Article

Planes, Trucks, and Ferris Wheels: Impacts of Market Developments on Industry Structure and Profitability

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Abstract

This project explores the impacts of four market developments in the air transportation, computer technology, theme park entertainment, and truck transportation industries on firm annualized returns and market structure. Analyzing such developments helps inform how to best react to current events of similar caliber as they begin to impact market structure and profitability. Previous literature studied such effects on intra-firm and inter-industry behavior but has so far lacked direct analysis of industry-wide impacts. Combining data from Compustat and NYU's Stern School of Business, I employ regression discontinuity design to decompose the immediate and lagged impacts of critical events on annual stock close prices and annualized returns. The air transportation, computer technology, and theme park entertainment industries demonstrated an immediate decrease in annualized returns of 29.9, 57.5, and 3.8 percentage points respectively, while the truck transportation industry demonstrated a 17.6pp increase. Lagged effect analysis yielded consistent results with the initial regression and industry analysis, save the theme park transportation industry which saw a 5.06 percentage point increase in returns. All four industries experienced considerable increases in new entrants, bankruptcy, and mergers following critical events, with very few dominant players from the year of each critical event persisting until the present.

Keywords: Transportation, Entertainment, Stock Returns, Profitability, Merger, Bankruptcy, Computers, 1980, Great Stagnation

1. Introduction

In his 2011 pamphlet *The Great Stagnation: How America Ate All the Low-Hanging Fruit of Modern History, Got Sick, and Will (Eventually) Feel Better*, economist Tyler Cowan argues that the United States economy entered an era of innovation stagnation in the early 1970s that has persisted through the present day. In my project, I explore the economic state of this so-called era of stagnation, from approximately 1970 until 1990, with a focus on technology, entertainment, and transportation. Contrary to Cowan's interpretation, the 1970s and 1980s were rich in economic development and activity. During this time, the technology, entertainment, and transportation industries experienced noteworthy change, approximated by four critical market developments: the opening of Walt Disney World in 1971, the passing of the Airline Deregulation Act of 1978 and the Motor Carrier Act of 1980, and the release of the IBM Personal Computer in 1981. Each development catalyzed rapid and disruptive change. In analyzing the impacts of these four market developments, or critical events, at the start of the Great Stagnation, I discover whether they had significant impact on profitability within each industry. Further analysis studies how the economic and regulatory changes impacted competitive landscapes and market structures, including if they influenced which firms survive to the present day.

At present, there are a considerable number of market developments that parallel the critical events of the 1970s and 1980s that have potential to similarly revolutionize their respective industries and the overall market economy. Recent innovations in artificial intelligence, transportation, specifically with electric and autonomous vehicles, and renewable energy are poised to change consumer purchasing demands and the operations of firms. As such, it is important to explore how market developments of this caliber shape market structure and profitability, and more precisely, whether such innovations are worthwhile for firms to develop and for consumers to invest in. At the same time, governments are increasingly considering the effects of these modern technologies, and whether it is worthwhile to allow them to operate unchecked or to regulate them. These four industries, accompanied by a strong selection of data, are varied and dynamic, providing opportunities for generalization across industries and scenarios outside the specific areas and time periods of study. By analyzing the impacts of four critical events across the start of the Great Stagnation, conclusions can be drawn on the impacts of such innovations or regulations, and how to best react to developments as they change their respective industries.

This type of market development, and the four critical events specific to this project, are infrequently studied by relevant economic literature. Both deregulatory acts – the Airline Deregulation Act and the Motor Carrier Act – are featured in research released shortly after their passage. This body of literature focuses on the impact of deregulation on consumers and its influence on firm pricing. Notably, research by Boisjoly and Corsi in 1982 observe no significant change of the makeup of the truck transportation industry as a result of deregulation. Comparatively, there is little research on the impact of the IBM personal computer nor the opening of Walt Disney World on their respective industries. While two 1998 and 2003 papers use the personal computer as a case study for cross-industry shocks and internal changes in profitability, there is little to no academic literature outside of historical descriptions on the theme park entertainment industry from 1970 through the 1980s.

In approaching the analysis, this project computes the impacts of the four critical events on the annualized returns and stock close prices of firms in the air transportation, computer technology, theme park entertainment, and truck transportation industries. By combining data from the Compustat database, a source of financials for over 80,000 active and inactive publicly traded companies, with S&P 500 financials from New York University's Leonard N. Stern School of Business, a comprehensive dataset of relevant companies is compiled together with correlated S&P 500 annualized return and close price for each year of a company's existence. With the assistance of an adjustment factor for the impacts of dividend payouts and stock splits, annual stock close prices are used to calculate the annualized rate of return for each firm. Two separate regressions utilize this data: regression (1) employs a regression discontinuity design that regresses an indicator for the critical event with interaction terms for years from the critical event to calculate a raw impact on annual stock close prices. Regression (2) uses identical regression variables but adjusts the output variable to annualized stock returns. Both regressions include a control for market performance approximated by the S&P 500 annual close price or annualized return.

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The regressions yield statistically significant results suggesting that each critical event impacts on the industry's overall profitability. While the truck transportation industry experiences an immediate increase in annualized stock returns of 17.6 percentage points following its critical event, the air transportation, theme park entertainment, and computer technology industries realize decreases in annualized returns of 29.9, 57.5, and 3.8 percentage points, respectively. Uniquely, the air transportation and computer technology industries see an eventually increasing profitability trend, while the results suggest continued or newly negative profitability trends for the theme park entertainment and truck transportation industries in the years following their critical events. All four industries experience increases in new entrants, bankruptcy, and mergers following their critical events, in most cases contributing to either immediate or eventual decreases in profitability as more firms existed in industries than markets could support. As a general result, very few dominant players from the year of each critical event persisted until the present day, with examples including Pan American Airways, Control Data Corporation, and Transcon Lines. By 1983, the air and truck transportation industries witnessed closures of twenty and seventy-two firms respectively, with most market-leading firms disappearing following deregulation. The theme park entertainment industry experienced a similar shrinkage, allowing for the growth of regional conglomerates like the Taft Corporation and Six Flags. While IBM dominated 80 per cent of the computer technology post-critical event, it lost control as competitors emerged. The industry followed a similar path to the transportation industry and experienced an increase in mergers and bankruptcies starting in the 1990s.

Robustness checks confirm that the regression results are significant in certain settings, and thus hold validity when analyzing the true impacts of the critical events. Additional analysis explores the lagged effects of each critical event, which remain relatively consistent with the initial regression results and industry analysis.

2. Background

2.1. History

As President Carter aptly described in his 1979 speech, the United States experienced a 'crisis of confidence' (Schneider) throughout the 1970s – confidence in government, social structures, and financial systems. Despite this skepticism, the 1970s witnessed rapid financial innovation, as the Nasdaq launched for the first time on February 8th, 1971, along with the Reserve Fund as the first U.S. money market fund; at the same time, the United States abandoned the Bretton Woods fixed exchange rate in 1971. The Reserve Fund, similar money market funds, and the flexible exchange rate played an outsized role in investments in the 1970s as inflation ran rampant and investors looked for guaranteed returns (Society, 2002), further contributing to the sentiment of distrust that President Carter described. This rapid inflation also impacted consumer habits which adjusted to favor lower-quality goods as prices rose, morphing into the consumerism that characterized the 1980s (Hill, 2011).

In the Decade of Excess – the 1980s – emerging corporate power and social changes transformed the U.S. economy to resemble that of today. With a larger focus on technology and entertainment, consumers began to utilize credit cards as commonplace purchasing tools and leaned further into material, disposable purchases (Hill, 2011). The United States economy began the 1980s in recession, a first running from January through July 1980 with a second from July 1981 to November 1982, resulting in a net loss of 3.1 per cent of total payroll employment across industries including communications and transportation. Following this set of recessions, industries took on a 'leaner look,' as the chief of National Estimates Lois M. Plunkert said in 1990, with many firms modernizing their production processes and the percentage of women in the labor force increasing from 51 to 57 per cent (Plunkert, 1990, 3-16).

The 1980s also saw legislative revision, with acts like the 1984 Cable Communications Policy Act deregulating telecommunication companies and providing firms with more power over pricing and investment in the industry. U.S. President Ronald Regan attempted to combat the harmful inflation of the 1970s and early 1980s by focusing on deregulating corporate systems and encouraging his theory of trickle-down economics, which surmised that financial breaks for corporations and the wealthy would lead to more disposable income for consumers. Consumer demand slowed by the end of the decade, raising fears of another recession (Plunkert, 1990, 3-16).

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Coinciding with the beginning of this notable increase in consumerism, Walt Disney World opened in 1971 on the outskirts of Orlando, Florida. At its start, the Walt Disney World complex was a single park, Magic Kingdom, with three connected resorts for visitors. The Walt Disney World property was only the second Walt Disney Company theme park at the time, though proposals for an international version existed since 1962 (Associated Press, 1994), and reaffirmed to developers and investors the continued potential of experiential entertainment and regional theme parks that the opening of Disneyland in Anaheim, California first demonstrated two decades earlier. Consumers remained interested in the Disney brand, the opportunity that the experiences presented, and the allure of theme park visits, with over 400,000 guests visiting the park in its first month of operation ('Disney World…', 2019).

In a possible attempt to dispel the crisis of confidence described in President Carter's 1979 speech, The Airline Deregulation Act and the Motor Carrier Act were passed in 1978 and 1980, respectively. Both acts, like the 1984 Cable Communications Policy Act, had unavoidable effects on their respective sub-industries. With their passage, companies maintained more power over their business operations and strategy, markedly outside of government regulation. Prior to their inception, the United States government only provided rights to companies for specific travel routes, including the direction of travel on those routes. For both trucking and air travel, routes were limited and fares restricted in attempts to limit competition and protect consumers and existing companies. Deregulation offered firms more flexibility in determining their travel routes, allowing them to maximize the transportation of people and products. Both laws contributed to a drastic structural shift within the industries, decreasing firm market power and opening the market for more entrants (Rose, 2012, 376-380; Boisjoly and Corsi, 1982).

Like the 1971 opening of Walt Disney World, the 1981 release of the IBM Personal Computer catapulted an increasingly profitable personal electronics industry towards market dominance. Before the IBM Personal Computer, other personal computer variants existed – the Apple II, the Commodore 64, the Atari Model 400 and 800, the Tandy Radio Shack-80 – but none received the widespread adoption of the IBM Personal Computer. Because of its easy clonability, the IBM Personal Computer also naturally grew a 'vast "ecosystem" of software, peripherals, and other commodities for use with the platform' (Computer History Museum, 2014). The innovations that accompanied the IBM Personal Computer still shape the industry today.

