JOURNAL OF INTERNATIONAL FINANCE AND ECONOMICS®

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Printed and Published in the USA.

TABLE OF CONTENTS

THE VALUE PREMIUM IS NOT DEAD IN CANADA

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dx.doi.org/10.18374/JIFE-21-2.1

ABSTRACT

This study examines whether a value premium still exists in Canada. The evidence presented in this paper suggests that the Canadian value premium persists in recent years, particularly for stocks with low prices. The value premium is argued to be countercyclical so that the strength of the business cycle in causing longer expansions and deeper contractions can lead to trends and plunges in the value premium. While some declare that the value premium is dead, our evidence suggests it has not evaporated in Canada most likely due to the combined effects of a stable Canadian economy, and industries that are less growth oriented.

***Keywords**: value premium, value stock, growth stock, anomaly*

1. INTRODUCTION

Value stocks have low price-to-book ratios, whereas growth stocks sell at high multiples of book value. Since the 1970s many researchers have documented a value premium, meaning that value stocks outperformed growth stocks (Basu, 1977; Fama and French, 1992, 1993, 1996; Lakonishock, Shleifer, and Vishny, 1994). As in the United States, Canadian value stocks have been shown to have higher returns compared to growth stocks (Athanassakos, 2009). However, Fama and French (2020) document a decline in the performance of value stocks in the United States over recent decades leading some to question the wisdom of using a value strategy.

While some evidence suggests that value investing is dead in the United States, is this purely an American phenomenon? In their recent examination of the value premium, Fama and French (2020) argue that the value premium is lower in recent years, but is this also the case for Canada? The U.S.'s closest neighbor to the North provides a test ground to address this question. Notably, some practitioners and academics argue that it is too early to write a post-mortem for value investing (Framsted, 2019; Israel, Laursen, Richardson, 2020). This paper updates the evidence provided by Athanassakos (2009) and provides new evidence on the value premium in Canada.

With a sample including all stocks in the Canadian universe from 1985-2005, Athanassakos (2009) documented a strong and consistent value premium for the full sample, as well as for bear and bull markets, recessions, and recoveries. Firms were sorted into value and growth portfolios using both the price-to book ratio (P/B) and the price-to-earnings ratio (P/E). In all conditions, value beat growth. Athanassakos (2009) concluded that the value premiums in Canada and the United States were quite similar and argued that differences in market structure and firm characteristics across the countries had no discernable impact on the observed outperformance of value stocks above growth stocks for the 1985-2005 sample period. However, there are significant differences in policy between Canada and the United States that give reason to expect differences in performance across the nations' markets.

In recent decades, debates over immigration and medical care have become heated in the United States. In Canada, these social issues have been dealt with more successfully. Furthermore, in the 1990s Canada responded to its increasing debt load by cutting spending and implementing other austerity measures that decreased its debt load. Thus, when the global recession hit in 2008, Canada's debt-to-GDP ratio was under 20%, from over 70%, and it was better able to tackle the challenges of a recession.

Furthermore, starting much earlier in the 19th century, Canada diverged from the path chosen in the U.S. and set up a concentrated banking system that is closely regulated (Bordo, Redish, Rockoff, 2015). As a result of the nation's policy choices, the Canadian economy is more resilient and stable (Lee, 2010; Schmuel, 2010). In contrast to the meltdowns in the U.S. banking system in 2008, Canada's large and diversified financial institutions were much more able to weather the storm.

The value premium is argued to be countercyclical so that the strength of the business cycle in causing longer expansions and deeper contractions can lead to trends and plunges in the value premium. According to Chen, Petkova, and Zhang (2008) the decline in the profitability of a value approach in the United States in recent decades is not likely due to a permanent downward shift but instead more likely to be due to countercyclicality in the value premium.

In a more stable Canadian market, the value premium may be less impacted by countercyclical forces than in markets in the United States. An additional factor impacting the value premium in Canada is the industry structure. Canada does not have exponential growing pharmaceutical and high-tech companies such as American firms including Apple, Microsoft, Google, and Amazon. The Canadian market is dominated by firms in the financial industry as well as materials and energy stocks.

The remainder of this paper is organized as follows. The second section describes the sample construction and provides summary information. The third section reports the primary results on the Canadian value premium. The fourth section provides insight into the relationship between the value premium and firm size. The final section contains a discussion of the results and concluding remarks.

2. DATA DESCRIPTION

To provide evidence on the Canadian value premium, we sample Canadian companies from the COMPUSTAT database for 1983 through 2018. Though our sample ends in 2018, we believe our results reflect the long-term Canadian experience.

However, we recognize that the economic upheaval of 2019 – 2020, with the black swan effect of Covid-19, led to a sharp reduction of inflation and interest rates which may have worked against value stocks (Athanassakos, 2020). For firms with December years-ends, we match annual fundamental data including book value and earnings per share with prices at the end of April of the following year. We exclude firms with non-December year-ends to ensure appropriate inter-temporal comparisons over our cross-section (Givoly, 1985).

All companies in our sample had reported financials for the previous year by the end of April of next year. While some previous studies benchmark to June (e.g., Athanassakos, 2009), we use data from April because all our sample firms, having a December year end, reported financials by that time. Specifically, we compute price-to-book value (P/B) and price-to-earnings (P/E) by dividing the stock price (P) as of April of year t by the book value or earnings per share from COMPUSTAT for fiscal year ending t-1. Our sample includes firms that are headquartered in Canada and traded only on a Canadian exchange.

In contrast, Athanassakos (2009) uses all stocks in the Canadian universe which includes stocks trading on a Canadian exchange, as well as those trading outside Canada. He combines COMPUSTAT, from which price to earnings (P/E) and price to book value (P/BV) ratios were derived, with the Canadian Financial Markets Research Center database (CFMRC) from which Canadian total stock returns, stock prices, betas, volumes, and shares outstanding were obtained.

Here we report results with a sample that excludes inter-listed stocks because stocks traded in the U.S. may show patterns closer to those of American firms, and our goal is to provide insight into the Canadian experience. As described subsequently, we collected and examined a sample including inter-listeds and inferences were similar. These additional results are available upon request. Annual return was calculated by summing monthly returns from May of the previous year (t) through April of year t+1. We match fundamental information with beta, shares outstanding, and trading volume from the Canadian

Financial Markets Research Center (CFMRC) database. We compute market capitalization by multiplying price times shares outstanding and annual volume by the sum of trading volume over the preceding year (t-1 to t) divided by shares outstanding.

We applied several filters to the data before analysis. Stock price had to exceed $1. An observation with negative P/B or P/E was deleted. Also deleted were observations with P/B (P/E) in excess of 20 (200). As noted by Athanassakos (2009) and others, extreme values are likely due to data errors. The data are adjusted for stock splits and dividends and the top and bottom 5% of observations based on returns are excluded.

The final sample includes 3,688 (2,563) firm-year observations for 768 (608) companies with the P/B (P/E) criteria from 1983-2018. We repeated all analysis reported subsequently with a sample that included firms headquartered in Canada and traded in both Canada and a non-Canadian exchange. The sample including cross-listed companies includes 4,834 (3,192) firm-year observations for 925 (723) companies with the P/B (P/E) criteria from 1983-2018. Here we report results using the P/B sorting criteria, though all results were replicated with the P/E criteria, and are available upon request.

For each year of our sample, we ranked firms from low to high based on the multiple (P/B or P/E) and then divided the data into quartiles. We examine quartiles, rather than deciles, to ensure reasonable sample size. Because multiples change from year to year, quartile membership also changes across sample years.

