The relative-age effect and career success: Evidence from corporate CEOs

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ABSTRACT

This paper finds that the number of CEOs born in June and July is disproportionately small relative to the number of CEOs born in other months. Our evidence is consistent with the "relative-age effect" due to school admissions grouping together children with age differences up to one year, with children born in June and July disadvantaged throughout life by being younger than their classmates born in other months. Our results suggest that the relative-age effect has a long-lasting influence on career success.

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If you make a decision about who is good and who is not good at an early age; if you separate the "talented" from the "untalented"; and if you provide the "talented" with a superior experience, then you're going to end up giving a huge advantage to that small group of people born closest to the cutoff date.

Malcolm Gladwell, 2008, Page 25

1. Introduction

There is mounting empirical evidence that children born right before the school admission date are at a disadvantage as a result of being up to a year younger and less physically and intellectually developed than classmates in their school grade. As a result, these children are selected for fewer leadership roles in school activities in their beginning school years. For example, other things being equal, children born in the months right before the cutoff date of school admission are less likely to be a sports team captain or be chosen for a speaking part in school plays. This well-documented condition has become known as the "relative-age effect" or the "birth-date effect".[1]

This paper investigates whether a relative-age or birth-date effect extends to the selection of CEOs of S&P 500 companies. Given the high level of corporate achievement such positions represent, and the relatively fierce competition faced in reaching such positions, CEOs represent an ideal context for studying the evidence for such an effect, and to investigate whether it extends beyond school into adulthood.

US schools' admission cutoff dates typically fall between September 1st and January 1st, making children born in the summer months of June, July and August the youngest in their class (Simon and Grant, 1967). However, to the extent that parents hold back their children born just before the cutoff dates due to their relative immaturity and possible parent awareness of the relative-age effect (see Graue and DiPerna (2000) and Noel and Newman (2003) for example), children born in August may be among the oldest. For this reason, it is the children born in June and July who are likely to be the youngest among their classmates and thus be most affected by the relative-age effect: August-born admissions will consist of the youngest and the oldest in class. Consistent with this, we expect and do indeed find that individuals born in June and July have a significantly lower chance of becoming a CEO than those born in other months. This occurs relative to both an equal division of births across months, and relative to the actual monthly pattern of births. Our results are broadly consistent with the view that relative-age effects significantly influence people's actual or perceived leadership ability. To quote the abstract from one research paper

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[1] For sports, see Glamser and Vincent (2004) and Esteva et al. (2008) for example; for academic performance, see Bedard and Dhuey (2006) and Angrist and Krueger (1991) for example.

Table 1
Number of CEOs by month.

	CEO number (1)	CEO percent (2)	Percent of days in a year (3)	Percent of US population (4)	Test of differences (2)–(3) (%)	Test of differences (2)–(4) (%)
June + July	45	12.00	16.71	16.91	−4.71***	−4.91***
June	23	6.13	8.22	8.16	−2.09*	−2.03*
July	22	5.87	8.49	8.75	−2.62*	−2.88**
Other ten months	330	88.00	83.29	83.09	4.71***	4.91***
Total	375	100	100	100		

The sample consists of 375 CEOs of S&P 500 companies from 1992 to 2009. Column (1) presents the number of CEOs born in the respective months. Column (2) presents the number of CEOs born in the respective months as percentage of the total number of CEOs. Column (3) presents the number of days in the respective months as percentage of the total number of days in a year (365). Column (4) presents the percentage of births of US population in the respective months.

* Statistical significance at 10% level.
** Statistical significance at 5% level.
*** Statistical significance at 1% level.

in this area, "…school entry cutoffs induce systematic within grade variation in student maturity, which in turn generates differences in leadership activity. We find that the relatively oldest students are 4%–11% percent more likely to be high school leaders", (Dhuey and Lipscomb, 2008). Kuhn and Weinberger (2005) also showed that students who acquired leadership skills during high school are more likely to have managerial positions 11 years later. Our paper is the first to investigate the importance of the relative-age effect in the context of selecting corporate CEOs.

2. Empirical analysis

In order to investigate the possible presence of a relative-age effect among high achieving US CEOs we collect birth-date information for the CEOs of S&P 500 companies between 1992 and 2009. Based on ExecuComp database, we first identify the names of the CEOs, and then search for their birth-date in the Biography Resource Center, which provides comprehensive biographic information of notable individuals in business, art, government, and other endeavors. We are able to identify birth-date information of 375 CEOs.

Table 1 shows the number of CEOs sorted by birth month. We see 45 of the 375 S&P 500 CEOs were born in June and July, representing only 12% of our sample CEOs. In determining the statistical significance of the number of CEOs born in June and July, we define a dummy, *JuneJulyCEO*, as one if the CEO is born in June or July and zero otherwise. With the null-hypothesis that the population birth number is uniformly distributed throughout the year, we conduct a two-tail t-test versus the null that *JuneJulyCEO* = 16.71% ($(30 + 31)/365$). The null is rejected at the 1% level.

In actual fact US births follow a seasonal pattern rather than a uniform distribution (Nunnikhoven, 1992). In order to more precisely judge the relevance of relative-age effects, we further compare the proportion of CEOs born in June and July to the proportions of the US population born in these two months.[2] In the US, 16.91% of the population is born in June and July, which is slightly higher than 16.71% with a uniform distribution. It is apparent that the result that fewer CEOs are born in June and July is not because of the seasonality of births. Indeed, when we re-do the t-test with the null hypothesis: *JuneJulyCEO* = 16.91%, the null hypothesis is rejected at the 1% level.[3]

Further examining June and July separately, we find that 6.13% (22) of sample CEOs are born in June, which is significantly smaller than the uniformly-distributed birth rate (30/365 = 8.22%) or the actual US birth rate in June (8.16%). Similarly, 5.87% (23) of sample CEOs are born in July, significantly smaller than the uniformly-distributed birth rate (31/365 = 8.49%) or the actual US birth rate in July (8.75%).[4]

To the extent that most states began to have state-mandated cutoff dates for school entry after 1960, CEOs born in 1955 or later are more likely to be affected by admission cutoff policy. As a robustness check, we examine the subsample of 43 CEOs born in 1955 or later. Out of these 43 CEOs, only one CEO is born in June and two CEOs are born in July: the number of CEOs is distinctly underrepresented in June and July.

3. Conclusion

This paper contributes to a growing literature about the relative-age effect, whereby younger children born in June and July are at a disadvantage versus their older classmates born in other months in sports and academics. Based on a sample of S&P 500 CEOs we document that CEOs born in June and July are underrepresented. Our study extends the relevance of relative-age effects from school to the world of business, and suggests that relative-age effects have a long-lasting impact on career success.

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[2] We collect the information of monthly births of the US population during 1917–1968 (the range of CEOs' birth year in our sample) from the annual Vital Statistics of the United States, Natality Series, Volume I, published by the Centers for Disease Control and Prevention (http://www.cdc.gov/nchs/products/vsus.htm).

[3] We do not attempt to construct a regression model that controls for other characteristics that might influence the likelihood of a person attaining a CEO position because we would need the birth information for a control group, and this information cannot be found in any public database.

[4] There are 32 CEOs born in August, which is not significantly different from the uniform-distributed birth rate or the actual US birth rate in August. This is consistent with some August-born children being held back for school entry, making August-born children among the youngest and oldest in class.

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