterogeneity in productivity levels across firms is persistent through time. Second, entry and exit decisions are systematically related to differences in firm productivity. In particular, the productivity distribution of continuing firms stochastically dominates the distributions of entering and exiting firms. Third, at the moment of entry, the group of failing members of any entry cohort has lower productivity than the group of surviving members of the same entry cohort. Fourth, the post-entry productivity level of entering firms grows more rapidly than the productivity of incumbent firms, although this pattern is not always highly significant. Finally, we find that sunk costs are an important source of heterogeneity across firm productivity. The evidence we find is consistent with models of industry dynamics predicting lower productivity for firms operating in markets with a higher level of sunk entry costs.
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1. Introduction

This paper uses a micro panel data set of Spanish manufacturing firms to examine productivity differences between groups of entering, exiting and continuing firms. To organize our empirical work, we rely on the emerging theoretical literature that seeks to account for the observed heterogenous productivity across individual producers. The field of industrial economics has contributed to the analysis of this heterogeneity through models of industry dynamics proposed by Jovanovic (1982), Hopenhayn (1992), Ericson and Pakes (1995), where the path of growth and failure that characterize micro data is driven to a large extent by differences in productivity. They allow for industry equilibriums with simultaneous flows of firm entry and exit and heterogeneity in productivity at the firm level. In particular, we rely on the Hopenhayn's (1992) model that emphasizes the notion of sunk cost to explain productivity differences. On the empirical side, Tybout (1996), Caves (1998), Bartelsman and Doms (2000), Haltiwanger (2000) and Foster et al. (2001) provide excellent reviews of the literature. We examine productivity differences between firms that are similar to those comparisons performed by Aw et al. (2000, 2001, 2002). A related literature reports decompositions that try to measure the contribution of entry, exit and share effects to productivity growth as in Baily et al. (1992), Griliches and Regev (1995), Olley and Pakes (1996) and Foster et al. (2001), among others. Baldwin (1993), Audretsch (1995) and Roberts and Tybout (1996) analyze different aspects of the dynamic process by which firms evolve over time, including productivity.

The main purpose of this paper is to explore if entry and exit patterns are related to productivity differences at the firm level, as suggested by models of market dynamics. In particular, we focus on the exam of productivity differences between continuing, entering and exiting firms. We take as reference a sample of Spanish manufacturing firms over the period 1990–1997. The paper makes three contributions to the literature. First, we add another national perspective to the available evidence based on firm level productivity. Second, we use the methodology proposed by Delgado et al. (2002) that compares the entire distribution of firm productivity rather than just marginal moments, typically means. In particular, we compare the cumulative distribution function of total factor productivity for continuing, exiting and entering firms. The paper implements a testing procedure based on the concept of stochastic dominance for ranking differences between productivity distributions. Third, we test if productivity differences between groups of firms are consistent to market selection forces and, also, if sunk costs, that we measure at the firm level, influence the distribution of productivity levels across incumbent firms.

Our results are largely similar to those found in parallel studies (see Aw et al., 2001, 2002; Foster et al., 2001) and, therefore, provide evidence favorable to some of the implications of models of industry dynamics. The main empirical findings can be summarized as follows. First, heterogeneity in productivity levels across firms is persistent through time. Second, entry and exit decisions are systematically related to differences in firm productivity and, in particular, the productivity distribution of continuing firms stochastically dominates the distributions of entering and exiting firms. Third, for any entry cohort, the initial productivity distribution of the failing members is stochastically dominated by the distribution of surviving members. Fourth, the behavior of post-entry