We then computed equally weighted mean (and median) returns for each quartile using the return for each stock in the quartile for the subsequent year (e.g., Fama and French, 1992; Lakonishok, Shleifer, and Vishny, 1994; La Porta, Lakonishok, Schleifer, and Vishny, 1997). Quartile 1 (Q1) includes the stocks with the lowest P/B or P/E firms (the value stocks), and quartile 4 (Q4) includes the stocks with the highest P/B or P/E firms (the growth stocks).

In addition, we computed a time series of nonoverlapping returns for each stock within each quartile for the full sample, subperiods, bear and bull markets, and recessions and recoveries. The designation of a year as bull, bear, recessions, or recoveries follows from https://thedowtheory.com/resources/bull-bear/recessions/, which is consistent with year by year assignments of recessions and recoveries or business cycles as indicated by National Bureau of Economic Research (https://www.nber.org/cycles.html).

For our full sample period 1987, 1990, 2000, 2002, 2008, and 2011 are bear market years, with all other years in the 1983 through 2018 period characterized as bull markets. In addition, recession years during our sample period are 1990, 2001, 2008, and 2009.

3. OBSERVATIONS ON THE CANADIAN VALUE PREMIUM

Table 1 presents summary information for each year of the 1983-2018 sample period and the data is sorted by P/B. The key variables summarized are the subsequent year return (Return, annual %), P/E, P/B, Price, Beta, Market Value, and Volume, which are computed as described in the previous section of this paper. We observe that percentage annual return varies with economic conditions, with low returns observed during the global financial crisis around 2008-9 and a sharp rebound in 2010-11.

We also see that the multiples (P/B and P/E) generally increased during the 1980s, peaking in the mid-1990s, and showing a volatile up and down pattern thereafter. The Canadian firms in our sample had average prices from the high single digits to high teens during the period of observation. The average beta for our sample firms varies quite a bit from year to year with a low of 0.56 in 2015 and a high of 1.20 in 2011 but is generally less than 1.0. Average market capitalization typically increased over the 1980s and 1990s to a maximum of $680 million in 1999, falling to $226 million in 2018. Finally, from Table 1 we also observe volatility in the liquidity of the Canadian market as measured by the volume of trade from

year to year, with a minimum fraction of shares outstanding traded of 13% in 1983 and maximum of 77% in 2001.

Table 2 summarizes evidence on the value premium in Canada where the value premium (VP) is computed as the difference between the returns for value and growth strategies. Panel A of the table reports mean and median returns (%) for quartiles sorted by P/B and tests of differences across value and growth strategies for each year in our sample from 1983 through 2018. As noted earlier, inferences are similar when we sort by P/E, and are available upon request. The mean and median are generally different each year so we conduct t-tests and χ^2-tests of the null hypothesis that the mean and median returns for value and growth strategies are equal. The last two columns of Panel A of Table 2 report p-values for tests of a value premium with the t-test (mean) and the χ^2-test (median).

To provide a clear picture of the temporal pattern in the value premium, we also plot the value premium by year in Figure 1. Panel A (B) shows the pattern for the mean (median) VP each year. For most of the early sample years before 2003, we observe a quite large, positive premium for a value strategy. However, later we see that the VP is more often negative and of smaller magnitude.

Panel B of Table 2 summarizes mean and median returns (annual %) for quartiles sorted by P/B, the value premium, and tests of differences across value and growth strategies by sub-periods (1983-2018, 1983-2000, 2001-2018), state of the world (bear and bull market, recession and recovery), beta, firm size, and trading volume. Though the VP is significantly positive for the first half of the sample period (1983-2000, 5.81% for mean VP) and the full sample (1983-2018, 2.79% for mean VP), the VP is not significantly different from zero for the second half of the observation period (2001-2018, -0.83% for mean VP).

The results reported in Panel B of Table 2 indicate that the return to a value strategy significantly beat a growth strategy in bear markets (8.88% vs. 2.36% for mean returns) and recoveries (12.46% vs. 9.72% for mean returns). However, the value premium is not significantly different from zero in bull markets or recessions. In contrast to Athanassakos (2009) and Kwag and Lee (2006) who report that value stocks outperformed growth in the United States throughout the business cycle, in more recent years the VP is not consistently and significantly positive. In Figure 2 we plot the VP sorted by P/B by sub-period and state of the world. As in Figure 1, Panel A (B) shows the pattern for the mean (median) VP. While the VP is positive over most periods and states of the world, Figure 2 indicates that the largest value premiums are observed during bear markets.

In Panel B of Table 2 we observe some differences in firms that fall into value and growth categories across characteristics when we examine beta, firm size, and trading volume. Value firms tend to have lower betas than growth firms with a significant difference in the median betas (0.81 vs. 0.92), though the difference in the means (0.90 vs. 0.95) is not statistically different.

This is particularly interesting because value firms are significantly smaller than growth firms ($156.78 million ($66.48 million) for the mean (median) market capitalization for value firms vs. $531.36 million ($188.43 million) for the mean (median) market capitalization for the growth firms), yet the value stocks do not appear to have greater systematic risk. Finally, from Table 2 we see no significant difference in the fraction of shares outstanding traded for value or growth stocks. Growth stocks do not trade more than value, suggesting that the value premium does not derive from poor liquidity.

4. THE VALUE PREMIUM AND FIRM SIZE

As reported in Table 2 (Panel B), consistent with Athanassakos (2009), value firms are significantly smaller, in market cap terms, than growth firms, but do not seem to have higher risk. We decided to delve deeper into the value premium for small firms, where small firms are defined based on price level rather than market cap, given that prior research has documented that returns anomalies are primarily a low-price stock effect (Bhardwaj and Brooks, 1992; Jensen, Johnson, and Mercer, 1998). As a result, we take each quartile sorted by P/B and then again sort within the multiple quartile by price into quartiles, or

PQ for price quartile. Because prices change from year to year, quartile membership also changes across sample years. Panel A (B) of Figure 3 shows the mean (median) value premiums for value/growth strategies determined by P/B quartiles for low price (PQ1) and high price (PQ4) quartiles.

The figure includes VPs for the full sample (1983-2018) as well as the two sub-periods (1983-2000, 2001-2018). For the total sample, the value PQ1 stocks had a price range between $1.05 and $14 vs. a range of $11.63 and $93 for the value PQ4 stocks. The corresponding ranges for the growth stocks were between $1.09 and $12.03 for PQ1 vs. $10.88 and $110 for PQ4, respectively. Figure 3 suggests that the value premium is consistently positive across sample periods. In addition, consistent with earlier research, the value premium seems to be a low-price effect.

To more formally examine whether low-price value stocks earn a premium, we test whether returns from a low-price value strategy beat a low-price growth strategy. In Table 3 we report annual returns for value (Q1) and growth (Q4) portfolios sorted by P/B across price-based quartiles (PQ). In the tables, price quartile 1 (PQ1) includes the lowest priced stocks and price quartile 4 (PQ4) the highest priced stocks.

In Panel A we see highly significant differences in mean (median) returns for value and growth strategies for low priced stocks with p-values of 0.0083 (0.0056) for the full sample, 1983-2018. There is no significant difference in the returns for value and growth strategies for high priced stocks ($p > 0.05$).

We also see no significant difference across price quartiles (PQ1 and PQ4) for a value or growth strategy. For the early sample period (1983-2000) reported in Panel B of Table 3, the results are similar. For the more recent sample period (2001-2018) reported in Panel C of Table 3, while we see sizable differences in value and growth strategies with mean (median) returns of 12.82% (14.46%) for a value strategy and 7.52% (6.05%) for a growth strategy, the differences are not statistically significant ($p > 0.05$).

In a recent examination of the value premium, Fama and French (2020) note that the value premium is lower in recent years. We examine the VP for low priced value firms for the same sample period as Fama and French (1991-2018) and find that it is significantly positive ($p = 0.0325$ for mean and $p = 0.0239$ for median). Thus, while the premium to a value strategy is reported by Fama and French (2020) to have dissipated in the U.S., it is alive and well in Canada, especially for low-price value stocks. In the following section we discuss persistence in the Canadian value premium.