2.2. Relevant Literature

Literature covering the impacts of legislation and market developments during the establishment of the Great Stagnation is inconsistent. The Airline Deregulation Act of 1978 was, and remains, a popularly researched and discussed piece of legislation, with literature from the 1970s through the present exploring its development, underlying economic principles, and impact on consumers (Davis, 1982; Rose, 2012, 376-380). Understanding the consumer reaction to this legislation was paramount in determining its impacts on the airline industry (Davis, 1982), particularly when considering approximately 45 per cent of intercity airline travel originating in the business travel market alone. Like the Airline Deregulation Act of 1978, the Motor Carrier Act of 1980 is a point of significant academic enquiry because of its disruptive impacts on regional and national trucking industries. Existing literature explores the rationale behind the act (Corsi et al., 1982, 42-55), as well as its short-term effect on pricing and industry makeup (Ying, 1991, 264-273; Boisjoly and Corsi, 1982). Unlike the continued interest in the Airline Deregulation Act of 1978, the bulk of academic literature on the Motor Carrier Act of 1980 is limited to the decade following the law's enactment. Even so, research at the time found there to be no significant change in the makeup of the industry resulting from the law's passage (Boisjoly and Corsi, 1982).

Little to no academic literature aside from historical descriptions (Clavé, 2007) explores the status of the theme park entertainment industry during the 1970s and 1980s. There is, however, a significant body of amateur recordkeeping and relevant news reporting from the period in question. First-hand reports from websites like Ultimate Rollercoaster.com explore the history of the theme park boom of the 1970s, during which theme parks like those under the Six Flags moniker 'began to attract big-name corporate investors who saw [them] as a safe, new investing venture' (Sandy, 2006). Early investors in the theme park entertainment industry – including Taft

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Broadcasting, owner of Kings Dominion, Anheuser-Busch, owner of Busch Gardens, and the Marriott Corporation, owner of the 'Great American Parks' – saw the promise that regional amusement parks held, especially if patrons were willing to travel cross-country to visit landmarks such as Disneyland and Walt Disney World (Sandy, 2006). The New York Times reported in 1978 on the impacts of such amusement parks on the New Jersey economy, with State Commissioner of Labor and Industry Richard Goldman quoted as saying that they were "responsible for a genuine increase in [New Jersey's] tourist industry" (Sullivan, 1975). Despite the lack of academic research on the theme park entertainment industry in the 1970s and 1980s, the existing body of literature provides insight into the consumer engagement and financial investment that theme parks received.

Despite its persistence from the early 1970s through today, neither the financial impacts of the release of the IBM personal computer nor the personal computer in general are the subject of much literature save two papers from 1998 and 2003. In their 1998 work, authors Alan Reichert, James Moore, and Ezra Byler explore not the impact of the release of the personal computer on the technology itself, but instead its effects on the 'decision-making environment of large corporations' (Reichert et al., 1988). In short, the authors explore how firms in one industry react to shocks in another. These results are secondary to their main results on the impacts of the recessions of 1980 and 1982, efforts to deregulate industries including the transportation sector, and inflation on large US corporations and their internal financial analysis (Reichert et al., 1988). The 2003 paper by Barry Bayus, Gary Erickson, and Robert Jacobson follows a similar trajectory, but instead explores the impact of 'new product introductions on…drivers of firm value' (Bayus et al., 2003, 197-210). In their results, the authors find that these introductions do impact overall short-term profitability of firms, but not necessarily the long-term profitability. The impacts they found are limited to firms releasing the products themselves and explore the corresponding changes in advertising and impacts of decreases in marketing on firm profitability (Bayus et al., 2003, 197-210).

Overall, there is no significant literature that explores the trajectory of businesses nor industries following critical market developments at the start of the 1970s or 1980s. While literature does explore the short-term impacts of regulation on consumers, pricing, and industry structure as well as the intra-firm and inter-industry impacts of product releases, little is to be found that studies the impacts of similar critical events on firms across an entire industry.

3. Data & Methodology

This paper's analysis relies almost exclusively on the Compustat Financial Dataset. Produced by Standard and Poor's since 1962, Compustat is a comprehensive database of fundamental financials for over 80,000 active and inactive, publicly traded companies dating from June 1950 through the present day (S&P Global). Compustat provides financial ratio, company fundamentals, industry overview, index fund, and securities data; this paper's analysis employs the annual stock close prices for firms in each industry from 1951 until 2001 alongside annual company-specific adjustment factors, which combine to generate annualized stock returns.

Annualized stock returns act as a proxy for overall company profitability as they are both affected by the book value profitability of a firm, such that increases or decreases in profitability affect payouts to investors, as well as the intangible performance of a firm as reported through news outlets and consumer sentiment, as changes in stock price and returns are driven by market estimates of future profits and the discount rate applied to them. Annualized returns combine these tangible and intangible aspects of profitability into a single metric which simplifies the overall regression results. To generate annualized stock returns, Compustat provides a company-specific adjustment factor that acts to inflate or deflate a firm's per-share valuation based on stock splits and stock dividends that occur per year. Dividing a firm's stock close prices by this adjustment factor incorporates the effects of stock splits and dividends, thus extrapolating the true annual value of a firm's performance. The properly adjusted stock close prices are regressed alone in the first regression design and used to calculate the annualized stock returns for the second. Annualized returns are calculated with the standard formula for annualized rate of return, assuming a holding period of one and an annual gain or loss of the difference between the previous year and current year adjusted stock price.

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The inclusion of inactive companies in the dataset is of specific importance as one possible impact of all four critical events is the failure or closure of companies within the industries in question; despite their inactive status today, a critical event would have equally impacted inactive firms just as it impacted firms that remains in existence today. Including their data in each industry's overall dataset is helpful to see the impact of each critical event on both types of companies.

The annual close price and annualized return for the S&P 500 are employed as controls for overall market performance. Accounting for 'approximately 80% of available market capitalization' (S&P Dow Jones Indices, 2024), the close price and returns for the S&P 500 appropriately represent the change and growth that the market experiences year over year, just as firm-level annual stock close prices and annualized stock returns do. By using both as control variables, the effects of larger market pressures can be removed from changes in the dependent variable and the effects of each critical event isolated. A comprehensive dataset on the S&P 500 produced by Aswath Damodaran, of New York University's Leonard N. Stern School of Business, is used in each regression.

To analyze the effect of each critical event, I refined the Compustat dataset for each industry in question: air transportation, computer technology, theme park entertainment, and truck transportation. Each dataset was constructed using two methods. First, a list of industry leaders was compiled from primary sources and literature published around the time of each critical event, many of which had an outsized effect on consumer thought or industry structure. Section 5 explores these primary sources. Next, using North American Industry Classification System (NAICS) codes, the Compustat dataset was filtered and only companies that existed in the year of the critical event with specific, relevant NAICS codes were kept. A 'standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy' (United States Census Bureau, 2022), the NAICS offers a uniform way of selecting relevant companies affected by the four critical events. Oftentimes, the industry leaders gathered in the first method also appeared in the list of companies derived from the Compustat dataset, but a few instances occurred where certain companies were classified under a different code by NAICS due to business lines other than those of interest.

Once the subset of companies for each critical event was collected, the annual stock price close values and adjustment factors were compiled for each company across each industry and sub-industry, alongside active or inactive status. Data for each industry was limited to the twenty years preceding and following the critical event, a total of forty years, in an attempt to provide an appropriate window to observe the effects of each critical event while also removing the impacts of subsequent financial crises, such as the failure of the dot-com bubble, the financial crisis of 2007 and 2008, and the effects of the COVID-19 pandemic in 2020. The S&P 500 annual close and annualized return values from 1951 through 2001 were also applied from the NYU Stern dataset to the corresponding years for each company. The table below summarizes basic qualities of each dataset:

	Total Companies	Year of Interest	Data Range	Currently Active	NAICS Codes
Air Transportation	40	1978	1958 – 1998	8	7131
Computer Technology	227	1981	1961 – 2001	23	3341, 3342
Theme Park Entertainment	12	1971	1951 – 1991	6	4811, 4812
Truck Transportation	31	1980	1960 – 2000	2	4841, 4842

Table 1: Industry-Specific Data Characteristics

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As explained in section 2.2, Relevant Literature, there is no significant literature that follows each industry or sub-industry nor explores critical events within The Great Stagnation as this project intends to. The papers by Reichert, Moore, and Byler and Bayus, Erickson, and Jacobson, however, approach their questions in similar fashions, taking an exogenous change in another industry or within a firm and analyzing the impact on firm or industry profitability after the change. This project follows a similar pattern, instead using an exogenous change affecting an industry and analyzing its effects on the industry in its entirety. In approaching the four separate critical events, each is treated as a discontinuity for their respective industries. As such, the analysis employs regression discontinuity design, with firm data from before the critical event acting as 'untreated' values and those after being 'treated.' The dependent variable in the first regression is firms' annual stock close price, and annualized stock returns in the second.

To properly isolate the effect of the critical event into a single coefficient β, the regression design centers the effect around the critical event. It includes one indicator variable, indicating whether the outcome is before or after the critical event, and an interaction term, the product between the fiscal year centered around the critical event and the indicator for whether the industry is post-critical event. The indicator variable acts to identify whether the industry in question experienced the critical event; should the industry be pre-critical event, that indicator equaled zero, and would equal one in the case that the industry experienced the critical event. The interaction term between the centered fiscal year and the indicator provides information on the number of years post-critical event. With the regression centered at the critical event year and two interaction terms for year pre- or post-critical event, the coefficient β_1 corresponds to the instantaneous change across the critical event threshold for each industry, or the change in the predicted mean as a result of experiencing the critical event. A positive coefficient β_1 would suggest an increase in profitability because of the critical event, and a negative coefficient would suggest a decrease. The coefficients β_2 and β_3 represent the slope of the profit function before the critical event and the change in slope following the critical event, respectively.

As indicated by the four critical events, the Great Stagnation, although slow on innovation, was a period of significant economic development; this development was not limited to the four industries that this project explores. As such, it is important to control for cross-market variation that could resultantly affect the performance of companies in the air transportation, computer technology, theme park entertainment, and truck transportation industries. By introducing a control variable for the annualized returns of the S&P 500, which acts as a proxy for overall market performance and growth, such cross-market variation can be accounted for and the immediate effect of the critical events isolated into the coefficient β_1. The effect of overall market performance on industry-specific performance is observed via the coefficient β_4.

