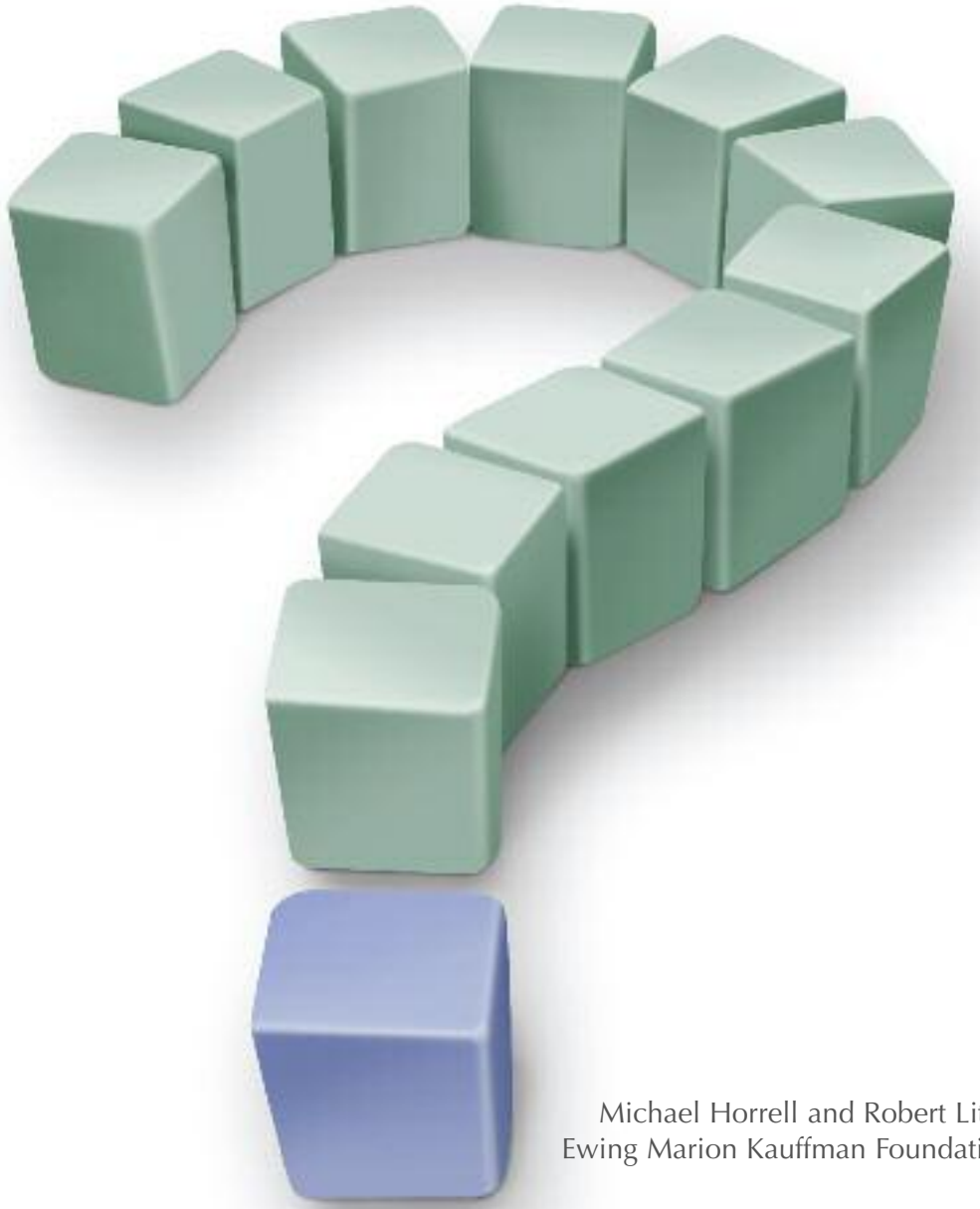
Kauffman Foundation Research Series:
Firm Formation and Economic Growth

After Inception: How Enduring is Job Creation by Startups?

July 2010



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KAUFFMAN
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Abstract

We analyze a Business Dynamics Statistics (BDS) dataset broken out by firm age to determine how total employment in startups changes as startups age. Conventional thinking on employment from startups is that many of the new jobs created by startups evaporate over the course of just a few years as firms exit the market. By tracking cohorts of firms started from 1977–2000, we find this to not be the case. While many firms exit over the life of each cohort (destroying jobs), other firms also grow (creating jobs). This growth in employment partially balances out the jobs lost by closing and shrinking firms. We also look at how recessions affect employment in these cohorts of firms. We find that starting a firm during a recession does not affect employment levels five years later, but cohorts of firms exposed to prolonged recessions did experience significantly lower employment levels.

