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On the Measurement of Entry Rates

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Abstract. The purpose of this paper is to explicitly examine the impact that two distinct methods used to measure entry have on identifying the determinants of entry. The two approaches can be termed as the ecological approach and the labor market approach. Based on new business startups in 75 regional markets in West Germany, we find that the two different methods for measuring entry yield disparate results. Most strikingly, we find that the ecological approach yields a positive relationship between unemployment and startup activity, while the labor market approach points to a negative impact of unemployment on the startup of new firms. By decomposing these two measures we offer a reconciliation of what appears to be a measurement contradiction.

Key words: Entry, Germany, regions, new firm startups

JEL codes: L0, L1

I. Introduction

Something of a controversy has arisen in the newly emerging literature examining the entry of new businesses into markets. While a number of studies have found that entry tends to be promoted in those spatial or temporal markets[1] with a high degree of unemployment,[2] others have found exactly the opposite – that a low rate of unemployment, which presumably reflects an economic environment of high growth, is most conducive to the entry of new businesses.[3] Similarly ambiguous results have emerged identifying the impact that wage rates have on entry. While a low level of wages, holding the level of human capital and skills in the labor force constant, has been identified as encouraging the entry of new businesses in some studies, in still others it has been found that entry is promoted by high wage rates (Reynolds, 1992, and 1993, Fritsch, 1992, Audretsch and Fritsch, 1992 and 1994).

Studies examining entry into markets on a product dimension, that is across industries, have also produced ambiguous results. Among the most perplexing is the finding that, in certain studies scale economies apparently deter the entry of businesses, while in others entry is either not effected or even systematically higher in the presence of scale economies (Acs and Audretsch, 1989, 1990, Chapter five). Most strikingly, in three of the country studies assembled by Geroski and

Schwalbach (1991) a negative relationship is found between scale economies and entry, while in two others a positive relationship is identified.

Why do such ambiguous and contradictory results emerge in studies of entry? One answer, as Storey (1991) points out, is that different studies focus on different aspects of entry, such as the entry of all firms, entry of all establishments, net entry (the difference in the number of firms or establishments in a market between two periods of time), and the entry of new firms. Another explanation, which Storey (1991) also emphasizes, is that time series analyses do not reflect the same aspects of the entry process as do cross-section analyses. In addition, various studies focus on different product markets, such as manufacturing or services, or spatial markets, such as different countries or regions, as well as over different time periods. In fact, given the differences in the samples and underlying economic environments analyzed, the emergence of ambiguous results is more understandable.

However, one source that may contribute to the confusion and ambiguity in the literature is that different methods are used to standardize across the units of observation to control for variations in market size across time, regions, or industries. In doing so, an entry rate is typically constructed. The purpose of this paper is to explicitly examine the impact that the two most prevalent methods used to construct these entry rates has on the consistency of results. Using these two approaches for the same data sample – that is, holding the time, spatial, and product dimensions constant – the extent to which the results are sensitive to the specific approach used can be directly tested. Such a direct test enables us to shed light on whether at least some of the ambiguity in the literature is attributable to different methods used to standardize the entry measure.

II. Two Approaches

There is little contention that measuring the absolute numbers of new entrants and then comparing them across markets would be as misleading as revealing. This is because markets, either along a product or a regional dimension, are not homogeneous with respect to size. For example, if the number of new entrants was twice as great in one market as in another, but the first market was also twice as large, it would not be correct to infer that entry activity was greater in the first market than in the second. That is, the absolute number of entrants must be standardized somehow to render a meaningful comparison across markets of different sizes.

Two approaches have generally been adapted in attempting to compare entry activity across markets. The first method standardizes the number of entrants relative to the number of firms in existence at the beginning of the period.[4] This approach can be termed as the ecological approach because it considers the amount of entry activity relative to the size of the existing population of businesses. The ecological approach is particularly prevalent in the industrial organization literature, where empirical studies have attempted to explain why the degree of entry varies so much across product markets.[5]

The second method, which can be characterized as the labor market approach, is to standardize the number of entrants with respect to the size of the work force. The labor market approach has a particular theoretical appeal, in that it is based on the theory of entrepreneurial choice proposed by Evans and Jovanovic (1989), among others. That is, each new firm is started by someone. The labor market approach implicitly assumes that the entrepreneur starting a new business is in the same labor market within which that new firm operates. It should be pointed out that the labor market approach does not assume away the phenomenon of cross-market worker mobility. This approach recognizes that labor is mobile, both in terms of spatial and product markets. However, it is assumed that some experience as an employee in the market has been gained before starting a new business.

In the product market dimension, this assumption is probably more accurate in manufacturing industries and less valid in the non-manufacturing sectors, whereas in regional markets it is more likely to hold for non-manufacturing than for manufacturing. Of course, the validity of this assumption clearly depends upon the degree to which markets, along either a product or spatial dimension, are delineated. Clearly the more aggregated the market, the more likely such an assumption is to hold. In any case, the labor market approach has the attractive property that there is a clear lower bound of 0.00 and a clear upper bound of 1.00, which would represent the extreme (and absurd) case where every worker within a labor market has started his/her own firm.