5. DISCUSSION AND CONCLUDING REMARKS

While some declare that the value premium is dead, our evidence suggests it has not evaporated in Canada (e.g., Fama and French, 2020). This paper reports the results of a reexamination with more recent stock market data of Athanassakos (2009) who reported a consistent value premium in Canada. The evidence presented in this paper suggests that the Canadian value premium persists in recent years, particularly for stocks with low prices.

As argued earlier in this paper, the Canadian market is more stable than the U.S. market and a more stable market is better able to weather shocks. As we have shown, the Canadian VP is particularly strong in bear markets.

Low P/E or P/B stocks imply market pessimism about growth going forward, whereas high P/E or P/B stocks imply optimism among investors concerning growth opportunities. High growth expectations are crushed in a bear markets resulting in stronger negative reactions in the market for growth stocks due to lowered expectations for the future.

Moreover, the Canadian value premium is also strong in low priced stocks. Low priced stocks tend to be more obscure, are followed by fewer analysts, and are typically less liquid than high priced stocks. Thus, stocks with low prices tend to react more strongly to positive market sentiment, which is more prevalent than negative sentiment, leading to their higher value premium.

In this paper we provide evidence that the VP is more persistent in Canada, as compared to the United States, because the Canadian market is better equipped to respond to shocks. Perhaps a more fundamental issue is why there is a value premium in the first place.

While it has been argued that the higher return to value is a premium for risk, recent evidence suggests that professional investors view value stocks as being *less* risky (Merkel and Sextroh, 2020). If the value premium reflects mispricing, it simply should not persist, particularly since everyone seems to be aware of it. The VP has received significant attention in practitioner circles as well as in the academic literature.

After the publication of a predictable return pattern, investors learn about the anomaly and it should disappear (McLean and Pontiff, 2016). However, recent evidence suggests that the United States is the only nation with a reliable decline in predictability after the publication of an anomaly (Jacobs and Müller, 2020).

If mispricing is due to a behavioral bias, smart arbitrageurs should take advantage of the mispricing, pushing the market toward a more rational outcome. If there are limits to arbitrage, as McLean and Pontiff (2016) argue, arbitrageurs are constrained in their ability to benefit from mispricing.

Another potential limiting factor is the strength of behavioral biases. Psychologists document people's numerous systematic biases. One that is particularly unyielding is probability judgment error. Investors overweight the tail of a payoff distribution leading them to overvalue assets with positively skewed outcomes (Barberis and Huang, 2008). We all are keenly aware that people buy lottery tickets even though lottery tickets are widely recognized to have negative expected values.

This reflects probability judgment error which is associated with both individual and aggregate market irrationality (Ackert, Charupat, Deaves, and Kluger, 2009; Ackert, Kluger, and Qi, 2012). For our purposes, growth stocks are akin to assets with a high probability of a large payout so investors subject to probability judgment error tend to pay too much for these stocks. On the other hand, investors who fall prey to this bias undervalue more stable value stocks, leading to a value premium. We believe that this bias is so pervasive among investors that it limits arbitrageurs' ability to eliminate what appears to be mispricing.

In evaluating a position based on market pricing, a value investor does not base a strategy simply on a multiplier, as in our simplified analysis and is typical of academic studies of the value premium. Fundamental information is the driving force. As noted by Israel, Laursen, and Richardson (2020), in addition to fundamentals, a value investor will consider expectations of non-risk-based preferences.

A value investor recognizes that many investors have preferences for lottery-like stocks leading investors prone to bias to pay too much for growth. Because of the combined effects of these highly entrenched preferences, a stable Canadian economy, and industries that are less growth oriented, value investing in Canada is not dead.

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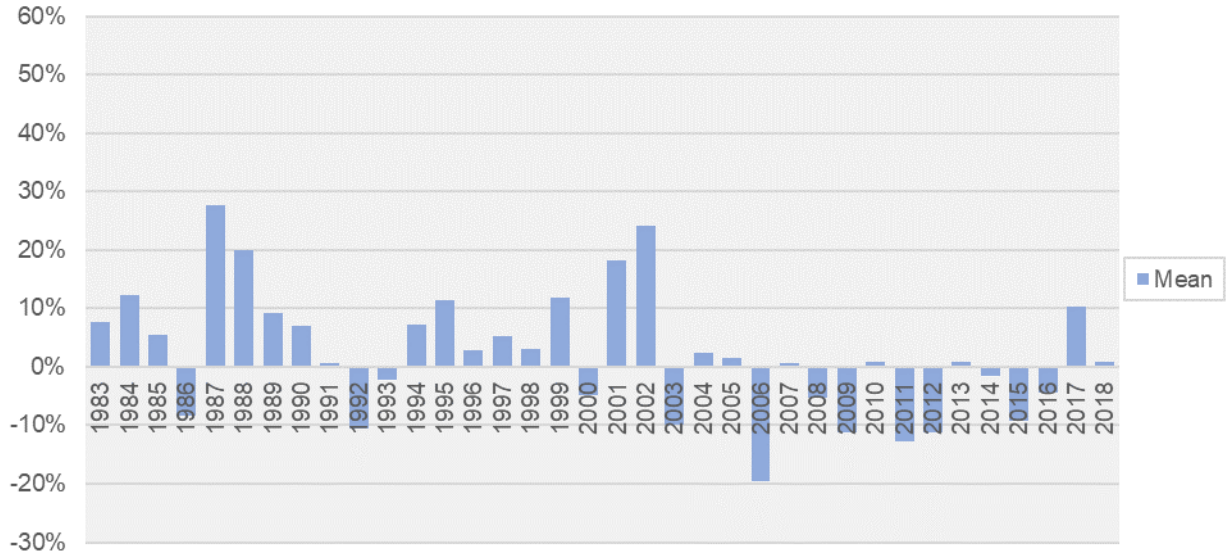
ACKNOWLEDGEMENT

The authors thank the Ben Graham Centre for Value Investing at Ivey Business School for financial support and Hannah Kim for valuable research assistance.