Key Findings

- Cohorts of firms started each year retain, on average, 80 percent of their initial total employment to age five.
- Older cohorts of firms exhibit increasingly higher employment retention rates over five years, but these rates are not substantially higher than those of new startup cohorts.
- Cohorts that start during a recession hire fewer people in the first few years following their birth, but they catch back up to the same levels of employment at age five.
- Prolonged recessions, on the other hand, appear to lower employment among cohorts. Cohorts at age five that had survived through portions of three recession years had roughly 10 percent less employment (as compared to their startup years) than cohorts of firms that encountered no recessions in their first five years.

Introduction

The current focus of economic policy in America is on how to create more jobs. With the latest estimate of the unemployment rate at 9.5 percent,[1] among the highest rates in decades and without much indication of decline anytime soon, this focus is not misplaced. To cut the unemployment rate significantly, it's clear that the United States needs to create jobs at rapid rates. One promising source of new jobs is startups.

Prior research has established the essential role of startups in new job creation and employment growth in the American economy. Kane (2010) states, "Startups aren't everything when it comes to job growth. They're the only thing," and he shows through an analysis of the Business Dynamics Statistics (BDS) dataset[2] that, "without startups, there would be no net job growth in the U.S. economy."[3] However, though new firms create the most jobs, it is unclear whether or not these jobs remain as these firms age to create a lasting impact on the economy.

Given that startups are usually thought of as highly volatile—Stangler (2010) estimates fewer than half of all new establishments survive to their fifth year[4] —a pertinent question arises: Do the number of jobs created by startups exhibit the same volatility as firm survival rates do? That is, how many startup jobs disappear only a year after they are created? This report looks first at employment in new firms as they age and, second, examines the impact of recessions and downturns on employment in young firms.

Approach and the Data

We approach this question of lasting employment from startups by looking at a more detailed tabulation of the BDS dataset used in Kane (2010). The BDS gives data on firms and their establishments according to firm age for each of the first five years after the birth year and in five-year blocks thereafter (age 6–10, 11–15, 16–20, 21–25 and 26+).[5] The data begin in 1977 and end in 2005, providing twenty-four cohorts of firms to examine.[6] By following these cohorts as they age, we can test the durability of job creation by startups.

Before getting into the data, it is first useful to examine how the volatility of startups fits into employment from startups. To do this, we look at the accounting on employment as enumerated in the BDS. The BDS tracks employment numbers at the establishment level, where an establishment is "a fixed physical location where economic activity occurs."[7] A new Wal-mart store, for example, would constitute a new establishment but would not count as a new firm. From here, the BDS puts employment growth and contraction from year to year into four categories: jobs added from firms adding new establishments, jobs added from firms expanding existing establishments, jobs removed from closing establishments, and jobs removed from shrinking establishments. Put into a formula, change in employment from year to year looks like this:

$$\triangle Emp = (JNewEst + JExpandingEst) - (JClosingEst + JShrinkingEst)$$

The groupings in the equation separate the two essential parts that make up changes in aggregate employment: firm growth (the left grouping) and firm contraction or failure (the right grouping).

If a given number of firms start in year t, say N firms, that number can only hold steady or decline

1. See BLS, 2010, "The Employment Situation—June 2010," BLS News Release. Available at http://www.bls.gov/news.release/pdf/empsit.pdf.

2. See Haltiwanger, John, Ron S. Jarmin, and Javier Miranda, 2008, "Business Formation and Dynamics by Business Age: Results from the New Business Dynamics Statistics," CES preliminary paper. http://webserver03.ces.census.gov/docs/bds/bds_paper_CAED_may2008_dec2.pdf. Downloaded July 20, 2010.

3. See Kane, Tim. 2010. *The Importance of Startups in Job Creation and Job Destruction.* Kauffman Foundation Research Series: Firm Formation and Economics Growth. Available at http://www.kauffman.org/uploadedFiles/firm_formation_importance_of_startups.pdf.

4. See Stangler, Dane. 2010. *High-Growth Firms and the Future of the American Economy*. Kauffman Foundation Research Series: Firm Formation and Economic Growth. Available at http://www.kauffman.org/uploadedfiles/high-growth-firms-study.pdf.