III. A Comparison

Does it make a difference whether the ecological or labor market approach is used to measure entry activity in trying to identify why this phenomenon varies so greatly across markets? To answer this question we use both measures alternatively in estimating what has by now become a fairly standard model for explaining the entry of new businesses across spatial markets. If the estimation is insensitive to the approach used to measure entry, then both estimates should yield similar qualitative estimates. However, qualitative differences in the results would imply that the estimation is in fact sensitive to the method used to measure entry.

By using records from the social insurance statistics in West Germany it is possible to identify in which of the 75 regional markets[6] a new establishment entered in 1986.[7] Storey and Johnson (1987) have identified those spatial characteristics that tend to have the greatest influence in determining the entry of new businesses. Within each segmented region exists the demand for new businesses and a potential supply of factors which facilitate the entry of new businesses. The interaction of these demand- and supply-side factors presumably shapes the resulting amount of entry activity. As Krugman (1991b) argues, positive externalities may exist among businesses within a specific region. That is, the demand- and supply-side factors may spill over from one business to another within a region, increasing the attractiveness of entering the region where such spillovers are the greatest.

One of the central supply factors influencing the entry decision is the existence of unemployed workers. As Storey (1991) points out, unemployed workers constitute not only an important source of entrepreneurs starting new businesses, but also a source of labor inputs for new firms. Evans and Jovanovic (1989) and Evans and Leighton (1989, 1990) proposed a framework of entrepreneurial choice where the probability of entering into self-employment depends upon the expected value of starting a new firm compared to that earned from employment in an existing enterprise. According to their theory, entry would be expected to increase as the wage falls.

A high level of human capital and skilled labor in the work force increases the potential supply of entrepreneurs for two reasons. First, skilled workers are more likely to possess the competencies that facilitate the shift from being employed by a firm to starting their own business. Second, a large pool of skilled workers may provide a key source of inputs needed by new firms, at least in a country like Germany.

Entry activity is hypothesized to be greater in highly populated areas than in regions with a low population density. One reason for this is that the infrastructure of services and inputs is more developed in regions that are more densely populated. As Krugman (1991a, p. 484) argues, "The concentration of several firms in a single location offers a pooled market for workers with industry-specific skills, ensuring both a lower probability of unemployment and a lower probability of labor shortage. Second, localized industries can support the production of nontradable specialized inputs. Third, informational spillovers can give clustered firms a better production function than isolated producers."

It has been often observed (Evans and Leighton, 1989, 1990) that employment experience elevates the likelihood of starting a new firm. Presumably the skills that are essential to founding and operating a new firm can best be learned while working in a small enterprise. This would suggest that the supply of potential entrepreneurs is negatively related to the average plant size in a industry.

The two approaches used to measure the entry rates are related in an ordinary least squares regression model to the 1985 unemployment rate, the mean manufacturing wage in 1985, the 1985 share of employment accounted for by unskilled and semi-skilled workers, the mean establishment size, and the 1985 population density. All of the explanatory variables are from the Social Security Statistics or from the Federal Statistical Office (Statistisches Bundesamt).

The results estimating the ecological and labor market approaches for measuring the entry of new businesses across 75 West German regions in 1986 are shown in Table I.

There are a number of striking differences emerging between the two approaches. First, using the ecological approach the unemployment rate is found to be positively related to entry activity. However, when the labor market approach is used to measure the entry rate, the unemployment rate is found to have a negative effect on the entry of new businesses. Second, the population density apparently

TABLE I. Regressions estimating entry rates (t-statistic in parentheses)*

	All Sectors		Manufacturing		Services	
	Ecological	Labor Market	Ecological	Labor Market	Ecological	Labor Market
Market Growth (%)	–0.011	–0.009	-0.112	–0.191	–0.555	0.003
	(0.12)	(0.16)	(1.26)	(1.72)	(0.56)	(0.03)
Unemployment Rate (%)	0.346	–0.006	0.345	–0.452	0.146	–0.071
	(3.77)	(0.11)	(3.65)	(3.80)	(1.47)	(0.77)
Mean Wage	0.599	0.339	0.510	0.047	0.499	0.463
	(6.12)	(0.11)	(5.41)	(0.40)	(5.05)	(5.05)
Share of Unskilled Labor	–0.318	–0.204	–0.300	–0.002	–0.328	–0.303
	(4.03)	(3.94)	(3.68)	(0.02)	(3.84)	(3.83)
Mean Establishment Size	–0.213	–0.944	–0.232	–0.751	–0.012	–0.925
	(2.22)	(15.74)	(2.35)	(6.05)	(0.12)	(9.62)
Population Density	0.408	0.288	0.400	0.084	0.355	0.436
	(5.00)	(5.37)	(4.74)	(0.79)	(4.02)	(5.33)
No. of Obs.	75	75	75	75	75	75
$\overline{R}^2$	0.655	0.851	0.633	0.421	0.596	0.653

*Under the ecological approach the entry rate is measured as the number of new establishments divided by the number of establishments in existence.