The final form of both regressions analyzes the effect of critical events on each industry via dependent variables of annual stock close price and annualized stock returns. Although the simplified annual stock close price provides less information in the first regression than annualized stock returns results provide in the second, it is useful in identifying possible trends in the effects of each critical event on industry performance. Even so, annualized stock returns prove to be the preferred metric to measure industry performance as they eliminate conflating factors such as differences in company valuation, stock splits, and dividend payouts between firms. Instead, company profitability is compared via a uniform measure of how investments in a firm perform. Annualized stock returns are employed as the dependent variable and the S&P 500 market performance proxy in the second regression in this paper's analysis:

$$(1)\ Annualized\ Stock\ Return_{it}$$
$$= \beta_0 + \beta_1[Post\text{-}Critical\ Event\ Indicator] + \beta_2[Time\ Trend]$$
$$+ \beta_3[Centered\ Fiscal\ Year \times Post\text{-}Critical\ Event\ Indicator] + \beta_4[Market\ Performance_t] + \varepsilon_i$$

The results of this regression now generate coefficients β_1, β_2, β_3, and β_4 and provide the impact of each critical event in simplified percentages with the impacts of market volatility and firm-to-firm variation removed.

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4. Results

The regression results suggest that each critical event had a notable impact on firm profitability. For all but the theme park entertainment industry, the sign of the instantaneous change in annualized stock returns remained constant across both the critical event-centered and lagged effect regressions, the latter which can be found in section 4.6. Although no critical events appear to have been entirely deterministic of an industry's overall profitability trend, the critical events across industries impacted profitability by a magnitude of 3.8 to 57.5 percentage points. While regression (1) provides results that are isolated in relevance to the period of study – annual stock close price, in US$ – the comparison between the nominal results from regression (1) and real results from regression (2) provides opportunities for further analysis which studies the nominal impacts of each critical event around the time of occurrence when compared to the actual impacts when studied over a longer timeline.

4.1. Air Transportation

In the nominal setting, the critical event of the Airline Deregulation Act of 1978 produced a coefficient β_1 of 0.154 for regression (1), representing an increase in annual stock prices for the air transportation industry. This trend reverses when examining regression (2), where the critical event lowered the annualized return for firms in the air transportation industry by 29.9 percentage points, a decrease from 8.95% to -20.95%.

The coefficients on the pre- and post-event slopes for regression (2) illuminate on the change in profitability pre- and post-critical event. For the air transportation industry, profitability was relatively constant pre-critical event, changing at a rate of only -0.442 percentage points per year. After the critical event, however, annualized stock returns begin increasing at a rate of 4.668pp annually, per the combined pre-event slope and post-event change coefficients. This suggests that, although there was a sudden observed decrease in profitability after the passing of the Airline Deregulation Act of 1978, firms across the industry in the end experienced rising profitability post-1978. Figure 1 supports this result graphically, suggesting that the industry returned to pre-critical event annualized returns and profitability starting in approximately 1986.

VARIABLES	(1) Close Price	(2) Annualized Returns
Instantaneous Change	0.154	-0.299**
	(1.312)	(0.134)
Pre-Event Slope	0.0525	-0.00442
	(0.0565)	(0.00608)
Post-Event Change in Slope	-0.127	0.0511
	(0.280)	(0.0464)
S&P 500 Price Control	0.0248***	
	(0.00786)	
S&P 500 Returns Control		0.971*
		(0.538)
Constant	6.564***	0.0895*
	(1.015)	(0.0541)
Observations	748	748
R-squared	0.175	0.008

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2: Regression Results, Air Transportation

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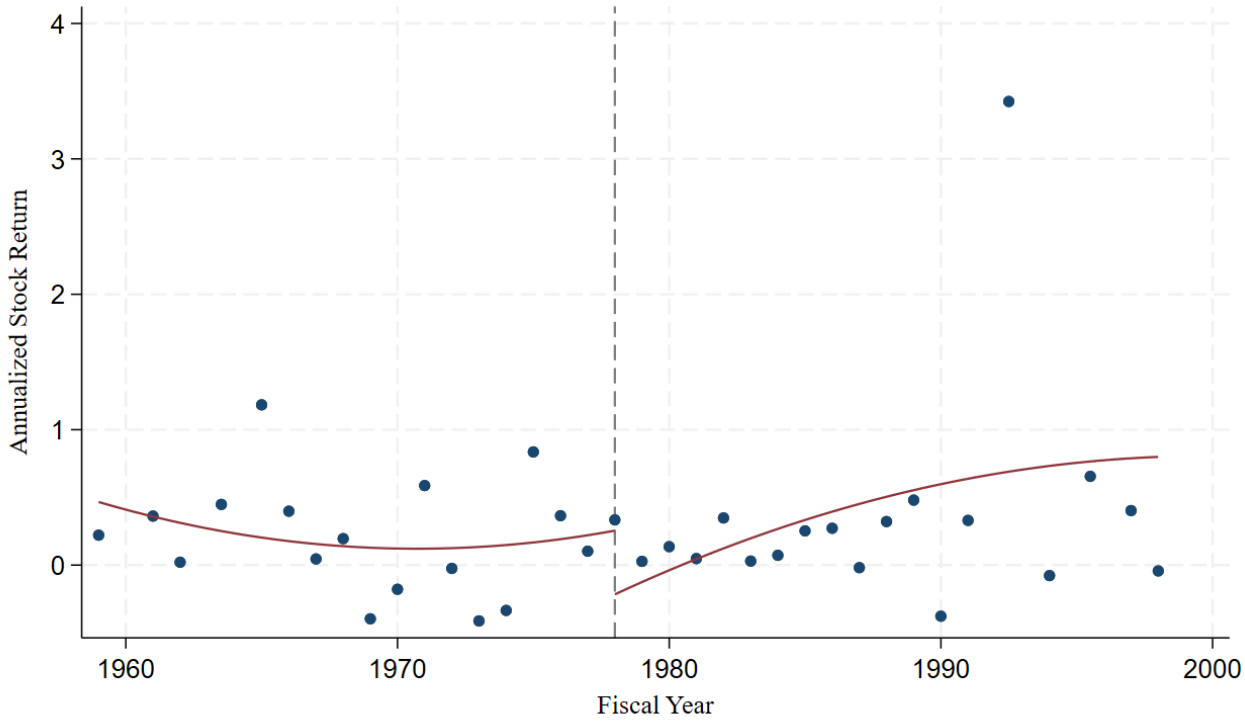

Figure 1: Binned Scatter Plot with Line of Best Fit for Regression (2), Air Transportation

4.2. Computer Technology

In the nominal setting, the critical event of the release of the IBM Personal Computer produced a coefficient β_1 of 448.8, representing an increase in annual stock prices for firms in the computer industry. This trend does not hold, however, when converting the output variable to annualized stock returns. In regression (2), the critical event lowered annualized returns for the computer industry by 57.5 percentage points, a decrease from 27.5% to -30.0%.

	(1)	(2)
VARIABLES	Close Price	Annualized Returns
Instantaneous Change	448.8	-0.575***
	(1,097)	(0.0796)
Pre-Event Slope	95.38*	0.00731
	(54.69)	(0.00711)
Post-Event Change in Slope	120.5	0.0184*
	(214.2)	(0.0101)
S&P 500 Price Control	-4.568	
	(2.890)	
S&P 500 Returns Control		1.630***
		(0.186)
Constant	1,621**	0.275***
	(706.2)	(0.0699)
Observations	3,539	3,539
R-squared	0.002	0.030

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3: Regression Results, Computer Technology

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On either side of the critical event, the slope of the profitability function remains positive, and as the results for post-event change in slope suggest, this positive slope increases in magnitude post-critical event. As such, profitability is increasing for the computer technology industry both pre- and post-critical event, despite the critical event lowering annualized returns for firms in the computer technology industry in 1981. This is seen graphically in Figure 2.

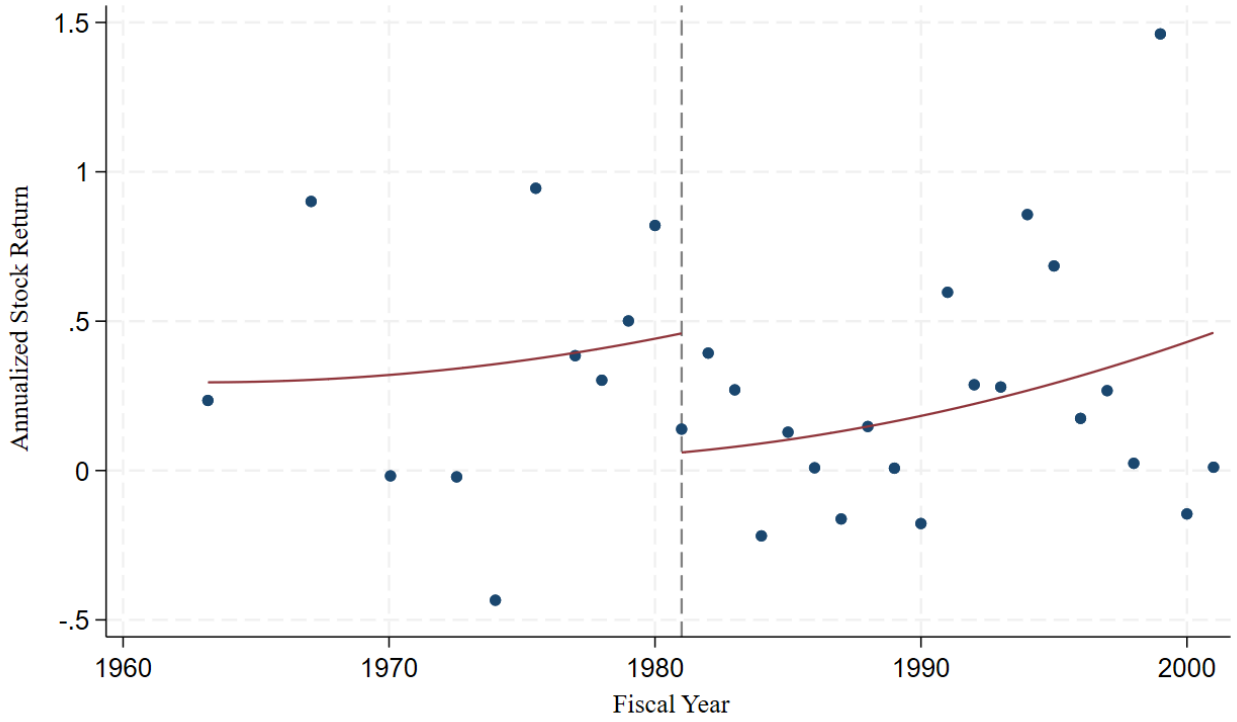

Figure 2: Binned Scatter Plot with Line of Best Fit for Regression (2), Computer Technology

4.3. Theme Park Entertainment

In the nominal setting, the critical event of the opening of Walt Disney World produced a coefficient β_1 of -1.556, representing a decrease in annual stock prices for the theme park entertainment industry. Unlike the air transportation and computer technology industries, this trend continues when converting the output variable to annualized stock returns. In the real setting, the critical event lowered annualized returns for the theme park entertainment industry by 3.8 percentage points, a decrease from 18.5% to 14.7%.