5. Kane (2010) gives a more detailed description of the entire dataset in his Appendix 1.

6. The data stop in 2005; therefore, the cohort of firms started in 2000 are the last cohort where full data is available.

7. See BDS. 2008. BDS Overview. U.S. Census Bureau: Business Dynamics Statistics. Available at http://www.ces.census.gov/index.php/bds/bds_overview.

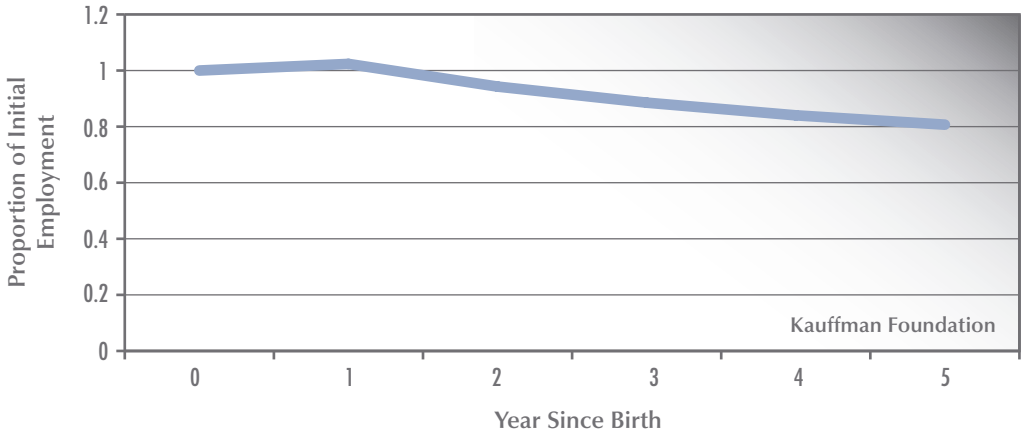
each successive year. Firms either survive (expanding, contracting, or holding steady in employment) or fail. Adding to the number of firms is simply not possible for that year-group because firms by definition cannot start at one year old. For employment, though, as the equation above shows, growth is an option. Therefore, the volatility in firm survival rates might have little bearing on the numbers of total employment in that year-group because, just as some firms fail in their first year, others experience tremendous growth.

It bears noting that the existence of employment growth does not mean that jobs don't get destroyed as firms go out of business—this actually is exactly what happens—but that this kind of job destruction can be balanced out by job creation at surviving and thriving firms. The combination of job destruction and job creation traditionally is called employment churn. Due to this churn—destruction and creation—it is possible that many of the jobs created by startups each year also get destroyed as these firms fail. However, if we are interested in total employment in a cohort of firms, we know that job destruction is only half of the story. We need to look at growth as well to see the whole picture.

Total Employment as Firms Age

Figure 1 shows the average employment of all firms as they age from year zero (birth) to year five.[8] The jobs created by startups when they come into existence do not disappear overnight. In fact, they are remarkably durable. When a given cohort of startups reaches age five, their employment level is 80 percent of what it was when it began. In 2000, for example, startups created 3,099,639 jobs. By 2005, the surviving firms (half of those that had started) had a total employment of 2,412,410, or about 78 percent of the number of jobs that existed when these firms were born.

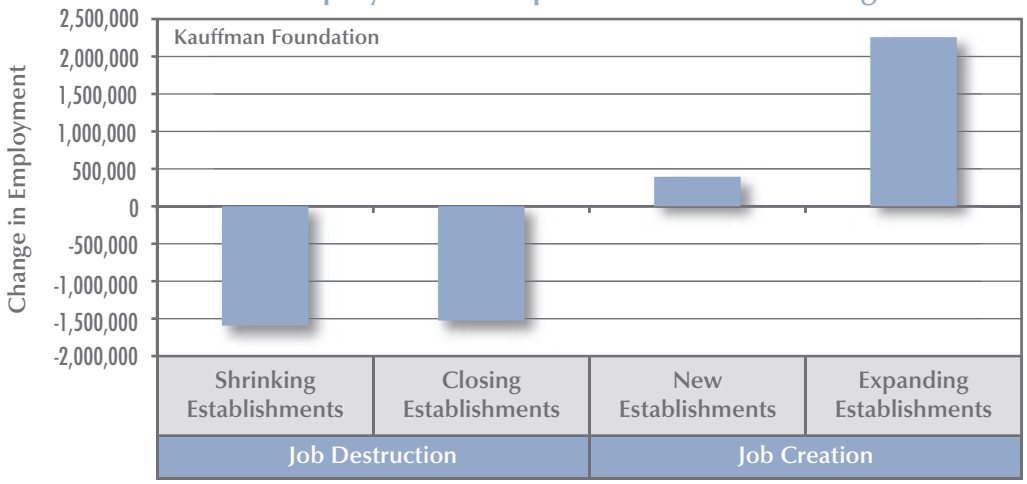
Figure 1: Total Employment in Firms as They Age



