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# Gazelle Companies: What Is So Special About the 20% Threshold?

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## Abstract

In business analysis, a special emphasis is placed on “gazelles”, companies that grow by at least 20% per year for several years (usually four). While this 20% threshold is somewhat supported by empirical research, from the theoretical viewpoint, it is not clear what is so special about this value. In this paper, we provide a possible explanation for this empirical fact.

## 1 Formulation of the Problem

**Empirical fact.** In the late 1970s, an MIT economist David Birch noticed that most jobs are created by fast-growing small companies [1], see also [2, 4, 5, 6]. His empirical analysis showed that most of these companies grow by at least 20% per year for a certain number of years. To describe such companies, he coined a special term “gazelle”: a company that grows by at least 20% per year for 4 years, from a certain sufficiently large initial revenue base (usually \$1,000,000).

This term is now widely used in business, and further studies confirmed that such fast-growing companies deserve special attention and special analysis.

**Problem.** While the 20% threshold seem to be supported by empirical data, there is no good theoretical explanation of why 20% (and not 15 or 25) is a threshold separating fast-growing companies from all others.

**What we do in this paper.** In this paper, we propose a possible explanation for the above empirical threshold.

## 2 Our Explanation

### 3 Analysis of the Problem

**Seven plus mins two law: reminder.** It is known that we usually divide each quantity into 7 plus plus minus 2 categories – this is the largest number of categories whose meaning we can immediately grasp; see, e.g., [8, 9]. For some people, this “magical number” is  $7 + 2 = 9$ , for some it is  $7 - 2 = 5$ .

**Consequences for evaluating the company growth.** As a result, when an expert make a decision about a fast growing company based on its annual growth, this expert does not use the exact growth percentage. Instead, he/she divides the range  $[0, 100]$  of possible growth rates (we exclude more-than-doubling grows rates above 100% as extremely rare) into  $n = 7 \pm 2$  subintervals, and then makes a decision based on which subinterval contains the actual growth rate.

Since we have no reason to believe that different subintervals have different width, it makes sense to conclude that these intervals are equally wide, i.e., that they have the form

$$\left[0, \frac{100}{n}\right], \left[\frac{100}{n}, \frac{200}{n}\right], \dots, \left[(n-1) \cdot \frac{100}{n}, 1\right].$$

(The idea that when we have no information about the objects’ difference, it is reasonable to assume that these objects are equivalent goes back to Laplace; it has been successfully used in numerous situations with uncertainty; see, e.g., [7].)

The first subinterval contains the 0 growth rate corresponding to stagnation. Thus, if the company’s annual growth rate is in the first subinterval, the expert will conclude that the company is *not* growing fast. Companies with growth rate at least  $\frac{100}{n}$  will be classified into second or further subinterval and, thus, will be identified as indeed growing fast.

Specifically:

- experts with  $n = 9$  consider all the companies with growth rate at least  $\frac{100}{9} \approx 11.1\%$  to be fast-growing;
- experts with  $n = 8$  consider all the companies with growth rate at least  $\frac{100}{8} = 12.5\%$  to be fast-growing;
- experts with  $n = 7$  consider all the companies with growth rate at least  $\frac{100}{7} \approx 14.3\%$  to be fast-growing;
- experts with  $n = 6$  consider all the companies with growth rate at least  $\frac{100}{6} \approx 16.7\%$  to be fast-growing;

- experts with  $n = 5$  consider all the companies with growth rate at least  $\frac{100}{5} = 20\%$  to be fast-growing.

Let us show that this idea explains the above empirical fact.

**Resulting explanation.** The above analysis shows that different experts have, in general, different thresholds for deciding whether a company is fast-growing. These thresholds range from 11.1% corresponding to  $n = 9$  to 20% corresponding to  $n = 5$ . So, if for some company, the annual growth rate is smaller than 20%, then, according to our analysis, some experts will not classify this company as fast-growing.

The only case when *all* experts classify the company as fast-growing is when its growth rate exceeds the fast-growing thresholds selected by experts of all types. In other words, the only case when all the experts agree that a company is fast-growing is when its annual growth rate exceeds the largest of the above thresholds. The largest of the above 5 thresholds is

$$\max\left(\frac{100}{9}, \frac{100}{8}, \frac{100}{7}, \frac{100}{6}, \frac{100}{5}\right) =$$

$$\max(11.1\dots, 12.5, 14.2\dots, 16.6\dots, 20) = 20,$$

so 20% is indeed the threshold after which the company is unanimously recognized as fast-growing.

This explains what is so special about the 20% thresholds proposed by D. Birch.

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