Pre-critical event, the profitability of the theme park entertainment industry was growing, as seen from both the results for pre-event slope as well as from literature on the industry (Sandy, 2006; Sullivan, 1975). After 1971, however, the slope of the profitability function reverses, as shown by the negative post-event change in slope coefficient. Figure 3 visualizes a similar but less drastic change in annualized returns and slope of the profitability function, suggesting that annualized returns remain essentially constant post-critical event at approximately 15%.

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VARIABLES	(1) Close Price	(2) Annualized Returns
Instantaneous Change	-1.556	-0.0380
	(3.066)	(0.236)
Pre-Event Slope	0.180	0.0104
	(0.180)	(0.0183)
Post-Event Change in Slope	0.645	-0.0333
	(0.428)	(0.0206)
S&P 500 Price Control	-0.00867	
	(0.0430)	
S&P 500 Returns Control		1.957***
		(0.367)
Constant	3.702	0.185
	(4.603)	(0.199)
Observations	84	84
R-squared	0.191	0.332

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Regression Results, Theme Park Entertainment

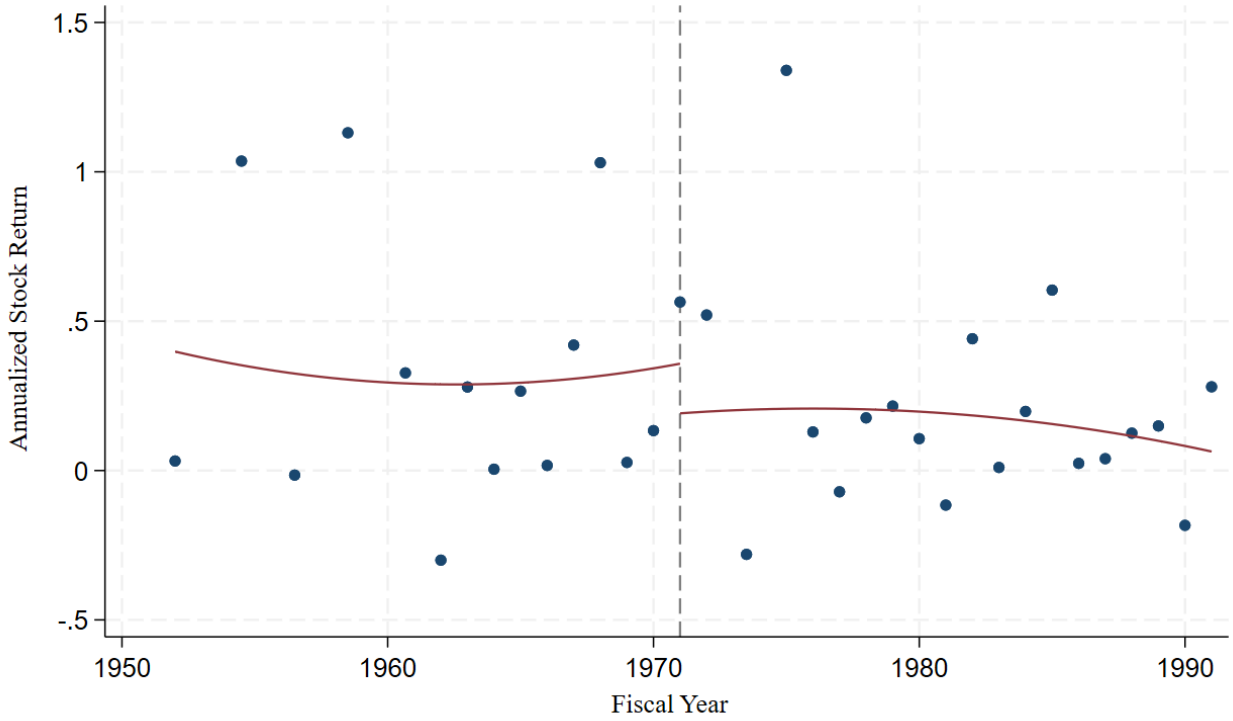

Figure 3: Binned Scatter Plot with Line of Best Fit for Regression (2), Theme Park Entertainment

4.4. Truck Transportation

In the nominal setting, the critical event of the Motor Carrier Act of 1980 produced a coefficient β_1 of -5,823, representing a decrease in annual stock prices for the truck transportation industry. This trend reverses when

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converting the output variable to annualized stock returns. In the real setting, the critical event raised annualized returns for the trucking industry by 17.6 percentage points. This change in annualized returns was promising for the truck transportation industry, increasing returns from -12.5% to 5.10%.

VARIABLES	(1) Close Price	(2) Annualized Returns
Instantaneous Change	-5,823	0.176**
	(4,955)	(0.0887)
Pre-Event Slope	220.9	-0.0244***
	(157.7)	(0.00765)
Post-Event Change in Slope	2,422*	0.0121
	(1,404)	(0.0121)
S&P 500 Price Control	-20.80	
	(25.11)	
S&P 500 Returns Control		1.296***
		(0.154)
Constant	7,750**	-0.125**
	(3,444)	(0.0547)
Observations	484	484
R-squared	0.044	0.109

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Regression Results, Truck Transportation

This change in profitability following the passage of the Motor Carrier Act of 1980, however, does not greatly impact long-term profitability for the industry. As seen from the results on pre-event slope, the truck transportation industry trended continuously unprofitable prior to its deregulation in 1980. The passage of the act slowed this trend, though the post-critical event industry continues to trend unprofitable. Figure 4 visualizes this progression and suggests that the industry returned to the pre-critical event level of annualized returns by 1990.

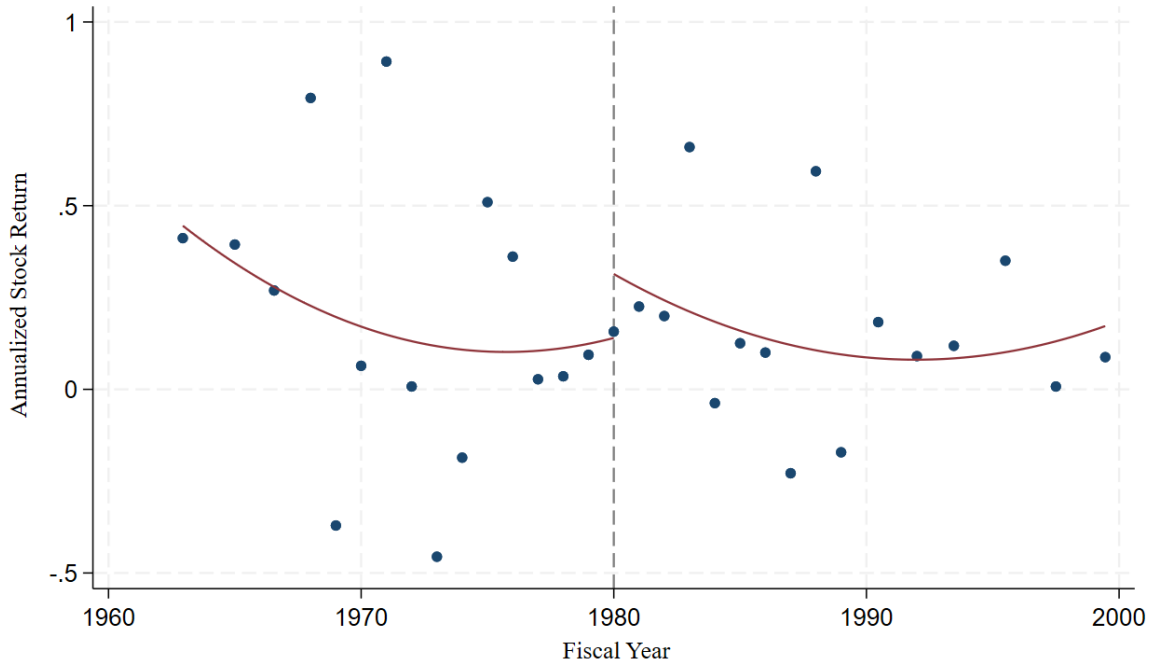

Figure 4: Binned Scatter Plot with Line of Best Fit for Regression (2), Truck Transportation

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4.5. Robustness Checks

Initial robustness checks and regression analysis confirm that the regression results hold some validity. For a portion of the regression results, p-values lie within a range that indicates some evidence of a trend in the data. The regression results for the air transportation industry are divided in their p-values; while the result on the immediate change in annualized returns, the coefficient on instantaneous change, is significant with a p-value below 0.05, the results for the impact of the critical event on the trajectory of the industry's profitability, the results on pre- and post-event slope, are not immediately identified as significant as their p-values remain above 0.1. Similarly, the results for the theme park entertainment lack statistical significance in their p-values, with most results from both regressions having p-values above 0.1. The numerical trends of the annual stock close price results do continue in annualized returns regression results, suggesting validity of the coefficients despite having high p-values. However, high p-values across results from both regressions do not automatically mark them as insignificant, nor does it mean evidence of impact from a critical event is not observed. Further analysis would be required to confirm significance.

Unlike the air transportation industry, the results for the computer technology and truck transportation industries are mostly statistically significant. Both sets of regression results see p-values below 0.05 on instantaneous change in the annualized returns regression results, suggesting that both produced statistically significant results for the immediate change in profitability of firms. Similar significance exists for both industries' results for the impact of the critical event on the slope of industry profitability functions. One coefficient of note in the computer technology results, 448.8 on int2, is not statistically significant; however, the negative coefficient for the annualized returns regression results is, suggesting that the true sign of the immediate change in profitability of firms is negative. For all industries, where a result is not proven statistically significant via a p-value, graphical analysis supports the regressed trend.