Figure 1. Value Premiums Sorted by P/B Ratio by Year, 1983-2018

Panel A: Mean Value Premiums



Panel B: Median Value Premiums

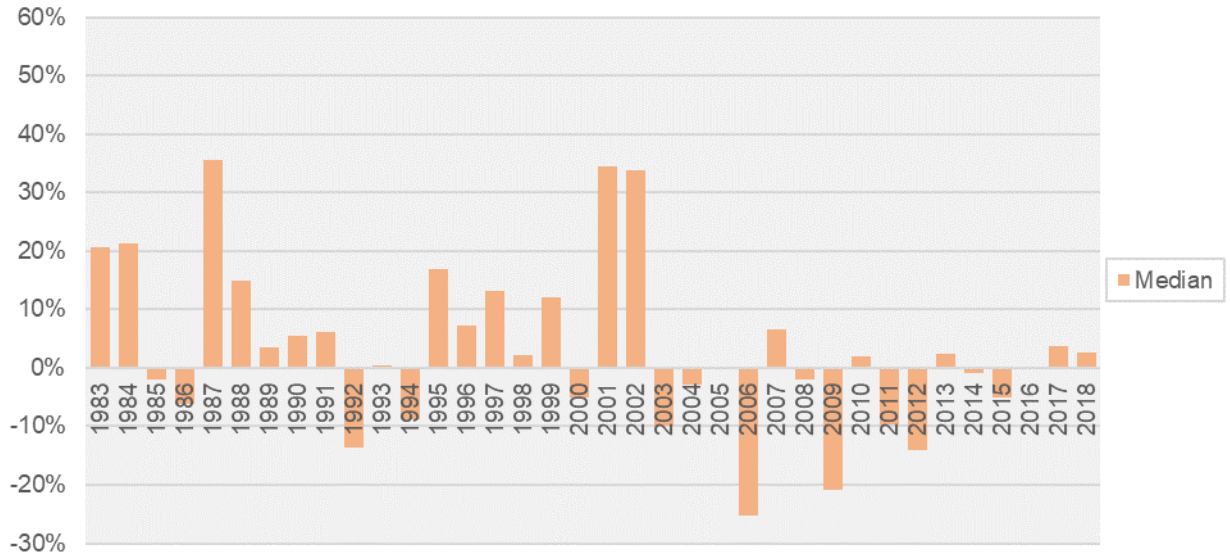
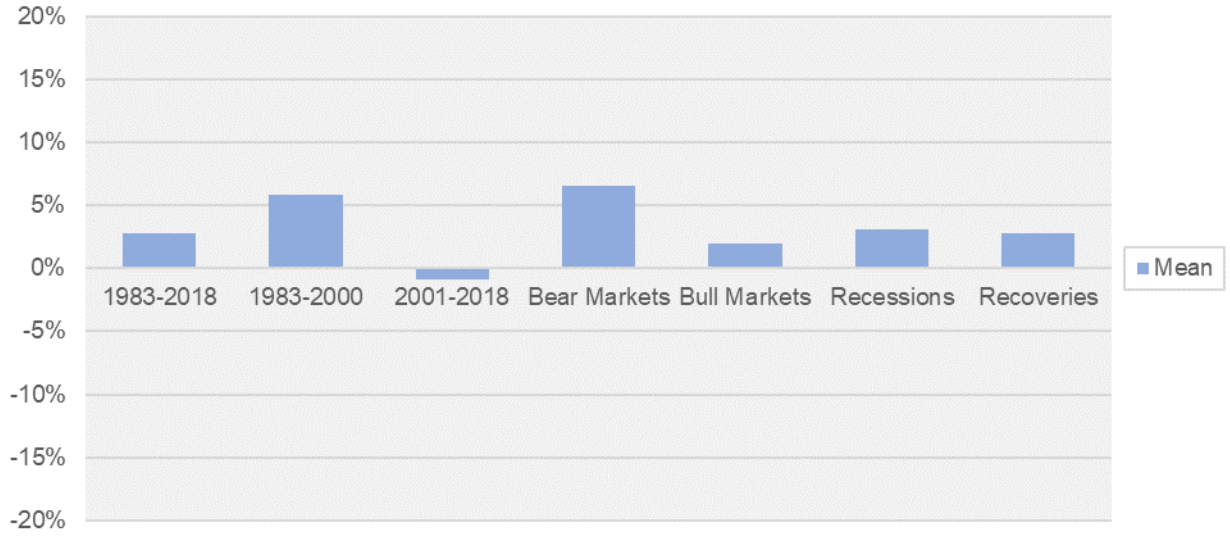


Figure 2. Value Premiums Sorted by P/B Ratio by Sub-Period and State of the World, 1983-2018

Panel A: Mean Value Premiums



Panel B: Median Value Premiums

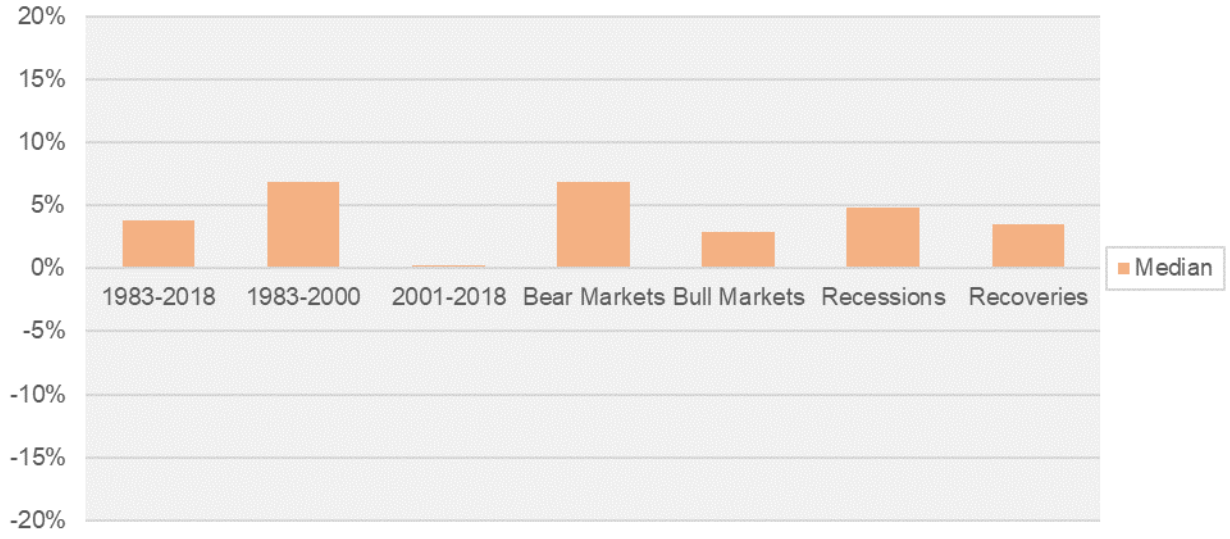
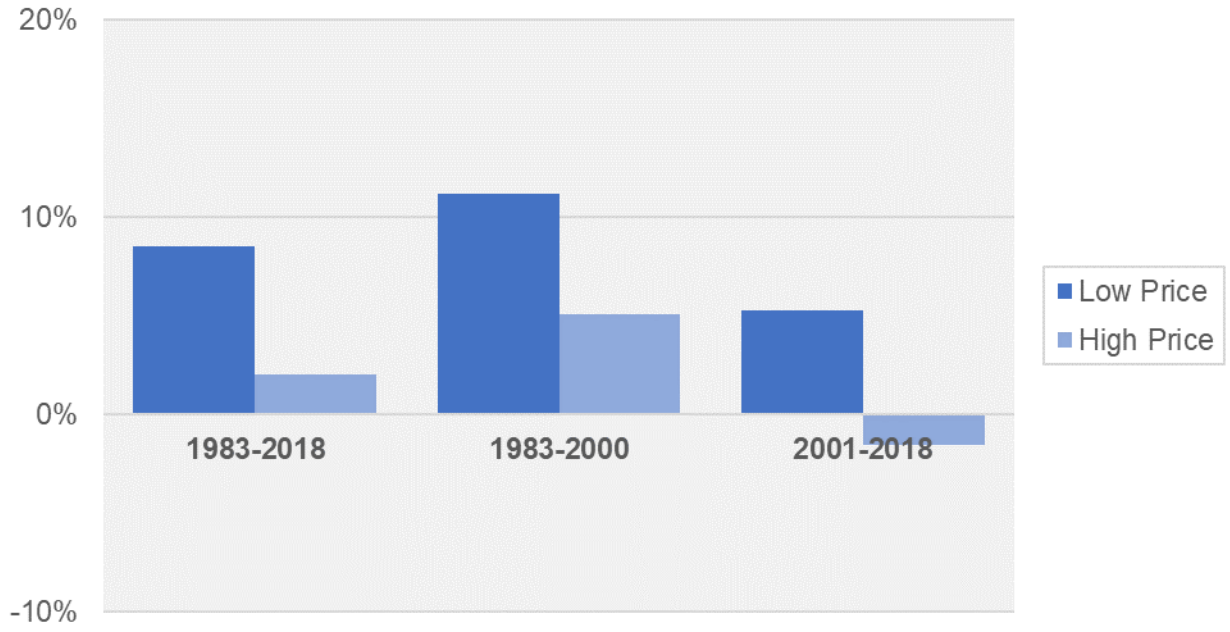