Source: Business Dynamics Statistics

8. See Appendix I for a non-aggregated version of Figure 1.

Figure 2:
Net Employment Composition from Birth to Age Five



Source: Business Dynamics Statistics

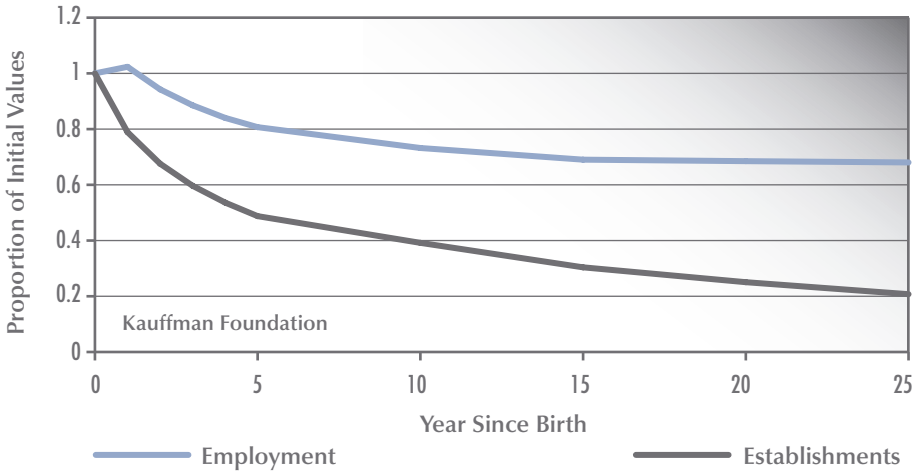
These numbers show that the job destruction caused by failing and contracting ventures is at least partially balanced out by the job growth that occurs at surviving firms. The BDS breaks out the data on job destruction, and the data show that from startup to year one, an average of 30 percent of the jobs that existed initially get destroyed in their first year due to firms exiting or shrinking. However, Figure 1 shows that this 30 percent destruction rate of jobs is more than offset by the job creation. In fact, from year zero to year one, average employment goes up just slightly. Though many startups fail in that first year, on average, total employment actually increases in the same period due to surviving firms growing and adding more jobs. This kind of employment churn becomes clearer as we look at the composition of net employment change and how establishments compare with employment in Figures 2 and 3.

Figure 2 decomposes where the age five numbers from Figure 1 come from in terms of the four categories presented in the formula in the previous section. Values in Figure 2 are averages across cohorts of the number of jobs lost and gained as a cohort reaches age five. The job destruction and creation are spelled out here explicitly. In a cohort's first five years, a substantial number of jobs are lost as establishments close and shrink. But establishments that expand and, to a lesser degree, establishments that open under existing firms, balance out this job loss. Thus we see that employment is kept afloat by firms that grow.

Figure 3 extends the analysis in Figure 1 to cohorts through twenty-five years. Since the BDS data are aggregated into five-year chunks after year five, these data points cannot immediately be compared to those in Figure 1,[9] but, following these five-year groups of firms, we are able to get a rough idea of

9. Data points past year five are created by tracking five-year groups of firms. For instance, the firms started from 1977 to 1981 make up five consecutive cohorts of firms. When the 1981 cohort is one year old, the 1977 cohort is five years old. Five years later, this group (the 1977 through 1981 firms) is now six to ten years old, and thus are data available for this entire group in the BDS.

Figure 3:
Employment vs. Establishments



Source: Business Dynamics Statistics

where these measures stand several years down the road. We see that twenty-five years after firms start, only about 20 percent of establishments are still in existence, but the employment numbers appear to level off at around 68 percent of their initial values. The fact that establishments have decreased so rapidly yet employment has more or less leveled out means surviving firms continue to grow, but also that employment churn continues even as firms age. Firms fail, but growth, even at these well-established firms, continues, keeping employment from dropping with the number of establishments.