When examining the R-squared values for each regression, most lie between 0.002 and 0.109, meaning that between 0.2% and 10.9% of the change in annual stock close price or annualized stock returns can be approximated by the regression design. Although this means that a significant amount of the impact across the critical event comes from other factors than the critical event itself, with the number of factors influencing the trajectory of the firms in each industry, having high R-squared values is likely difficult to achieve. In addition, residuals analysis affirms that the large majority of residuals are random, with only a few individual results skewing the R-squared values. Visualization of this analysis is found in Appendix VII.iii. It is worth noting that, for the theme park entertainment industry, R-squared values for regressions (1) and (2) are 0.191 and 0.332 respectively, meaning that between 19.1% and 33.2% of the change in annual stock close prices are attributed to the critical event and suggesting a greater critical event impact than in other studied industries.

For the annualized returns regression results in sections 4.1, 4.2, and 4.4, the standard error for each coefficient is small enough in magnitude to not change the output's sign. The standard errors in section 4.3, on annualized returns for the theme park entertainment industry, are much the opposite, with large enough magnitudes to suggest an actual, significant positive impact from the critical event on profitability, or an even larger negative impact on profitability. However, the regression fit suggested by residual analysis and the high R-squared values reinforce the theme park entertainment industry results as significant.

It is worth noting, alongside the often indeterminant robustness checks conducted across the regression results, that this project's analysis is intended as a first attempt at deciphering and identifying any possible effects on profitability and industry performance resulting from critical events like the four analyzed here. Inherently, a regression model attempts to optimize a trend that connects various data points, and much of the result is dependent on the selection of regression model chosen to approximate the trend demonstrated by the data. This project's analysis relies on a linear regression model to approximate the impacts of a critical event on a firm's annualized stock returns. Further study may determine a quadratic or other, higher-order polynomial regression to be more appropriate at approximating the data and thus provide a stronger, more robust result that more accurately illustrates the impacts. Similarly, additional controls or a stronger dataset could increase robustness. With that in mind, the regression results of this project should not be considered a conclusive, definitive answer to the impacts of the critical events during the Great Stagnation; instead, they act as a starting point which support a robust historical record and emphasize the impacts worth analyzing in each respective industry.

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4.6. Extended Analysis

Although each critical event had notable impact on their respective industries within the year of their opening, release, or implementation, it is wholly possible that the full magnitude of this impact was not observed until a later date. To assess whether there was such a lagged effect, the data was regressed an additional time with the year of discontinuity set two years following the critical events; that is, a discontinuity in 1980 instead of 1978 for the air transportation industry, 1983 instead of 1981 for the computer technology industry, 1973 instead of 1971 for the theme park entertainment industry, and 1982 instead of 1980 for the truck transportation industry. Profitability could have plausibly changed in the immediate aftermath of each critical event – firms could have quickly seen higher external investment, started new lines of business – but the full effect of longer-term projects resulting from critical events would not be immediately observable. To examine this possible lagged effect of critical events, regression (2), which calculates the impact of a critical event on annualized stock returns, centered two years post-critical event was re-run for each industry, providing enough time for large-scale firm and industry actions to have taken effect. Had each critical event occurred within the same year, the regression results of such a uniform date change could have been uniformly biased because of other correlated market events. However, they take place over the span of a decade and could not be uniformly affected by a single exogenous event.

VARIABLES	(1) Air Transportation	(2) Computer Technology	(3) Theme Park Entertainment	(4) Truck Transportation
Instantaneous Change	-0.0992	-0.516***	0.0506	0.0443
	(0.142)	(0.0605)	(0.218)	(0.0980)
Pre-Event Slope	-0.0107***	-0.00480	0.00344	-0.0155**
	(0.00408)	(0.00551)	(0.0139)	(0.00667)
Post-Event Change in Slope	0.0572	0.0427***	-0.0316*	0.00814
	(0.0496)	(0.00985)	(0.0183)	(0.0132)
S&P 500 Returns Control	0.886*	1.516***	1.944***	1.282***
	(0.538)	(0.184)	(0.361)	(0.154)
Constant	0.00230	0.151***	0.118	-0.0644
	(0.0692)	(0.0582)	(0.165)	(0.0590)
Observations	748	3,539	86	484
R-squared	0.007	0.032	0.301	0.101

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Regression Results, Lagged Effect of Critical Events

In this setting, the critical events of the air transportation and computer technology industries had noteworthy, lagged effects on the profitability of their industries' respective firms. Both experienced significant changes in annualized stock returns, a proxy for profitability, two years post-critical event that were comparable in magnitude and direction to the effects at the time of each critical event. The theme park entertainment and truck transportation industries – with a coefficient β_1 of 0.0506 and 0.0443 respectively – see negligible lagged effects of the critical event (of approximately 5.06 and 4.43 percentage points, possibly explained by annual fluctuation). As in the regressions which use the critical event year as the discontinuous cutoff, there are some noticeable changes in the slope of the profitability function for each industry, specifically in the air transportation and computer technology industries which see further increases in profitability trends. Figures 5 through 8 support these results graphically, though some suggest that there was an additional change in profitability trends at a period further post-critical event, which could possibly be attributed to another critical event-like phenomenon.

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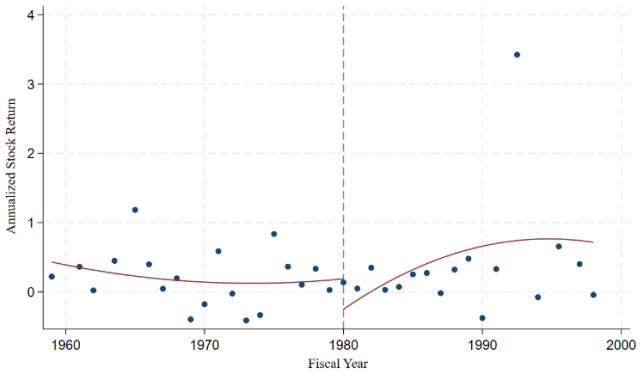

Figure 5: Binned Scatter Plot with Line of Best Fit for Lagged-Effect Regression, Air Transportation

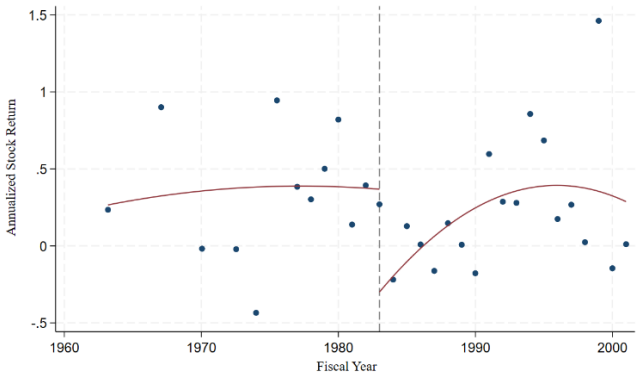

Figure 6: Binned Scatter Plot with Line of Best Fit for Lagged-Effect Regression, Computer Technology

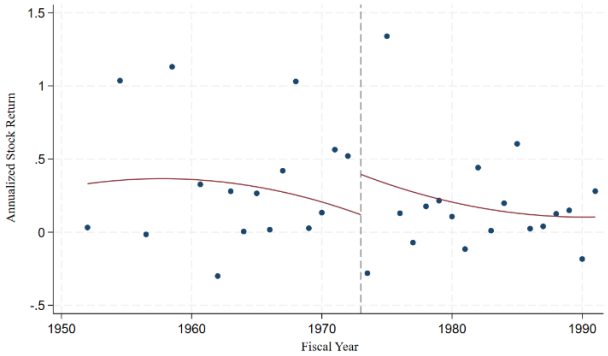

Figure 7: Binned Scatter Plot with Line of Best Fit for Lagged-Effect Regression, Theme Park Entertainment

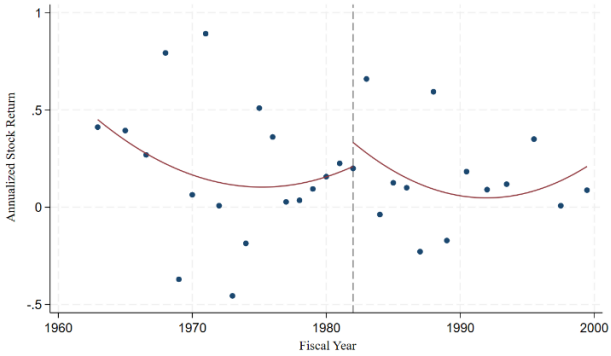

Figure 8: Binned Scatter Plot with Line of Best Fit for Lagged-Effect Regression, Truck Transportation

As in the regression sets for each individual industry, the statistical significance for the lagged effect of critical events varies. Approximately half of the results have p-values below 0.05, suggesting that the observations illustrate a real phenomenon. It is worth noting, however, that coefficients for the immediate change in profitability for the air transportation, theme park entertainment, and truck transportation industries have a p-value above 0.1; this result suggests that further analysis is required to confirm a lagged impact of each industry's critical event. The R-squared values for each regression lie either at or above the R-squared value for the corresponding regressions when using the critical event year as the discontinuity. With r-squared values between 0.007 and 0.301, this suggests that the lagged effect observed accounted for 0.07% to 30.1% of the actual change in firm profitability. Residual analysis parallels the results from section 4.5 and affirms that most residuals are random. Visualization of this analysis can be found in Appendix 7.3. Unlike the initial set of regressions, the standard errors for half of the lagged-effect regression results are larger than their associated coefficient, such that the actual effect may be larger or of a different magnitude than the regression result. For the remaining half, the standard error is small enough in magnitude to not change the sign of the coefficient.

5. Analysis

Although similarities across critical events made for a few, overarching trends of firm or industry performance, each industry experienced a unique minutia of effects. The opening of Walt Disney World and the release of the IBM Personal Computer – both new consumer 'products' – decreased the overall profitability of their respective industries, likely due to a combination of post-release competition and the failure of new and existing market players. The passing of the Airline Deregulation Act of 1978 and the Motor Carrier Act of 1980 – both direct deregulatory actions of the transportation industry as a whole – diverged in their effects on firms in each industry, as the truck

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transportation industry saw a temporary increase in profitability while the air transportation industry experienced the opposite. In both cases, deregulation contributed to longer term issues for new and existing firms, many of whom went bankrupt as a result.