Figure 3. Value Premiums Sorted by P/B Ratio and Price-Based Categories for Full Sample and Sub-Periods

Panel A: Mean Value Premiums



Panel B: Median Value Premiums

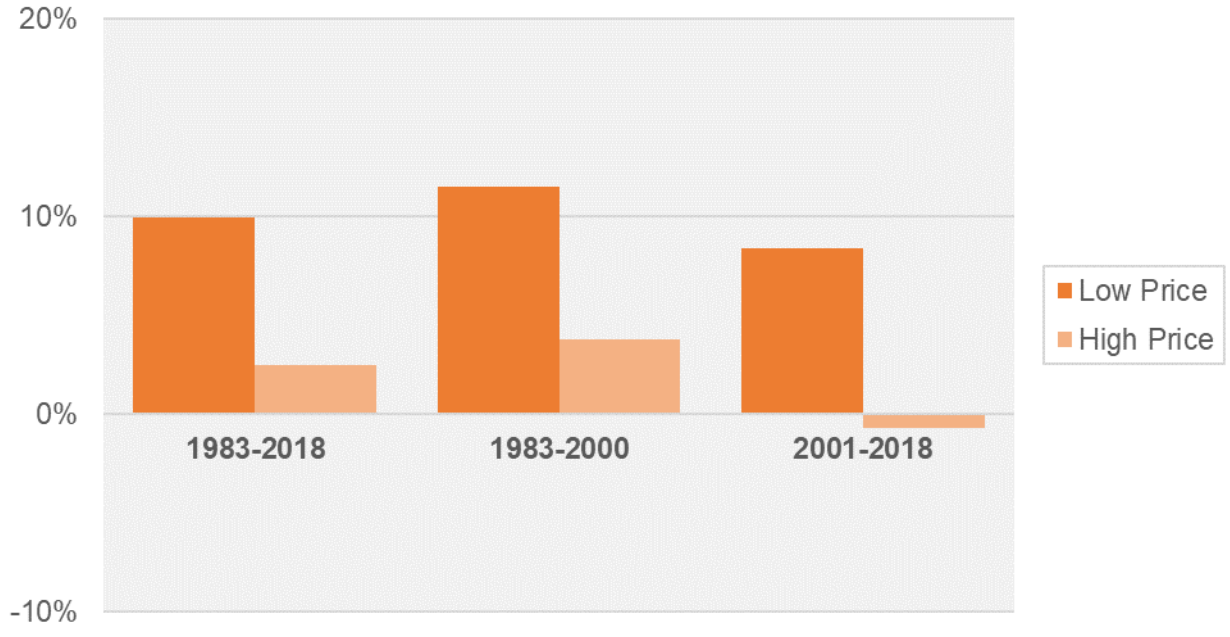


Table 1. Summary Statistics

The table reports summary information for each year of our sample. Return is annual subsequent year return (%). P/E, P/B, Price, Beta, Market Value, and Volume are as described in the second section of the paper.

Year	Return		P/E Ratio		P/B Ratio		Price		Beta		Market Value ($Mil.)		Volume/Shares		Obs.
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	P/B
1983	39.35	37.77	8.98	5.96	0.97	0.78	15.91	13.50	0.79	0.73	136.71	76.95	0.13	0.11	48
1984	13.75	10.32	13.24	9.13	1.62	1.15	17.88	14.75	1.00	0.89	157.14	95.20	0.22	0.16	91
1985	9.97	12.67	10.86	10.06	1.62	1.14	17.33	14.50	0.95	0.82	162.89	86.70	0.18	0.14	101
1986	16.67	18.57	8.65	10.06	1.63	1.20	15.31	13.62	0.94	0.87	211.18	123.33	0.18	0.12	93
1987	17.56	15.07	28.96	14.83	1.78	1.50	18.62	16.00	0.92	0.82	280.99	131.72	0.33	0.20	99
1988	-4.95	-4.44	6.22	14.85	1.89	1.55	16.96	15.50	0.92	0.80	302.92	139.66	0.29	0.21	109
1989	7.96	8.31	17.75	12.11	1.47	1.25	12.78	11.00	0.94	0.93	289.65	111.71	0.24	0.19	119
1990	-1.56	-1.06	19.65	10.09	1.45	1.25	12.38	10.44	1.04	1.05	274.79	116.13	0.20	0.16	104
1991	3.31	6.16	25.23	9.44	1.30	1.15	11.10	9.63	1.01	1.01	304.78	133.64	0.25	0.20	98
1992	1.64	-0.58	20.29	11.81	1.29	1.16	10.84	9.12	0.99	1.02	311.41	131.56	0.18	0.15	99
1993	14.84	11.15	20.58	10.62	1.37	1.22	12.55	10.50	0.92	0.96	381.11	179.79	0.19	0.13	83
1994	22.27	22.34	37.44	13.05	2.11	1.36	11.74	9.69	0.81	0.72	364.74	187.80	0.35	0.20	100
1995	-4.10	-5.30	36.01	16.32	1.96	1.66	12.01	10.00	0.90	0.81	351.17	160.17	0.50	0.33	136
1996	12.37	13.14	18.85	11.50	1.53	1.38	9.50	7.44	0.89	0.84	299.43	108.80	0.35	0.29	150
1997	16.94	18.53	24.95	12.26	2.01	1.41	10.54	7.25	0.84	0.85	349.88	134.49	0.48	0.40	158
1998	17.59	18.01	23.66	15.80	2.29	1.79	12.31	8.15	0.88	0.86	436.15	150.28	0.44	0.41	153
1999	-3.03	-0.03	13.23	18.73	2.29	1.84	14.92	8.05	0.85	0.84	680.41	158.65	0.42	0.36	130
2000	9.25	5.47	16.79	11.64	1.92	1.45	9.91	5.80	0.89	0.86	302.77	101.04	0.44	0.31	139
2001	13.74	16.98	10.64	10.06	2.01	1.31	10.34	5.15	0.79	0.73	421.99	85.08	0.77	0.36	125
2002	10.04	13.17	12.92	10.37	1.91	1.41	10.02	4.95	0.71	0.60	337.40	81.10	0.40	0.28	125
2003	0.80	0.09	20.84	10.68	1.78	1.35	10.29	4.90	0.70	0.54	313.16	88.32	0.44	0.35	126
2004	24.54	22.80	12.88	12.71	1.93	1.33	9.54	6.30	0.67	0.49	271.04	118.88	0.48	0.47	133
2005	17.83	19.97	21.97	13.91	2.43	1.60	11.35	8.27	0.64	0.36	350.27	179.25	0.62	0.55	144
2006	21.11	18.88	14.67	17.08	2.27	1.62	12.05	9.09	0.77	0.52	387.30	205.23	0.64	0.52	146
2007	1.69	1.15	15.01	15.96	2.80	1.78	12.25	8.73	0.97	0.79	443.52	213.10	0.66	0.53	143
2008	-6.32	-5.03	2.94	10.06	2.46	1.50	11.93	7.20	1.00	0.89	397.77	172.73	0.54	0.47	132
2009	-25.35	-27.81	1.98	8.40	1.89	1.21	11.34	7.54	1.10	0.99	433.94	138.16	0.54	0.43	87
2010	41.39	44.32	14.19	3.84	1.12	0.94	9.56	5.25	1.11	0.97	160.50	57.11	0.49	0.40	64
2011	21.65	20.01	5.57	3.00	1.51	0.98	11.75	7.58	1.20	1.04	268.16	83.53	0.51	0.40	62
2012	3.63	4.02	27.95	8.88	1.31	1.01	11.65	9.85	1.07	0.93	210.24	82.27	0.27	0.22	44
2013	6.69	8.96	4.83	4.08	1.52	1.02	10.97	9.92	0.87	0.90	254.99	67.08	0.29	0.24	45
2014	9.01	7.50	7.06	8.75	1.25	1.00	11.34	10.40	0.65	0.53	230.72	77.68	0.26	0.25	63
2015	4.48	5.91	14.19	7.29	1.21	1.00	11.69	9.97	0.56	0.36	196.55	63.65	0.34	0.33	69
2016	-4.39	-5.01	3.30	8.58	1.15	0.97	11.35	9.98	0.66	0.53	219.98	55.69	0.34	0.29	64
2017	18.86	17.51	1.37	4.55	1.13	0.94	10.19	9.00	0.71	0.50	217.28	44.15	0.32	0.29	57
2018	5.68	5.76	12.22	6.67	1.14	1.01	11.76	10.40	0.80	0.48	265.66	54.03	0.34	0.29	49