Under the labor market approach, the entry rate is measured as the number of new establishments divided by the number of workers in the region.

exerts a positive influence on entry when the ecological approach is used but a negative influence with the labor market approach.

Not only do disparate results emerge in the estimates between the two alternative approaches to measuring entry activity, but the degree of disparity also depends upon the sector of economic activity. For example, when all sectors are analyzed, there is no qualitative difference in the impact of the degree of unskilled labor in the market on entry activity. Using both the ecological and labor market approaches, the extent to which the work force is accounted for by unskilled workers is negatively related to the entry rate. While these results also emerge for the service sector, no statistically significant relationship can be found to exist in manufacturing when the labor market approach is used. However, under the ecological approach a negative and statistically significant relationship is found to exist between the extent of unskilled labor in the work force and the entry rate in the manufacturing sector. A number of other such disparities in the results between sectors can be observed.

IV. Reconciliation and Conclusion

The results of the comparison are somewhat discouraging, because they suggest that the answer to practical and policy relevant questions such as, "Is the entry of new businesses promoted or impeded by the presence of high unemployment?" and "Do high wages attract or repel the startup of new businesses?" is, "It depends – on the measure used to standardize the entry rate." That is, while a high unemployment rate results in a high rate of entry relative to the number of establishments already in existence, the propensity of workers to start a new business in a high unemployment region tends to be relatively low. There are two possible interpretations for the negative relationship between the propensity of workers to start a business and the unemployment rate. The first is that the propensity to start a business is lower for unemployed than for employed workers. Thus, as workers shift from being employed to being unemployed, the overall entry rate tends to decline. The alternative explanation is that the propensity to start a business, regardless of employment status, is negatively influenced by higher regional rates of unemployment.

As Table II makes clear, standardizing the amount of entry by the number of establishments already in existence leads to a negative correlation between the ecological measure of the entry rate and the share of employment accounted for by the smaller establishment size classes, but a positive correlation exists for the larger establishment size classes. Inherent in the ecological measure is a relatively low ratio of potential entrepreneurs per establishment in the small establishment size classes but a high ratio of potential entrepreneurs per establishment in the large establishment classes.

Thus, in markets where most of the employment is accounted for by small establishments, each new establishment has a relatively low impact on the overall (ecological) entry rate. By contrast, in markets where a relatively high share of

TABLE II. Simple correlation between the entry rate measures and employment shares of establishment size classes

Employment size of establishment	Entry rate measurement	
	Ecological	Labor Market
1–4	–0.10	0.88
5–9	–0.27	0.76
10–19	–0.36	0.68
20–49	–0.51	0.51
50–99	–0.44	0.39
100–199	–0.37	-0.11
200–499	–0.19	-0.24
500–999	0.27	–0.05
1000+	0.39	–0.54

employment is accounted for by large establishments, each new business has a relatively large impact on the (ecological) entry rate.

When the amount of entry is standardized by the size of the labor force, a positive correlation emerges between the labor market measure of the entry rate and the share of employment accounted for by small establishment size classes, but a negative correlation is found for the large establishment size classes. This presumably reflects the point made in the previous section that the propensity of a worker to start a business is generally negatively related to the size of the establishment in which (s)he has accumulated experience.

More than anything, however, the results of this paper point to the care that must be taken in empirical studies standardizing measures across observations and making inferences from the results. At least some of the controversy that has emerged in the literature regarding the relationships between the entry of new firms and the unemployment and wage rates may be attributable to the sensitivity of the estimation to the approach used to measure entry activity. The divergent policy implications emerging from these two approaches are equally striking. Whether the case of market entry is typical or atypical will hopefully become apparent as similar studies are undertaken across the wide range of topics falling with the economists domain.

Notes

1. It should be pointed out that some of these studies focus on the relationship between unemployment and new-business entry across spatial markets for a single point in time (for example, Audretsch and Fritsch, 1992), while others focus on the relationship within a single spatial market but over various points of time (Highfield and Smiley, 1987). Only a handful of studies

have combined the cross-section and time series approaches (Yamawaki, 1991, Audretsch, 1993).

2. See the studies reviewed in Storey (1991) and Audretsch and Vivarelli (1995).
3. For examples see Reynolds (1992, 1993) and Audretsch (1993).
4. Or, in some cases, an average of the number of firms in the beginning and at the end of the relevant time period.
5. For examples of the ecological approach to measuring entry, see the individual country studies contained in Geroski and Schwalbach (1991) and Acs and Audretsch (1990, Chapter five).
6. These regional markets are based on the 75 "planning regions" (Raumordnungsregionen) in what used to constitute West Germany.
7. The data base is derived from social insurance records collected for individuals. The records on individuals identify the establishment at which the individual is employed. The data base covers over 90 percent of employment in the West German private sector. For a more detailed description of the data base see Fritsch (1992) or Audretsch and Fritsch (1992 and 1994).

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