In every industry post-critical event, a consistent stream of firm mergers was present. Almarin Phillips in his 1981 paper, written three years post-passage of the Airline Deregulation Act, explored the causes of these mergers in the deregulated air transportation industry. He surmised that mergers in this post-regulatory environment were inevitable: the rapid introduction of incremental product offerings, overexpansion of companies in the new market, and difficulty in coordinating offerings between firms in the short-term fostered an environment that favored airline mergers (Phillips, 1981). Phillips' assessment of a market conducive to mergers is generalizable across all four industries in the analysis. The air transportation, computer technology, theme park entertainment, and truck transportation industries all experienced an increase in agglomeration post-critical events, in almost every case because of the critical event itself. Firms were forced to react to the market volatility catalyzed by their respective critical events, and oftentimes the way to stabilize, increase efficiency, and decrease overhead was to merge with another firm or absorb their resources (or vice versa, offload assets or ownership). In many instances, firms were faced with a choice to either merge or go bankrupt, oftentimes due to the declining profitability that the regressions in both the main and extended analysis demonstrate. Per Phillips, 'negative profits threaten survival and encourage mergers.' The decrease in solvency that many firms experienced post-critical events was oftentimes avoided by mergers; if that was not the case, they succumbed to bankruptcy and closure. As a general result of bankruptcies, closures, and mergers across the four industries, very few dominant players from the year of each critical event still exist in the present-day market.

5.1. Air Transportation

Following the Airline Deregulation Act of 1978, the regression analysis in section 4.1 shows a 29.9 percentage point decrease in annualized returns for the air transportation industry. This decrease, however, is counteracted by a positive trend in overall profitability after the critical event, reinforced by the trend in Figure 1. The analysis in section 4.6 demonstrates a smaller, -9.92 percentage point lagged effect in the air transportation industry on annualized returns, although the standard deviation is large enough to suggest the nonexistence a consistent trend of a lagged effect. As in the regression results of section 4.6, Figure 5 implies that there is a constant to increasing trend in profitability for the air transportation industry, aligning with the observations from Figure 1. As the regression and figures suggest, there was a period of instability in the air transportation industry directly following the Airline Deregulation Act of 1978, when a substantial number of airlines were founded, experienced bankruptcy, or underwent a merger as firms attempted to return to pre-critical event profitability. Between 1978 and 2005, there were 160 airline bankruptcies (Turner, 2005); at the same time, various notable airlines went through multiple mergers to form the industry-dominating firms of today.

Directly following the 1978 law, the air transportation industry entered a frenzy, with existing airlines announcing new flight paths and new airlines entering the market in attempts to capitalize on the now-anarchic access to flight paths. While new airlines like People Express, Presidential, and New York Air looked to establish themselves in the market, regional players such as Frontier, Braniff, Delta, Continental, Northwest, Air California, and Southwest all endeavored to gain national market share. The intense competition between existing dominant airlines, regional players, and new entrants contributed to lower prices which shrunk profits and posed a challenge for new firms attempting to remain competitive and profitable (National, 2021). Although there may have been an initial increase in profitability as passenger numbers increased and airlines maximized the number of routes they flew, staunch competition between firms quickly reversed this trend and led to the demise of many new and existing corporations. By 1983, twenty airlines had gone bankrupt – including Braniff and Continental – and 'only three of the 10 top carriers in the nation [were] reported to be showing a profit' (Rowen, 1983). Of those mentioned above, only Delta and Southwest were able to make headway in establishing themselves as dominant players in the air transportation industry. In the years following the Airline Deregulation Act, a ripple of mergers moved through the market: American Airlines acquired Air California in 1987, followed by Reno Air in 1997; more recently in 2012, United Airlines and Continental merged; and to build on their successes following deregulation, Delta merged with Northwest Airlines in 2010, and Southwest with Morris Air and Air Train Airways in 1993 and 2010, respectively. As Phillips explored, the

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trend of mergers in the air transportation industry helped to avoid the excess capacity issues and adjustment costs that accompanied the rapid changes after airline deregulation.

The rise and fall of People Express Airlines illustrates the speed at which the air transportation industry transformed post-deregulation. Founded in 1981, People Express was the quintessential budget airline, cutting excess costs to enable a ticket price significantly lower than competitors, resulting in revenues which ballooned to US$1 billion in 1985. This new model of air travel was unsustainable for many large firms like Pan American, Trans World, and Eastern Airlines who were unable to price to compete with these less expensive entrants, leading to their closures. Those who could compete, however, quickly put People Express out of business in 1986 as they offered additional travel routes and in-flight services for the same price as a People Express flight (Siddiqi, 2003). The rapidity of People Express Airlines' downfall demonstrates the ferocity of the air transportation industry post-deregulation: despite rapid entry and adjustment by new and existing firms, the low-price model was unsustainable in the long term, turning both new and legacy firms towards either merger, bankruptcy, or closure.

The regression results for the air transportation industry aptly demonstrate this rise and rapid fall of the industry in the 1980s. As firms entered the market, new and existing firms were forced to compete for market share as the revenue previously shared across a smaller set of firms was split by a larger group of firms. More firms entered than the market could support – exceeding carrying capacity – and as a result firms quickly closed or merged as the market readjusted to the adequate supply of airlines and services. Both Figure 1 and Figure 5 visualize this stark change: while some firms had success following the critical event, the oversaturation of the market made most if not all unprofitable, taking almost a decade to correct this trend. The difference between the regression results in sections 4.1 and 4.6 also support this analysis, as an annualized return of -20.95% post-critical event in 1981 remains unprofitable with a -9.69% annualized return in 1983. The Airline Deregulation Act of 1978 revolutionized the air transportation industry, but not without mass casualties of firms, old and new.

5.2. Computer Technology

As the regression results in sections 4.2 and 4.6 suggest, the release of the IBM Personal Computer had a net-negative effect on the computer technology industry's overall profitability, with an initial, discontinuous effect of between -57.5 and -51.6 percentage points on annualized returns, the latter being the lagged effect after two years. This discontinuous profitability change does reverse post-critical event, with the results for both computer technology regressions demonstrating the continuation of positively-trending profitability that the market experienced pre-critical event. The development and release of the IBM PC was designed to be such a disruptive force in the personal computer market, decreasing annualized returns for computer technology firms by a net 18.64 percentage points, from 8.95% pre-critical event to -9.69% in 1983. Up until 1981, IBM focused exclusively on large-scale, enterprise level computing machines that were unaffordable to the average consumer. Seeing the rapidly growing success of personal computers from firms like Apple Inc. and Tandy Corp., and recognizing consumer loyalty to the IBM brand, IBM quickly designed and released their first personal computer in 1981. The IBM PC was distinct from its competitors in that it was developed exclusively with existing hardware and software, using the offerings of Microsoft and Intel to make the product a success. Overnight, IBM's personal computer became the market leader. With approximately US$1 billion in revenue in its first year, by its second year of production the IBM PC was selling 200,000 units a month, far exceeding the firm's predictions for sales of 200,000 units a year. IBM quickly became the dominant firm in the computer technology industry, with approximately 80 per cent of the market share (Cortada, 2021).

The same tactics for producing the IBM PC so quickly and efficiently, however, triggered its downfall. Competing firms recognized the simple production process of IBM and promptly began production of their own IBM knockoffs, and thus the market was flooded with 'clones,' as they were termed. Concurrently, the costs of computer components and memory were rapidly decreasing, from US$4.48 billion per terabyte of memory in 1981 to only US$300 million per terabyte in 1985 (McCallum, 2022). Major competitors such as Hewlett-Packard, Compaq, Dell, and the Burroughs Corporation launched their own personal computers with the same or similar off-the-shelf technology and operating systems; for several reasons, these clones were often less expensive alternatives to the market-dominating IBM PC (Bajarin, 2021). To further their ability to compete with IBM, the Burroughs Corporation merged

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with the Sperry Corporation, a leading computer technology company for enterprise-scale devices, in 1986 to 'create economies needed to compete effectively against I.B.M.' (Sanger, 1986). Despite the consumer's loyalty to the IBM brand, these competing products were able to overtake the IBM PC in sales and by 1992 IBM's market share had shrunk to a measly 20 per cent.

The growing success of IBM's direct competition did not mean overall success for the entire industry, however. By the 1990s and early 2000s, the computer technology industry was facing decreasing sales and shrinking market size. Major players in the computing industry quickly succumbed to the growing competition, such as the Control Data Corporation, who failed to capitalize on the 1980s craze of the personal computer and by 1992 had attempted a debt offering and was dissolved into two subsidiaries (Charland and Reilly, 2003). Similarly, 2001 brought the merger of Hewlett-Packard and Compaq. Despite their once dominance in the personal computer industry, they merged to attempt to retain their status in the industry and compete with firms like IBM across their entire product line (Sorkin and Norris, 2001). Even IBM faced challenges, and in 2004 sold their failing personal computer business to Lenovo for US$1.75 billion (Cortada, 2021).

The trajectory of the computer technology industry closely follows its the regression results. Although IBM experienced an exponential increase in profits on account of their personal computer release, the release effectively siphoned sales, customers, and profitability from the remaining firms in the industry – decreasing annualized returns by up to 57.5 percentage points. Computer technology firms were faced with a crossroads: to rapidly develop and release imitations of the IBM PC, or to pursue other product lines. Firms like Hewlett-Packard and the Burroughs Corporation were quick to act, releasing successful clones of IBM's product, while others like the Control Data Corporation overdiversified and were left in ruin. As competitors eventually stole the market share of the IBM products, the overall market contracted, shrinking firms' margins, and contributing to the trend of acquisitions and failures; it took approximately two decades for the industry to reach pre-critical event levels of annualized stock returns. While some firms like Apple Inc. were able to survive until this return in profitability, the 1990s and early 2000s marked the end for many computer technology firms which flourished around the initial IBM personal computer release.

5.3. Theme Park Entertainment

The main regression results suggest that the opening of Walt Disney World in Orlando, Florida immediately lowered profitability for theme park entertainment firms by 3.8 percentage points, followed by a further decline in firm profitability year-over-year. This trend reversed in the extended analysis of lagged effects in section 4.6, which demonstrates an increase of 5.06pp in annualized stock returns alongside a relatively consistent profitability trend post-discontinuity. Combined, the theme park entertainment industry experienced a decrease in annualized returns from 18.5% pre-critical event to 16.86% in 1973. Despite this volatile profitability structure, the theme park entertainment industry in the 1970s was growing towards its peak. The 1970s saw regional players like Six Flags and Taft Corporation begin their dominance of the regional theme park sub-industry, while smaller, family-run amusement parks shuttered or sold out to the larger regional competitors. 1975 marked the first instance of Six Flags purchasing an already-established park, Astroworld in Houston, Texas, rebranding it, and attempting to make it profitable; this was repeated three additional times in 1977, 1979, and 1984 (Shaw, 2007). The Taft Corporation similarly replicated this trend by purchasing the pre-existing Carowinds Park in North Carolina in 1975 and opened it alongside two original parks, King's Dominion and Canada's Wonderland, in 1976, 1975, and 1982 respectively (Sandy, 2006). Both Taft and Six Flags demonstrated the growing dominance of regional theme park conglomerates post-critical event, supplanting the smaller, individual parks that floundered after the 1971 critical event. This divergence contributed to the decline in profitability demonstrated by the initial annualized returns regression; as more small parks struggled, their poor performance negatively affected overall industry performance.

