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Creative Destruction and Cycles in the US Capital Market: Evidence from Fortune 500 Firms

by

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Abstract

The paper analyzes the relationship between creative destruction and cycles in the US capital market. Creative destruction in a year is measured by the number of new firms in the Fortune 500 list. Creative destruction is found to be positively associated with smoothed annual returns based on the Dow Jones Index (DJI), signifying that new entries in Fortune 500 tend to be more during boom than during recession years. Easier financing of innovative ideas during boom is hypothesized as a reason behind such positive association.

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1 Introduction

A major manifestation of “creative destruction”, as defined by Schumpeter (1950), is replacement of old and leading incumbent firms by more actively innovative new firms. Schumpeter (1950) associated creative destruction to cyclical activities in an economy. Extending his arguments, economists have attempted to relate historical episodes of innovation to creative destruction. Historically, such episodes tended to occur in the form of cycles of long duration.¹ However, despite attempts to relate creative destruction to business cycle over long-run, there is little evidence of a clear short-run relationship.

In this paper, we attempt to relate creative destruction to short-run cyclical movements in the capital market. Empirically, a possible way to measure creative destruction is to restrict one’s attention to a certain number of “elite” firms and to examine the extent of replacements in the list over a time period. Empirical results in this paper are based on Fortune 500 firms from the year 1955 to 1994.² In case of US, earlier literature has shown that there exist substantial movements of new firms in Fortune 500 (Kirchhoff, 1989), with most of these replacements in or around ranks 401-500 (Norton, 1992). In this paper, we attempt to relate the number of new entries in a year to cycles in the capital market. The reason for choice of the capital market is that innovations often require financing. Hence, our hypothesis is that entry into the elite club will be more when the capital market is experiencing a healthy rate of expansion, because this is the phase when innovations by relatively smaller firms would tend to get more financial support.

The plan of the paper is as follows: Section 2 presents data and empirical results. Section 3 concludes the paper.

2 Data and Empirical Results

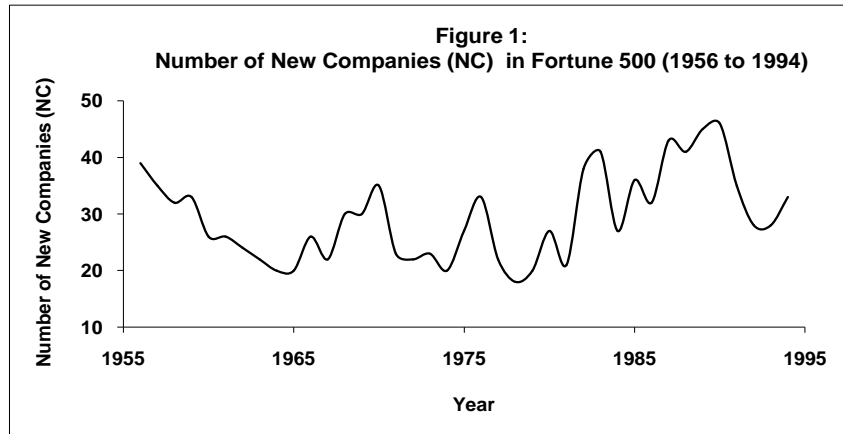
Fortune 500, an annual list collected and published by the Fortune magazine, ranks the top 500 U.S. public corporations in terms of their gross revenue. For any year, a natural measure of creative destruction would be the number of new entries in the list for that particular year.³ Figure 1 presents the number of new firms (NC) entering into the list from 1956 to 1994.

¹ The existence of at least five such historical episodes of high innovation [e.g., (i) industrial revolution, (ii) steam and railways, (iii) steel, electricity and heavy engineering, (iv) oil, automobile and mass production and (v) information and telecommunications] is well documented. The apparent stability in gaps between successive episodes have led some economists to propose the existence of Kondratiev-type long-wave cycles whose periodicity could be more than 50-60 years.

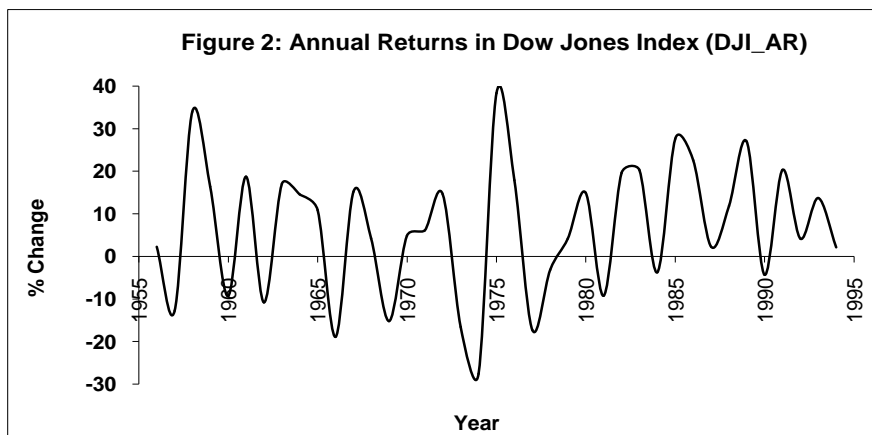
² In 1995, Fortune 500 list was redesigned. Since then, the list encompasses elite firms worldwide rather than only US firms. That is why we have restricted our study till 1994.