How Do Recessions Affect Employment in Startups?

Given the recent recession, it is natural to ask how recessions generally affect total employment in startups. We tackle this question by first categorizing years in the data period (1977–2005) as either non-recession or recession years as defined by the NBER.[10] A "recession year" for our purposes includes any portion of a year in which the economy was officially in recession.[11] From here, we create comparisons across cohorts as they survive through these recession years, and we make two classifications: whether or not a cohort of firms was started in a recession year and how many recession years (out of a total of five) cohorts lived through.

Figure 4 compares cohorts started during recessions against those that were started in non-recession years. The figure indicates that being started in a recession does adversely affect a cohort's employment in its first, second, and third years. However, the two series converge to similar values in the fourth and fifth years.[12]

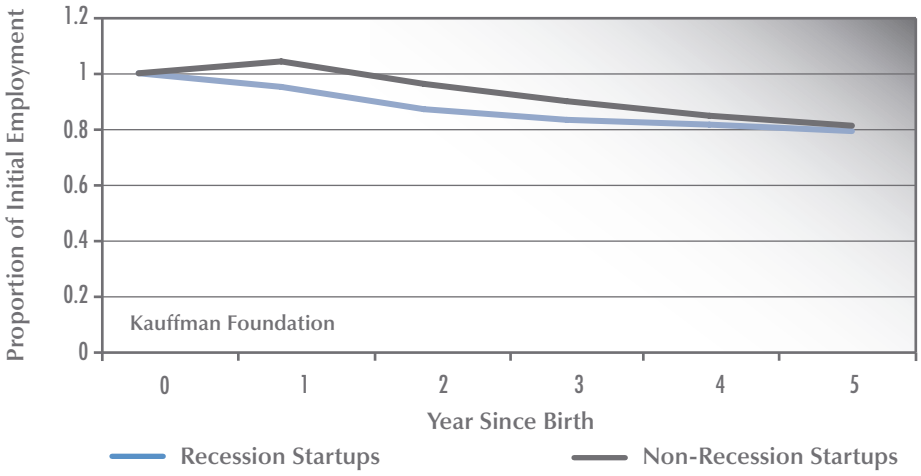
We interpret Figure 4 to mean that the consequences of starting a firm in a recession do not last. Though firms started in a recession year hire less in their second year, at age five, their employment reaches roughly the same level as firms

10. See NBER. 2010. *Business Cycle Expansions and Contractions.* National Bureau of Economic Research. Available at http://www.nber.org/cycles.html.

11. Recession years in this analysis are: 1980, 1981, 1982, 1990, 1991 and 2001.

12. It is worth noting that starting in a recession year does not significantly lower a cohort's starting employment. Therefore, comparing cohorts in this way is not thrown off by substantially different starting values of employment.

Figure 4:
Employment in Firms Started in Recession Years

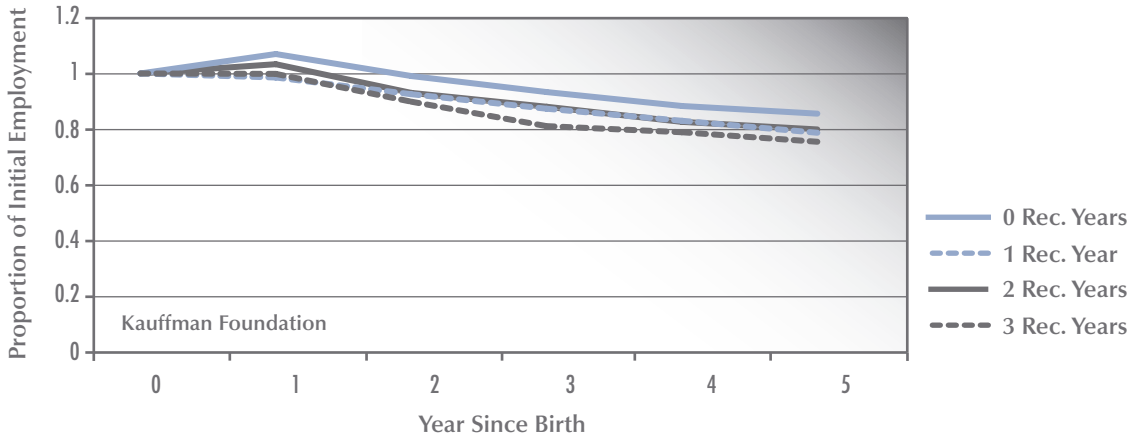


Source: Business Dynamics Statistics, NBER

that were not started in recessions. These results provide at least some hope that recent and current startups will experience a similar catch up in the years to come.