While regional firms like Six Flags and the Taft Corporation competed for local dominance, there was a growing rivalry between the industry's top two players: the Walt Disney Company and MCA Inc. (the then-owner of Universal Studios). Both firms opened their initial parks pre-1970, and up until then competed solely within the California market for theme park dominance. This changed with Disney's decision to build in Florida. Post-critical event, Disney remained dominant in the Florida market for almost two decades, as they expanded upon their concept of a vacation

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destination with the construction of EPCOT Center and additional resort properties. In a direct bid to challenge Disney, and sensing the opportunity to dominate the smaller, struggling theme parks in the area, MCA Inc. started to explore the prospects of building a second theme park in the Orlando area in July 1981. Noting the success of both the Walt Disney Company and regional leaders like Taft and Six Flags, MCA planned to replicate their studio-theme park experience from California in Orlando, a plan with Disney quickly countered with their own studio-theme park proposal (Perjurer, 2024). The late 1980s thus created another branch in the Disney-Universal rivalry, this time between Universal Studios Orlando and Disney-MGM Studios (later named Disney's Hollywood Studios).

The focused competition between Disney and Universal is aptly considered a duopoly, as discussed in Brian Ratajczak's 2022 article. He and his team highlighted the comparison of Pepsi and Coca Cola in defining the theme park relationship as such; while there are smaller players in the soft drink market, the large majority of market share belongs to two players who compete intensely with one another (Ratajczak, 2022). In the context of the opening of Walt Disney World and the subsequent effects on profitability, the competition between Walt Disney Company and MCA Inc. dominated the industry landscape for the large majority of the 1970s and 1980s. While smaller corporations and parks like Taft and Six Flags struggled for control on a local scale, the Disney and Universal empires worked to win over public opinion and bring visitors from around the country to their vacation destinations. While smaller firms competed for local dominance, Walt Disney World significantly increased revenue for the Walt Disney Company in the mid-1970s and is a factor in the increase of annualized returns that the lagged effect regression in section 4.6 demonstrates.

This duopolistic domination combined with the growing prominence of a second class of regional theme park chains contributed to the results from both sets of regressions. The success of Walt Disney World drew in smaller players looking to capitalize on the popularity of Walt Disney World and its west coast counterparts. Many found, however, that local markets could not sustain theme parks. The closure of these smaller parks helped to contract the market, providing an ideal opportunity for firms like the Taft Corporation and Six Flags to purchase them and grow their regional offerings. By 1990, with the opening of Universal Studios Orlando and Disney-MGM Studios and following the success of the Taft Corporation and Six Flags in growing their portfolios of pre-existing parks, industry-wide profitability plateaued.

5.4. Truck Transportation

Before the Motor Carrier Act of 1980, policymakers and regulators observed a 'relatively stable and profitable' truck transportation industry operating in a surplus credited to the industry regulations at the time (Ellig, 2020). The trucking industry was dominated by a selection of top players, much like the theme park entertainment and air transportation industries post-critical event. Economists believed that industry pricing was inflated over a competitive market's prices, with much of this surplus passed to consumers in the form of higher prices. To eliminate these distorted prices for consumers, the Motor Carrier Act looked to democratize the truck transportation industry, ceding more power to the natural demand of the market to set prices, and allowing firms to optimize their operations to best meet consumer needs. Ellig notes that, post-critical event and post-deregulation, the truck transportation industry was revolutionized for consumers who saved up to US$15.4 billion annually from new competitive pricing, decreased operating costs per vehicle, and improvements in service. The deregulation of the truck transportation industry also allowed for a plethora of new entrants, many of which were non-union and could offer lower wages, passing on cost savings to consumers (Ellig, 2020). Firms internalized portions of the savings and restructuring as well: the regression results in sections 4.4 and 4.6 suggest immediate and lagged increases in annualized returns of 4.43 and 17.6 percentage points for the truck transportation industry. Firms were able to reoptimize quickly to take advantage of the market agitation.

This increase in returns, however, does not illustrate the full effects of the critical event of the Motor Carrier Act of 1980. Better statistics to explore the trajectory of the truck transportation industry are the combined effects of coefficients on pre-event slope and post-event change in slope, which reflect the change in profitability year-over-year for firms. Both pre- and post-critical event, the combined effect remained negative, meaning that the truck transportation industry maintained a negatively-trending profitability. In addition, even though the firm experienced increases in profitability, annualized returns remain in the low post-critical event, for values of 5.10% in 1980 and -

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2.01% in 1982. Despite the positive outlook for consumers portrayed by Ellig in his work, much of the industry struggled post-critical event. Within the newly democratized industry, new entrants who were prepared to price low and undercut market leading prices overran existing firms. As such, market dominating firms suffered financially while small players struggled to survive with less-than-sustainable prices. Within three years of deregulation, the truck transportation industry saw the closure of 72 major freight haulers, totaling 16 per cent of the industry's revenue (Premack, 2020). This ripple of closures did not end there; by 1986, over 4,000 truck transportation companies had failed (Premack, 2020), and by 1991 over 150,000 well-paying jobs were lost (Bartlett and Steele, 1991). These firms were quickly replaced by hundreds of small upstarts that could price agilely and ensure positive cashflow through simpler offerings and lower wages.

1989 provides a perfect case study on the carnage that followed the Motor Carrier Act critical event. Transcon Lines, once the 12th largest U.S. trucking company with operations across 31 states and revenues of US$143.3 million, had grown from a local, southern California-based firm to a national powerhouse (‘US 1,’ 2017; Kennedy, 1995). Like many firms and executives of the era, Transcon fervently opposed the Motor Carrier Act of 1980, as deregulation allowed for unlimited, rate-cutting entrants who would encroach on established territories (Lockridge, 2022). Despite this opposition, the law was passed, and like many other firms Transcon suffered. With union drivers that put the firm at a disadvantage for wage competition, Transcon Lines attempted to follow the path of other trucking companies and salvage their rapid unprofitability by merging with other trucking firms, but to no avail; by 1990, the firm was losing US$5 million a month. Following a rocky period from 1990 through 1993 where the firm was gutted and later repurchased by a group of Indiana investors, a subsequent 1994 court statement by Transcon Lines made clear the impact of ‘heightened competition resulting from Congress' partial deregulation of the motor carrier industry in 1980’ (Kennedy, 1995).

The Transcon situation was not unique: of the top 30 trucking firms of 1979, 21 had either shut down or merged with another to survive by 1991 (Bartlett and Steele, 1991); as of 2024, only four remain. 26 of the top 30 firms all succumbed through bankruptcy, merger, or closure to the cutthroat competition following the deregulation of 1980, taking with them the profitability of the market as demonstrated in sections 4.4 and 4.6. Regardless of the intent of the Motor Carrier Act of 1980, in the end it gutted the truck transportation industry of its previously dominant players, decreasing overall wages for employees and profitability for firms as the market moved closer towards perfect competition.

6. Conclusion

The regression and historical analysis of four distinct critical events across the air transportation, computer technology, theme park entertainment, and truck transportation critical events demonstrate that each critical event impacted the trajectory and structure of the related industries. Despite similar deregulatory critical events, the air transportation and truck transportation industries diverged in their immediate effects on annualized returns, of -29.9 and 17.6 percentage points respectively, while the air transportation industry also experienced a lagged 9.92pp decrease in profitability two years post-deregulation. Both industries also saw significant industry restructuring following their critical events. Deregulation lowered barriers to entry and democratized their respective markets, such that new firms were incentivized to enter. With that, established firms like Transcon Lines in the truck transportation industry and Continental Airlines in the air transportation industry were forced to restructure their pricing models and offerings to be more competitive with new entrants. Although this benefited consumers, in both cases this rapid price restructuring and decrease in market power bankrupted hundreds of new and established firms, causing them either to merge with others or close all together. Regression results parallel this historical trend: although there was an immediate increase in annualized returns for the truck transportation industry, the Airline Deregulation Act of 1978 and Motor Carrier Act of 1980 maintained or increased declines in profitability in both markets.

The theme park entertainment and computer technology industries proved similar in their response to critical events. Both industries experienced declines in profitability directly following their critical events – of 3.8 and 57.5 percentage points respectively – though diverged in two-year lagged effects of the critical events, with the theme park entertainment industry experiencing a 5.06pp increase in annualized returns while the computer technology industry

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trended more drastically with a 51.6pp decrease. IBM and the Walt Disney Company – both the cause of their respective industry critical events – can be considered market leaders during the periods of study. As such, it was correctly predicted that their new 'product' releases would disrupt their respective industries. The theme park entertainment industry experienced its peak in the 1970s, including the opening of Walt Disney World, after which two distinct realms of competition appeared between the two market leaders, the Walt Disney Company and MCA Inc., and a set of smaller regional players including Six Flags and the Taft Corporation. While the Walt Disney Company and MCA Inc. escaped the 1970s relatively unscathed and preparing to open new offerings, local amusement and theme parks suffered financially and closed en masse, providing room for regional theme park corporations to purchase and grow their local holdings. This trend was illustrated by the decreasing profitability trend between 1971 and 1973 in the regression analysis of the theme park entertainment industry, and while it likely affected all firms in the industry, smaller regional players would have faced the most difficulty in remaining profitable.

A similar scenario played out in the computer technology industry. IBM, a consumer-preferred brand in the computer technology industry, quickly dominated approximately 80 per cent of the computer technology market with the release of its personal computer. While this incentivized competitors to replicate and sell their own versions of the IBM machine, it also caused slow-reacting industry leaders like the Control Data Corporation to quickly lose industry presence and decreased firm profitability. By the 1990s, with the dominance of IBM 'clones' across the market and changing consumer demands, previous market leaders including IBM were faced with shrinking profitability and were incentivized to merge or were pushed to closure.