Table 2. Annual Return and Value Premium

Panel A: The table reports mean and median returns (%) for quartiles sorted by P/B, the value premium, and tests of differences across value and growth strategies by year.

Year	P/B Sorted Quartiles								Total		Value Premium		P-Value	
	Q1 (Value)		Q2		Q3		Q4 (Growth)				Q1-Q4		Q1≠Q4	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
1983	46.65	51.88	33.25	36.26	38.49	33.07	39.01	31.34	39.35	37.77	7.63	20.54	0.450	0.419
1984	19.54	24.79	14.43	9.19	13.85	11.91	7.19	3.48	13.75	10.32	12.36	21.30	0.098	0.040
1985	9.50	4.02	10.04	12.67	16.32	24.15	4.05	6.04	9.97	12.67	5.44	-2.01	0.497	0.806
1986	4.91	9.28	26.37	26.16	22.64	26.10	13.27	15.47	16.67	18.57	-8.36	-6.19	0.422	0.383
1987	31.49	40.90	23.38	25.40	11.36	11.49	3.76	5.36	17.56	15.07	27.73	35.53	0.002	0.006
1988	6.65	2.56	-7.90	-5.09	-5.65	-4.44	-13.31	-12.35	-4.95	-4.44	19.96	14.92	0.005	0.013
1989	13.31	10.06	0.14	0.13	14.62	13.74	4.00	6.59	7.96	8.31	9.31	3.47	0.249	0.399
1990	-1.23	-0.21	-0.14	-2.43	3.39	5.76	-8.27	-5.60	-1.56	-1.06	7.04	5.38	0.411	0.249
1991	3.09	10.42	6.43	9.03	1.37	5.81	2.40	4.32	3.31	6.16	0.69	6.10	0.930	0.594
1992	-7.69	-15.66	0.03	-2.40	11.83	10.47	2.78	-2.10	1.64	-0.58	-10.47	-13.56	0.220	0.218
1993	16.46	11.50	18.14	12.45	5.78	9.20	18.57	11.15	14.84	11.15	-2.11	0.35	0.828	0.850
1994	23.65	15.69	25.15	21.90	23.93	26.55	16.34	24.54	22.27	22.34	7.31	-8.85	0.320	0.528
1995	-0.60	1.20	1.29	1.43	-5.12	-5.83	-11.96	-15.62	-4.10	-5.30	11.36	16.81	0.115	0.056
1996	18.97	22.07	10.19	8.25	3.98	2.16	16.08	14.80	12.37	13.14	2.89	7.27	0.673	0.394
1997	20.28	21.64	15.12	16.65	17.23	23.00	15.10	8.49	16.94	18.53	5.17	13.15	0.452	0.356
1998	15.75	17.37	33.51	32.03	8.44	12.52	12.72	15.18	17.59	18.01	3.04	2.19	0.689	0.647
1999	6.85	11.46	-7.34	-1.53	-6.87	-5.01	-4.99	-0.71	-3.03	-0.03	11.84	12.17	0.142	0.139
2000	7.12	3.90	13.18	8.36	4.63	1.68	11.95	9.00	9.25	5.47	-4.83	-5.09	0.527	0.463
2001	18.24	27.72	14.73	14.18	21.85	27.93	0.02	-6.78	13.74	16.98	18.23	34.50	0.052	0.062
2002	19.12	25.81	14.79	16.38	10.95	4.29	-4.98	-8.02	10.04	13.17	24.09	33.84	0.011	0.009
2003	-4.46	-6.78	-1.62	-1.80	3.86	2.78	5.44	3.00	0.80	0.09	-9.90	-9.79	0.131	0.113
2004	28.53	22.53	18.61	18.10	24.77	25.51	26.11	25.44	24.54	22.80	2.42	-2.91	0.725	0.960
2005	16.87	16.46	17.91	20.71	21.28	23.30	15.25	16.73	17.83	19.97	1.62	-0.27	0.836	0.831
2006	11.81	13.58	15.90	13.50	25.34	22.50	31.38	38.85	21.11	18.88	-19.57	-25.27	0.005	0.001
2007	4.10	7.67	-0.43	1.42	-0.48	-8.36	3.51	1.07	1.69	1.15	0.59	6.60	0.941	0.677
2008	-11.07	-6.23	-4.48	-1.36	-4.01	-5.70	-5.71	-4.22	-6.32	-5.03	-5.36	-2.01	0.429	0.560
2009	-30.83	-42.52	-29.37	-33.09	-21.43	-27.24	-19.61	-21.65	-25.35	-27.81	-11.22	-20.87	0.190	0.078
2010	45.23	49.47	41.92	39.14	34.08	42.97	44.34	47.45	41.39	44.32	0.89	2.02	0.917	1.000
2011	14.50	14.02	23.73	21.12	21.17	14.44	27.28	23.79	21.65	20.01	-12.78	-9.77	0.261	0.228
2012	-1.32	-4.55	3.62	4.19	2.21	3.29	9.99	9.41	3.63	4.02	-11.30	-13.96	0.287	0.279
2013	6.32	9.58	4.57	6.70	10.57	12.48	5.35	7.11	6.69	8.96	0.97	2.47	0.919	0.667
2014	6.63	2.83	6.31	8.11	15.37	17.20	8.11	3.68	9.01	7.50	-1.48	-0.85	0.866	1.000
2015	-0.60	3.37	5.06	6.78	5.21	-0.53	8.56	8.37	4.48	5.91	-9.16	-5.00	0.055	0.056
2016	-6.48	-4.74	-5.37	-7.30	-3.72	-3.84	-2.00	-4.56	-4.39	-5.01	-4.48	-0.17	0.535	0.910
2017	23.76	17.91	21.94	18.75	15.92	15.77	13.47	14.23	18.86	17.51	10.28	3.67	0.115	0.256
2018	7.01	6.41	3.86	3.71	5.70	7.93	6.04	3.85	5.68	5.76	0.98	2.56	0.816	0.514

Panel B: The table reports mean and median returns (%) for quartiles sorted by P/B, the value premium, and tests of differences across value and growth strategies by sub-periods, state of the world, beta, firm size, and trading volume.