One catch, however, is that, as Figure 5 outlines, cohorts of firms can be damaged by being exposed to prolonged or repeated recessions. In particular, Figure 5 shows employment for cohorts separated by how many of each cohort's first five years were recession years. As in the previous chart, firms weathering recessions do worse off initially, but cohorts of firms living through many recession years seem to consistently have lower levels of employment. Furthermore, there doesn't appear to be the kind of convergence that was present in the previous chart.

Figure 5:
Firms Weathering Recession Years



Source: Business Dynamics Statistics, NBER

Implications of the foregoing charts run both ways. While starting in a recession doesn't hurt a cohort of firms' employment, being exposed to prolonged recessions does. The current recession is the longest in several years; thus, cohorts that started right before or at the start of the current recession might have been significantly affected. On the other hand, as the U.S. economy climbs its way out of recession, the cohorts of new firms started now likely will not be affected similarly as they will have survived through fewer recession years.

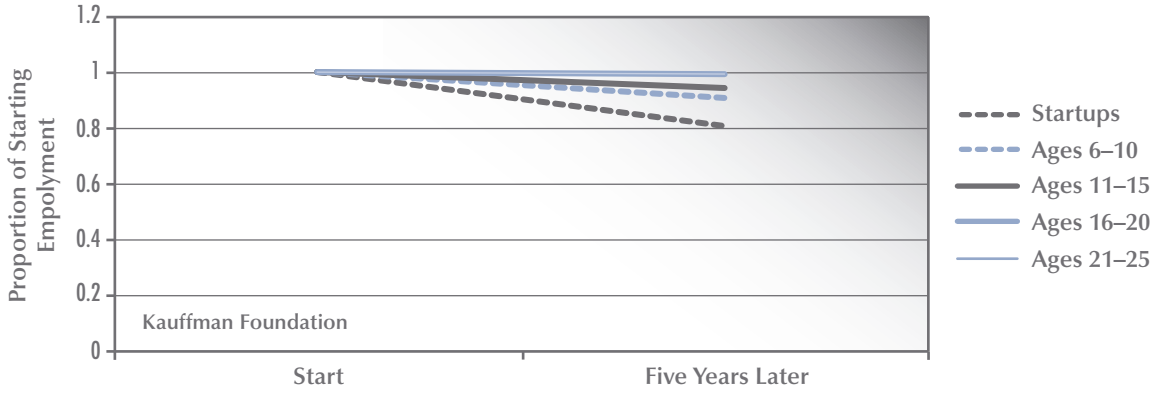
Startups as Compared to Established Firms

The analysis so far has covered the data, but has yet to include much in the way of whether or not the employment retention we see in startups is "good" or "bad." We have seen that employment follows a different track than establishment survival; however, it is not an opposite track. Employment in a cohort of firms is highest in its first years and declines steadily after that. Certainly an 80 percent retention rate over five years could be seen as better than the 50 percent survival rate of firms over this same period, but the question remains: What exactly defines "better?"

One way to define "better" is to compare the employment retention rate of cohorts of startups with the retention rates of cohorts of established firms. Figure 6 does this. As outlined in Figure 1, cohorts retain 80 percent of the jobs they create at birth five years later. Figure 6 compares this retention rate with the employment retention rate of older firms as they age. Cohorts six to ten years old retain about 91 percent of their employees after five years. For cohorts eleven to fifteen years old, the number is 94 percent, and for cohorts sixteen to twenty-five, the retention rates are almost 100 percent. Again, we should emphasize that this doesn't mean the jobs themselves are kept; rather, the figure reports the total numbers of jobs. As Figure 3, shown earlier, highlights, employment churn occurs well into a cohort's lifecycle.