Although this project modestly analyses a selection of four critical events, the structure is replicable for a large variety of industries across periods in the last 80 years, or any period that provides sufficient financial data on a large subset of an industry. This pattern could prove useful for a wide range of stakeholders from policymakers to banking analysts looking to predict the effects of a meaningful change to market structures and profitability. As this project's analysis supports, market developments like those in the air transportation, computer technology, theme park entertainment, and truck transportation industries oftentimes have redistributive effects that create volatile environments for firms looking to turn a profit. Save for catalyst firms like IBM and the Walt Disney Company, the returns and performance of firms declined and for many became unprofitable. While market history is not necessarily correlated with future forecasts, finding critical events in the past that proxy future developments can help illuminate the direct and indirect effects of potentially significant market-shaping developments, guiding investors and policymakers in their actions. Just as historians attempt to apply history to current and future scenarios, this structure can help firms and governments explore the outcomes of potential, future critical events.

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Appendices

A.1. Stata Code

The calculations for this project were conducted in Stata in three parts. The initial involved adjusting the annual stock close price (prcc_c) value from Compustat to include dividend payouts and stock splits and importing the NYU Stern S&P 500 dataset. Outside of Stata, a variable for start annual stock price opening, prcc_ly, was generated from the adjusted annual stock close price of the previous year. The second set of calculations included calculating the annualized returns for each firm, shortening the timeline of the dataset, generating indicator and interaction variables, running the two main regressions, and analyzing residuals. The third part repeats the calculations from the second part with a lagged critical event date. A sample set of Stata code for the theme park entertainment industry is below:

Part 1:

```
drop if missing(prcc_c)
gen adjprice_cy = prcc_c / ajex
drop _merge
drop if missing(sp_return)
```

Part 2:

```
gen stock_return = (adjprice_cy - adjprice_ly)/(adjprice_ly)
drop if missing(adjprice_ly)

drop if fyear>1991
drop if fyear<1951

gen fyear1 = fyear-1971
gen fyear2 = fyear-1971
replace fyear2 = 0 if fyear<=1971

gen int2 = 1
replace int2 = 0 if fyear<=1971

reg adjprice_cy int2 fyear1 fyear2 sp500_close, robust
outreg2 using ThemeParkResults.doc, replace ctitle(Close Price)
reg stock_return int2 fyear1 fyear2 sp_return, robust
outreg2 using ThemeParkResults.doc, append ctitle(Annualized Returns)

predict pred_return
predict resid_return, residuals
scatter resid_return pred_return, yline(0)
graph export ThemeParksResiduals-StockReturn.png

binscatter prcc_c fyear, nq(40) line(qfit) rd(1971) ytitle({stSerif: Annual Stock Price})xtitle({stSerif:
Fiscal Year})
graph export ThemeParks-StockPrice.png
binscatter stock_return fyear, nq(40) line(qfit) rd(1971) ytitle({stSerif: Annualized StockReturn})
xtitle({stSerif: Fiscal Year})
graph export ThemeParks-StockReturn.png
```


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Part 3:

```
gen stock_return = (adjprice_cy - adjprice_ly)/(adjprice_ly)
drop if missing(adjprice_ly)

drop if fyear>1991
drop if fyear<1951

gen fyear1 = fyear-1973
gen fyear2 = fyear-1973
replace fyear2 = 0 if fyear<=1973

gen int1 = 1
replace int1 = 0 if fyear>1973
gen int2 = 1
replace int2 = 0 if fyear<=1973

reg stock_return int2 fyear1 fyear2 sp_return, robust
outreg2 using ThemeParkResults-Lagged.doc, append ctitle(Annualized Returns)

predict pred_return
predict resid_return, residuals
scatter resid_return pred_return, yline(0)
graph export LaggedThemeParksResiduals-StockReturn.png

binscatter stock_return fyear, nq(40) line(qfit) rd(1973) ytitle({stSerif: Annualized Stock Return})
xtitle({stSerif: Fiscal Year})
graph export ThemeParks-StockReturn-Lagged.png
```

A.2. Residual Analysis

To analyze the fit of the regression designs to the trend of each industry's data, I analyzed the residual plots from each regression in section IV. Despite some vertical bunching, all showed a random pattern, proving that the model accurately fit the data. The air transportation and computer technology industries respectively did have one and five significant residual outliers, and for visualization purpose were omitted from the graphical analysis.

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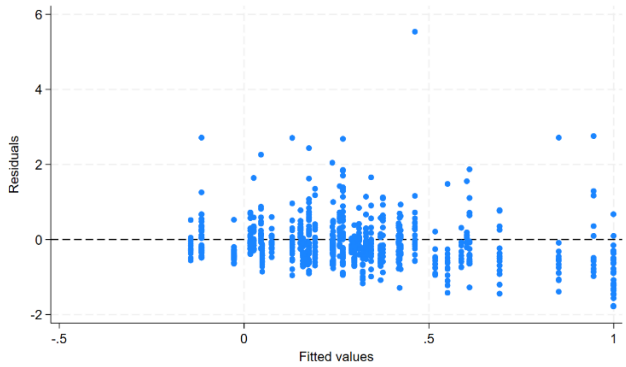

Figure 9: Residuals Plot with Line for Regression (2), Air Transportation

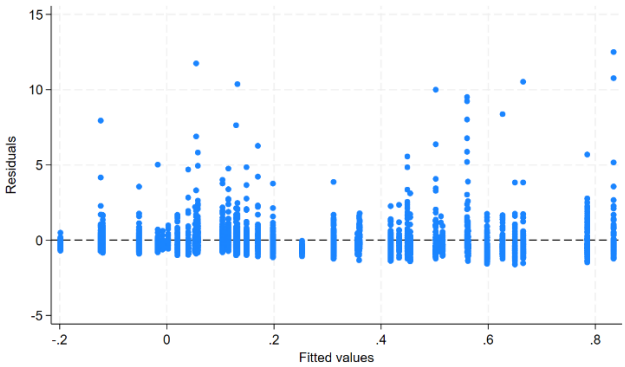

Figure 10: Residuals Plot with Line for Regression (2), Computer Technology

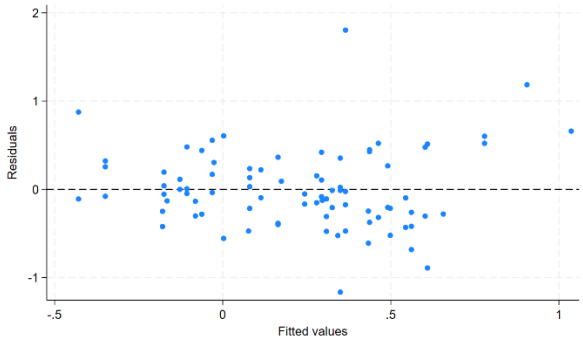

Figure 11: Residuals Plot with Line for Regression (2), Theme Park Entertainment

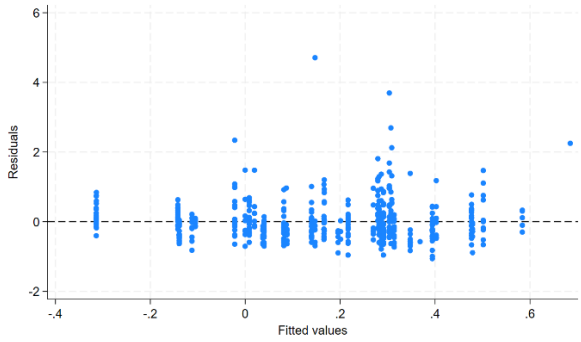

Figure 12: Residuals Plot with Line for Regression (2), Truck Transportation

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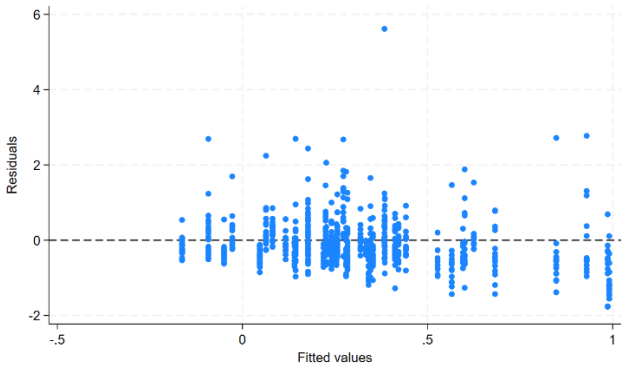

Figure 13: Residuals Plot with Line for Lagged Regression, Air Transportation

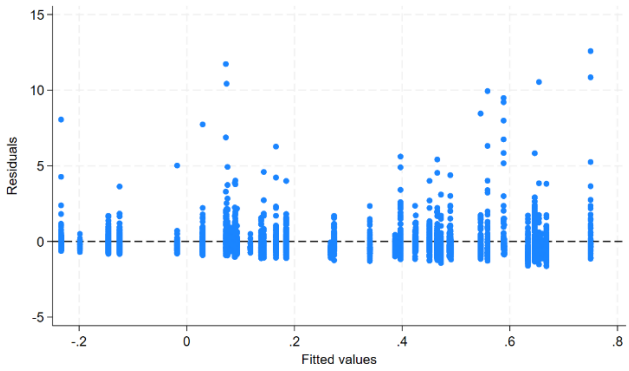

Figure 14: Residuals Plot with Line for Lagged Regression, Computer Technology

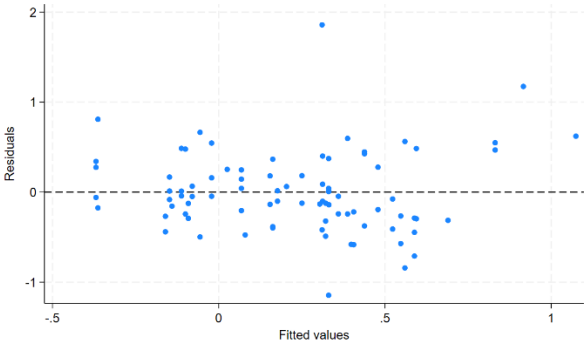

Figure 15: Residuals Plot with Line for Lagged Regression, Theme Park Entertainment

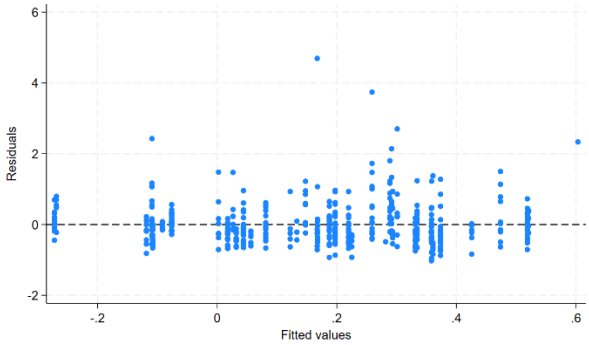

Figure 16: Residuals Plot with Line for Lagged Regression, Truck Transportation

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