Year	P/B Sorted Quartiles								Total		Q1-Q4		P-Value Q1≠Q4	
	Q1 (Value)		Q2		Q3		Q4 (Growth)							
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
1983-2018	10.43	10.40	9.91	9.16	9.73	9.66	7.64	6.57	9.43	8.94	2.79	3.83	0.058	0.026
1983-2000	12.06	12.11	11.25	9.99	8.61	8.89	6.24	5.28	9.55	9.11	5.81	6.83	0.003	0.002
2001-2018	8.49	8.51	8.29	8.38	11.08	10.06	9.33	8.26	9.29	8.79	-0.83	0.26	0.705	0.907
Bear Markets	8.88	6.79	10.35	8.38	6.40	4.12	2.36	-0.02	7.00	5.95	6.52	6.81	0.076	0.059
Bull Markets	10.77	10.61	9.81	9.19	10.46	10.73	8.80	7.75	9.96	9.65	1.97	2.86	0.219	0.122
Recessions	-4.35	-3.88	-3.04	-5.17	1.65	-0.64	-7.45	-8.69	-3.31	-4.60	3.10	4.82	0.486	0.455
Recoveries	12.46	12.00	11.70	10.54	10.86	10.62	9.72	8.46	11.19	10.50	2.74	3.54	0.074	0.043
Beta	0.90	0.81	0.84	0.73	0.81	0.72	0.95	0.92	0.87	0.79	-0.05	-0.10	0.164	0.015
Size ($Mil)	156.78	66.48	269.36	101.79	332.14	130.58	531.36	188.43	325.56	117.24	-374.58	-121.95	0.000	0.000
Volume/Shares	0.40	0.29	0.43	0.35	0.39	0.30	0.43	0.30	0.41	0.31	-0.03	-0.01	0.512	0.575

Table 3. Annual Returns for Value (Q1) and Growth (Q4) Portfolios Sorted by P/B for Price-Based Quartiles (PQ)

Panel A: 1983-2018

		PQ1 (Low Price)	PQ4 (High Price)	PQ1 ≠ PQ4 p-values
Q1 (Value)	Mean Median Observations	0.1340 0.1424 251	0.1109 0.1023 236	0.4231 0.3630
Q4 (Growth)	Mean Median Observations	0.0485 0.0432 247	0.0905 0.0773 234	0.1467 0.0876
Q1 ≠ Q4 p-values	Mean Median	0.0083 0.0056	0.4026 0.4225	

Panel B: 1983-2000

		PQ1 (Low Price)	PQ4 (High Price)	PQ1 ≠ PQ4 p-values
Q1 (Value)	Mean Median Observations	0.1386 0.1424 139	0.1385 0.1104 128	0.9983 0.8740
Q4 (Growth)	Mean Median Observations	0.0266 0.0276 136	0.0877 0.0726 128	0.1103 0.0646
Q1 ≠ Q4 p-values	Mean Median	0.0090 0.0076	0.1074 0.1572	

Panel C: 2001-2018

		PQ1 (Low Price)	PQ4 (High Price)	PQ1 ≠ PQ4 p-values
Q1 (Value)	Mean Median Observations	0.1282 0.1446 112	0.0782 0.0703 108	0.2459 0.2491
Q4 (Growth)	Mean Median Observations	0.0752 0.0605 111	0.0939 0.0774 106	0.6825 0.5636
Q1 ≠ Q4 p-values	Mean Median	0.2860 0.2334	0.6783 0.7656	

SHORT AND LONG-TERM IMPACTS OF US FISCAL STIMULUS ON US INCOME

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dx.doi.org/10.18374/JIFE-21-2.2

ABSTRACT

Our study examines the impact of US government's stimulus spending on the nation's income. We apply the VECM model on US data from 1980 to 2020. We also estimate impulse response of our model variables by giving one standard deviation positive shock to each of our model variables. From our VECM estimates as well as impulse responses, we find that, while the long-term impact of US fiscal stimulus spending on US GDP is positive and significant, the short-term effect is insignificant.

Keywords: *fiscal stimulus spending, stationarity, cointegration, VECM, short-term impact, long-term impact*

1. INTRODUCTION

The use of an expansionary fiscal policy has a long history in US economy. In an attempt to take the U.S. economy out of the Great Depression the nation fell into in 1929, President Franklin D. Roosevelt used expansionary policy by initiating several public works projects.

This policy worked fine in the beginning. Later, the president's effort to balance the economy caused the reappearance of the depression, which prompted him to resort to an expansionary fiscal policy one more time. To rescue the nation's economy out of the 1960 recession, President John F. Kennedy used expansionary policy to stimulate the economy.

Similarly, the recession of 2001 caused by a tech bubble bust prompted the then Bush administration to embrace an expansive fiscal policy. The then president introduced an expansionary fiscal policy through the Economic Growth and Tax Relief Reconciliation Act, which authorized the government to mail out tax rebate checks and lower income tax slabs.

But, the terrorist attacks of September 11, 2001 sent the U.S. economy back into recession. The president, therefore, launched a war on terror and cut business taxes in 2003 through the Jobs and Growth Tax Relief Reconciliation Act to stimulate the economy.

In an attempt to dig the nation's economy out of recession caused by a demand shock mainly due to the housing bubble bust combined with a supply shock due to surges in oil prices, the Obama administration used an expansionary fiscal policy by introducing the American Recovery and Reinvestment Act in 2009. This Act cut taxes, extended unemployment benefits, and funded public works projects. The law was meant to stimulate the weak economy that cost $787 billion in tax cuts and government spending.

The Trump administration used an expansionary policy through the Tax Cuts and Jobs Act and also increased discretionary spending—especially for defense.

Although the long term impact of an expansionary fiscal policy is subject to intensive debate, both democratic and republican presidents alike seem to believe that an expansionary fiscal policy stimulates the economy at least in the short run.

While republicans mostly insist that an expansionary fiscal policy be focused on cutting business taxes and lowering income tax rates, democrats mostly insist that the policy be focused on supporting low-income people and increasing spending on public works projects.

However, their arguments as to how an expansionary fiscal policy stimulates the economy run in two different directions. While republicans argue that cutting business taxes spurs investment, which in turn creates employment, generates income and stimulates the economy, democrats, on the other hand, argue that financial supports to low-income people and spending on public works projects create demand in the economy raising expected profit for the businesses, thereby raising investment, employment, and income and ultimately stimulating the economy.

The following table exhibits that, although offering a different rationale for, all 3 recent presidents (republicans and democrat): President Bush (2001-2008), President Obama (2009-2016), and President Trump (2017-2020) have used an expansionary fiscal policy during their tenure, which created a huge budget deficit as evident from the following table..

U.S. Budget Surplus or Deficit			
Year	**Surplus or Deficit**	**Year**	**Surplus or Deficit**
2001	128.2	2011	–1,299.6
2002	–157.8	2012	–1,076.6
2003	–377.6	2013	–679.8
2004	–412.7	2014	–484.8
2005	–318.3	2015	–442.0
2006	–248.2	2016	–584.7
2007	–160.7	2017	–665.4
2008	–458.6	2018	–779.1
2009	-1,412.70	2019	–984.2
2010	–1,294.4	2020	–3,131.9

Source: Economic Report of the President, 2021:
https://www.govinfo.gov/content/pkg/ERP-2021/pdf/ERP-2021.pdf

It is, therefore, interesting to examine if an expansionary fiscal policy always stimulates the economy. In other words, does an expansionary fiscal policy always spurs investment, raises the level of employment, and raises a nation's income. I this study, we will investigate whether a stimulus policy (an expansionary fiscal policy) does really stimulate the economy or raise the nation's income.

Our study examines several previous studies related to this issue. A study by Senokovic et al (2018) analyzes the quantitative power of fiscal stimulus in the creation of economic growth applying structural vector auto-regression by determining the size of the fiscal multipliers on G7 countries.

Their results find the values of the fiscal multipliers not exceeding unity in all cases. They also find that a one-time positive shock to the government consumption affects the aggregate output to a greater extent than the domestic price level and interest rates.

Leeper, E. et al (2010) examine the growth effect of government investment using the neoclassical growth model. They conclude that while implementation delays can produce small or even negative output responses to increases in government investment in the short run, it can also negatively affect economic growth in the long run when public capital is insufficiently productive.