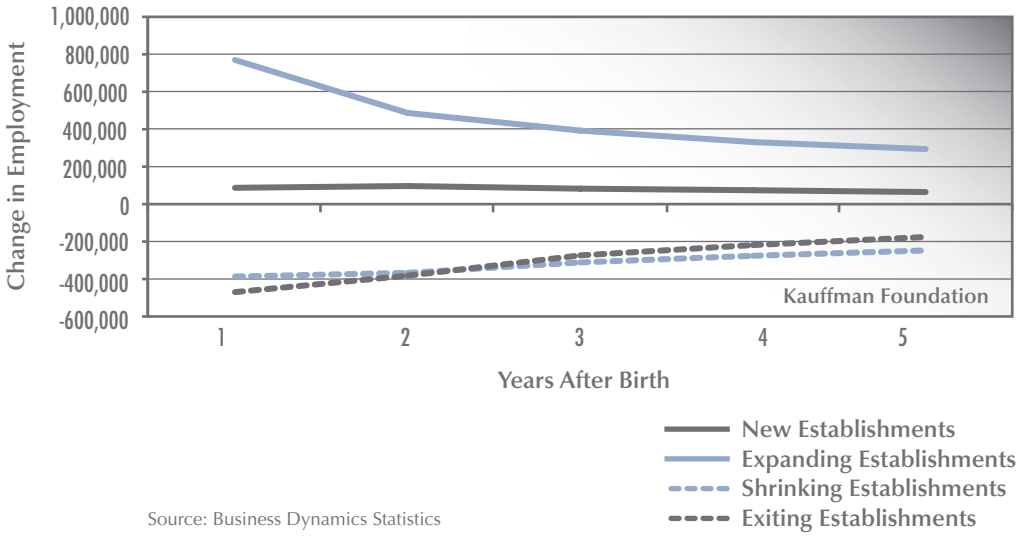
From Figure 6, the conventional wisdom—that startups and, thus, employment in startups are

Figure 6:
Employment Retention Rates



Source: Business Dynamics Statistics

Figure 7:
Net Employment Composition Over Time



Source: Business Dynamics Statistics

highly volatile—is at least partially correct. Groups of startups, in terms of their total employment, are more volatile than groups of established firms. It might be tempting, then, to say that startups should raise their employment retention rate. However, this summation overly simplifies the relationship between startups and established firms.

The fact is that startups, if they survive, become the established firms, and changes in startups early on would inevitably affect how these startups look when they become established. For example, a lower retention rate of 80 percent could lead to the higher retention rates later on as weaker firms get weeded out. From this perspective, we might think a *higher* failure rate in the first few years would be best. That way, the firms that fail would fail sooner, improving job retention later. But, again, this analysis could be oversimplifying the dynamics between startups and established firms. If we were able to pick out the winners while removing the others—a highly difficult if not impossible task in and of itself—there might be consequences in terms of the amount of competition we would see between remaining firms. The winners might be a product of the endless innovation and hard work that is a result of needing to compete; thus, removing the less-fit competitors too early would produce lower-quality firms overall.

The dynamics of business formation are complicated. The question of whether or not cohorts of firms create and hold onto the "correct" number of jobs is difficult at best. However, we can say that the employment created by new firms (while constantly shifting due to employment churn) is less volatile than we might expect, and that this is a good thing. It means there is a degree of stability to startups that some readers may find surprising. While firms fail in great numbers right after they start, destroying jobs, those that grow open up new doors. These new opportunities are the new jobs.

Figure 7 shows the average number of job creation and destruction, broken out by its different parts. This chart again highlights the churn in newly created firms, but it also highlights the employment growth in new firms. Jobs added from new

establishments are consistent over time yet are few, but job creation from expanding establishments is quite high in the early years and decreases substantially as these firms age. Therefore, though young firms experience the most risk, uncertainty and volatility, they also experience the most new job creation and the opening up of new opportunities.

Conclusion

In this report, we examined a dataset from the U.S. Census Bureau on business and employment dynamics to find out what happens to the jobs created by new firms as these firms age. It is well established that, though many startups get formed each year, a great many of these also fail only a few years later. Whether or not employment from these new firms follows the same kind of pattern was unclear because, unlike the number of startups in a given cohort, employment in a cohort has the possibility to grow.