³ Another competing measure of creative destruction would be the average change in rank of all the common firms in the list in two consecutive years. However, the correlation between number of new entries and average variation in rank is as high as 0.99 in our reference period. Thus, separate analysis with respect to the second variable will lead to little value addition.

Figure 1 confirms that in any year the number of new entries typically varies between 20 and 40, a fact also observed in earlier studies (Kirchhoff, 1989; Norton, 1992). Figure 1, however, reveals the existence of cyclical movements. The first order autocorrelation coefficient of NC in Figure 1 is 0.63, indicating a moderate level of persistence. Higher order autocorrelations and partial autocorrelations of NC are smaller and there is no evidence in favour of unit roots.



To examine the relationship of creative destruction with cycles in the capital market, the market index considered in the paper is the Dow Jones Index (DJI). DJI is one of the most widely used indicators of the overall condition of the US stock market. DJI is a price-weighted average of 30 actively traded blue chip stocks, primarily industrials. Figure 2 presents the average annual returns in DJI (DJI_AR) during the reference period (i.e. 1955-1994). As evident in Figure 2, the data for annual returns show an erratic pattern. However, Figure 2 also reveals the possible existence of longer cycles in DJI_AR. To capture these cycles, we smoothen the series using a moving average of 3 years, the variable being referred as DJI_MA.⁴ DJI_MA exhibits a moderate level of persistence, the first order autocorrelation being 0.55. ADF test reveals that DJI_MA does not have any unit root.



⁴ A moving average of 3 years duration is likely to capture short-run Kitchin-type inventory cycles, whose periodicity tends to be within 3 to 5 years.

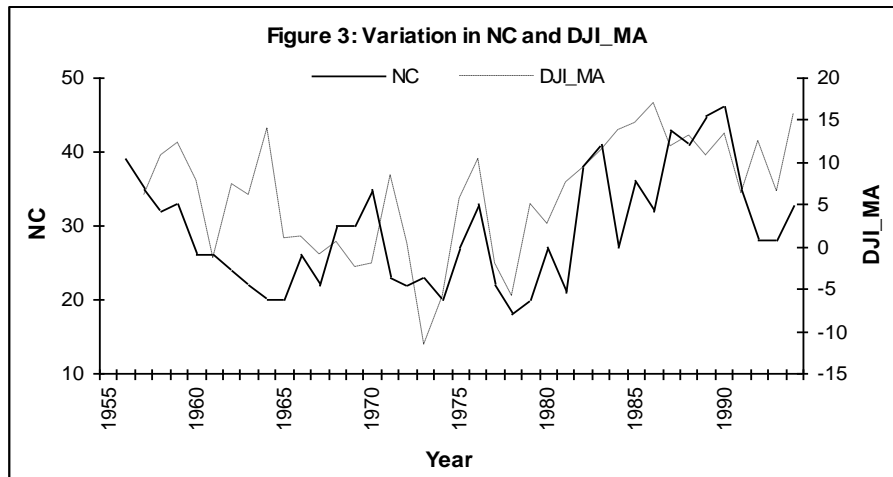


Figure 3 juxtaposes the movements in NC and DJI_MA. To appreciate the synchronous movements, the series are plotted with different scales. The correlation between NC and DJI_MA is 0.53. To examine the relationship more rigorously, NC is regressed on its first lag [referred subsequently as NC(-1) and DJI_MA].⁵ The estimated equation is as follows:

$$(1) \quad NC = 13.02 + 0.48 NC(-1) + 0.32 DJI_MA$$

(3.41) (3.49) (2.06)

$$R^2 = 0.47, \text{ Durbin's } h = -0.96$$

[Figures in bracket are t-statistics]

The significance DJI_MA in equation (1) indicates a positive association between smoothened annual returns in the US capital market and entries of new firms in Fortune 500 list. The value of R^2 in equation (1) is 0.47, which is moderate in case of financial data. The estimated coefficients reveal that about 1.6 percentage points increase in DJI_MA on an average lead to the inclusion of one more new firm in Fortune 500 (at the cost of old ones) in the long run. Results, therefore, suggest that the movements in stock market have a moderate impact on creative destruction.

3 Conclusion

The paper analyzed the relationship between creative destruction and cycles in the US capital market. Creative destruction in a year was measured as the number of new firms in the Fortune 500 list and Dow Jones index was considered as a representative of the US capital market. Results revealed that creative destruction was positively associated with cycles of about 3 years duration. Further, new entries in Fortune 500 were found to be more during boom than during recession years.

⁵ The first lag has been added to take care of persistence. Initially, to test for the role of political patronage, the regression equation also included a dummy variable called New_President that took the value unity in the first year of a new US president in office. Expectedly, the variable did not turn out to be statistically significant. This is because in a developed market like that of the US, political effects on any industry, sector or a particular firm are likely to be minimal. Hence, subsequently the variable was dropped from the model.

During the boom phase, a substantial part of an economy functions well. Consequently, relatively smaller and unknown firms with innovative ideas or better execution powers, who so far have been deprived of adequate financing, replace the established leaders. We hypothesize that this could be one major reason why the number of new entries in Fortune 500 was more during booms than during recessions. A possible extension of the research would be to examine similar data for other economies.

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