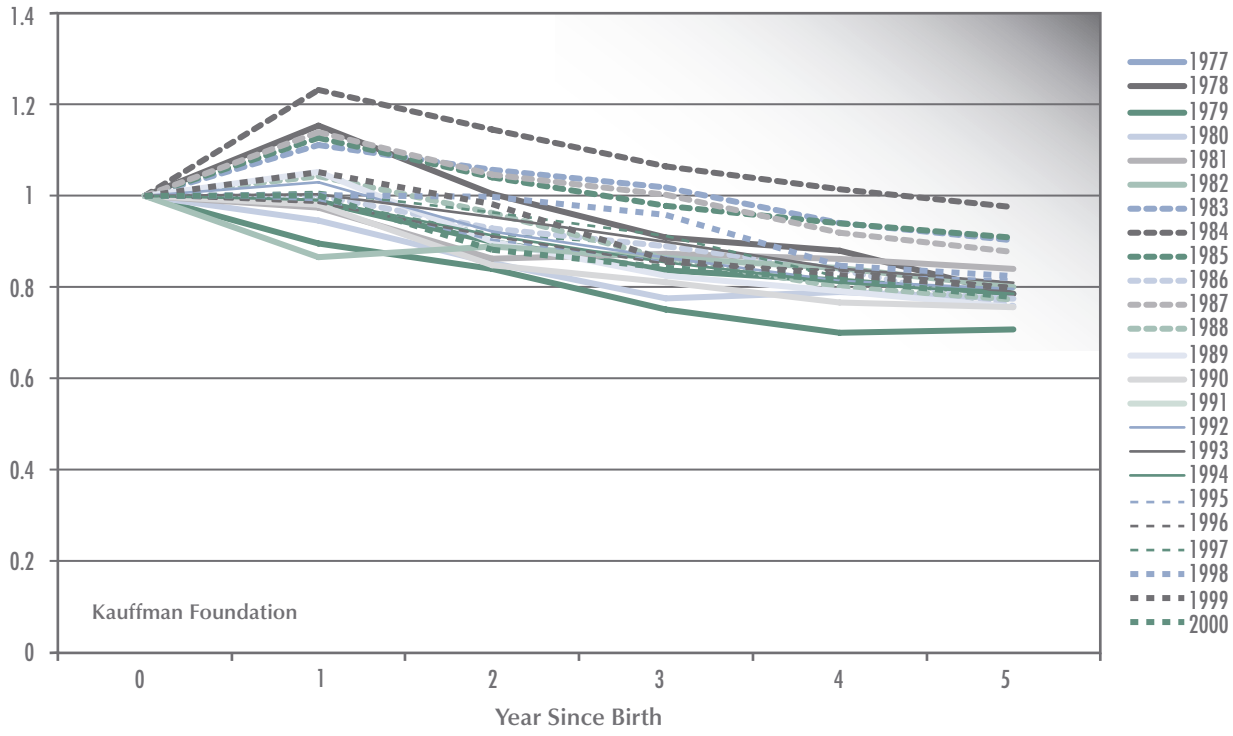
While employment declines over the life of a cohort, it does not mirror the survival rate of startups. For cohorts of firms started in 1977 to 2000, after five years, on average, 80 percent of the number of jobs that were created initially still exist in that cohort, while establishments have decreased by more than 50 percent over this same period. Further, as firms age, aggregate employment numbers appear to level off to a little more than 65 percent per cohort while the number of establishments continues to decline to 20 percent and below. This marked difference between employment and establishment survival outlines the employment churn that occurs in these cohorts of firms. While many firms fail in a cohort, destroying jobs, many also thrive, creating jobs. Further, this kind of churn appears to continue through a cohort's lifecycle as the number of establishments declines over time while total employment does not (or does so much more slowly).

We also looked at the relationship between recessions and the employment numbers, and found several things. The good news is that startups, in terms of total employment, do not appear to be affected in the long term if they start in a recession. They hire fewer people in the first few years, but they seem to catch back up to firms not started in a recession year as the cohorts age.

The bad news is that prolonged or successive recessions do appear to hurt employment in cohorts of firms. Cohorts of startups surviving through three recession years had about 10 percent less employment than those surviving through none. This amounts to a difference of about 300,000 jobs, or around 0.2 percent of all jobs in the economy. While this might seem like a very small number, the kind of convergence we saw looking at firms started in recession years either does not exist for cohorts of firms weathering many recession years, or it occurs over a much longer time horizon. Therefore, while the number of jobs lost due to prolonged or repeated recessions appears to be small, these small differences might compound over the years and across cohorts to create a lasting mark on the economy.

In the question of where new employment comes from, it is true that new startups matter. But if we are looking for employment that lasts, growth among these new businesses also is vital. Starting a business is often a risky endeavor. As such, many firms fail in their first few years, and the jobs that were created in these firms disappear as they fail. Without substantial growth on the part of surviving firms, the employment numbers would evaporate over the course of only a few years, creating little impact on the economy. Fortunately, the data show that this kind of growth exists, and it occurs every year.

Figure 1.5:
Total Employment in All Cohorts



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