A study by Carlino and Inman (2016) conducted on the US economy on the data spread over the period from 1960 to 2010 using a structural vector auto-regression model at the backdrop of the passes of American Recovery and Reinvestment Act of 2009 concludes that a fiscal stimulus that includes tax cuts and transfers to households, firms, and state and local governments are effective.

Drautzburg and Uhlig (2015), using a New Keynesian model, try to quantify the fiscal multipliers in response to the American Recovery and Reinvestment Act (ARRA) of 2009. They find the short-run multipliers to be around 0.53 and the long-run multipliers to be around − 0.36, that is, a short-run positive multiplier followed by a long-run negative multiplier.

A paper by Aizenman and Pasricha (2013) studies the patterns of government expenditure stimuli among Organisation for Economic Co-operation and Development (OECD) countries during the Great Recession (2007–2009). Of the 28 countries studied, the paper finds that emerging markets and countries with very high gross domestic product (GDP) growth during the pre-recession period saw larger net fiscal stimulus on average than their counterparts.

Nakamura and Steinsson (2014) use rich historical data on military procurement to estimate the effects of government spending. They exploit regional variation in military build-ups. They estimate an "open economy relative multiplier" of approximately 1.5.

Cohen-Setton, Gornostay and Lacharriere (2018), in their study trying to examine the impact of a tax cut on the economy, predicts that the sweeping tax cuts enacted in the United States at the end of 2017 and the spending package enacted in February of that year will yield an extra boost to GDP of 0.5 percent by 2020, instead of 2.1 percent.

Coenen, et al. (2012) apply seven structural DSGE models to examine the impact of a discretionary fiscal stimulus shocks and find that the size of many multipliers is large, particularly for spending and targeted transfers. They also find that fiscal policy is most effective if it has moderate persistence and if monetary policy is accommodative. They further finds that permanently higher spending or deficits imply significantly lower initial multipliers.

For a sample of developed countries, a study by Auerbach and Gorodnichenko (2017) trying to examine the impact of government borrowing in an effort to stimulate the economy find that government spending shocks do not lead to persistent increases in debt-to-GDP ratios. They also find that, even in countries with high public debt, the penalty for activist discretionary fiscal policy appears to be small.

Our study contributes to the existing literature of macroeconomics in two significant ways:

(1) we use vector error correction model to analyze the impact of US government stimulus spending on the nation's income using recent data,

(2) we analyze both the short run and long-run impact of government stimulus spending on the nation's income, and

(3) we also analyze how any shock to US government spending will affect the nation's income by estimating impulse responses.

2. THE MODEL

In order to analyze the impact of US fiscal stimulus on US income, we use the general equilibrium model. We start with the goods market equilibrium as following:

AD = AS = GDP

Where, AD, AS, and GDP are aggregate demand, aggregate supply, and output respectively. Since, aggregate demand equals personal consumption expenditure (CON), gross private domestic investment (INV), government consumption expenditure and gross investment (GOV), and net export (NX), it yields the following identity:

AD = CON + INV +GOV + NX

When the goods market is in equilibrium, AD = AD. This equilibrium condition allows us to write,

GDP = CON + INV + GOV + NX (1)

It means, any change in any of the four components of AD changes the AD and thereby the equilibrium output (GDP). In stochastic form the model in equation (1) can be expressed as,

$$GDP_t = a_0 + a_1 CON_t + a_2 INV_t + a_3 GOV_t + a_4 NX_t + e_t \quad (2)$$

Here e_t is an error term. If we assume that the systematic effects of all independent variables other than GOV are included in the intercept term and their random effects are included in the error term, then the model in equation (2) can be rewritten as.

$$GDP_t = b_0 + a_3 GOV_t + u_t \quad (3)$$

We expect a_3 to be positive, because any increase in government spending (G) raises the aggregate demand (AD) and thereby the output (GDP).

3. DATA

Data on US output or GDP and government spending (GOV) was collected from the Bureau of Economic Analysis website (https://apps.bea.gov/iTable/iTable.cfm?reqid=19&step=2#reqid=19&step=2&isuri=1&1921=survey) and ranges from 1980 to 2020.

4. METHODOLOGY AND EMPIRICAL FINDINGS

Since any change in the level of government spending has a short term effect as well as a long-term effect via income multiplier, in this study, therefore, we examine both the short-term and the long-term relationship between our dependent variable, GDP_t, and the independent variable, GOV_t.

Since most time series are nonstationary, we need to find if any long-term relation exist between them. In order for any two variables to be associated with a long-term relationship, both must be integrated of the same order.

Therefore, we fist investigate if these two variables are stationary, and if so, of what order, we conduct the augmented Dickey-Fuller test and obtained the following results:

Variable	t-statistic	Critical Value at 5%	Stationary?
GDP	1.403868	0.9987	Non-stationary
d(GDP,2)	-5.3264	0.0002	Stationary
GOV	0.026048	0.9553	Non-stationary
d(GOV,2)	-4.80538	0.0004	Stationary

The above results show that both variables are integrated of order 2 indicating a possibility of a long-run relationship between them. But before conducting a Johansen cointegration test to determine if any such relationship exists, we need to determine the appropriate lag length to be used in the cointegration test as the test is sensitive to lag length.

So, we run a vector autoregressive model to determine the appropriate lag length and obtained the following results.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-603.312	NA	5.56E+11	32.71955	32.80662	32.75024
1	-453.01	276.2307	2.05E+08	24.81133	25.07256	24.90342
2	-421.991	53.65381	47604439	23.35086	23.78625	23.50436
3	-412.887	14.76359*	36340162*	23.07496*	23.68450*	23.28985*
4	-409.121	5.699817	37197736	23.08761	23.8713	23.3639

As the above results show five out of six criteria selected that the appropriate lag length is 3. So, using a lag length of 3 we conducted the Johansen cointegration test that produced the following results.

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.473021	25.18965	15.49471	0.0013
At most 1	0.039409	1.487633	3.841465	0.2226

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.473021	23.70201	14.2646	0.0012
At most 1	0.039409	1.487633	3.841465	0.2226

Both tests indicate that there is at least one cointegrating vector between our model variables. Therefore, to determine a long-run and a short-run relationship between the two variables we run a vector error correction model. Based on the estimation, we obtain the following results.

Long-Run Equation:

$$GDP_t = -4914.085 + 7.576GOV_t \quad (4)$$

t-value = (16.3051)

Short-Run Equation:

$$\Delta GDP_t = -0.04368ECT_{t-1} + 0.546894\Delta GDP_{t-1} - 0.51016\Delta GDP_{t-2}$$

t-value = (-1.27540) (1.66706) (-1.39727)

$$-0.00616\Delta GDP_{t-3} + 0.118008\Delta GOV_{t-1} \text{ -0.9677}\Delta GOV_{t-2} \text{ - 1.03704}GOV_{t-3} + 589.1133 \quad (3)$$

(-0.01876) (0.05081) (-0.33526) (-0.44544) (2.58804)

The t-statistics (given in parentheses) suggest that, in the long run equation, the coefficient associated with the independent variable, GOV is statistically significant at 5% significance level. A positive and significant coefficient associated with this variable indicates that any rise (fall) in government spending raises (lowers) US GDP in the long run. In the short-run equation, on the other hand, the coefficients associated with the variables, ΔGOV_{t-1}, ΔGOV_{t-2}, and ΔGOV_{t-3}, are all insignificant at 5% implying that any change in government spending has no effect on US GDP in the short run.

How to interpret this finding? Several factors can be blamed for this unexpected finding. Why this is an unexpected finding? This is because, the purpose of an expansionary fiscal policy is to give an immediate relief to an economy ailing from a recession or slowdown. What factors could be responsible for this finding?

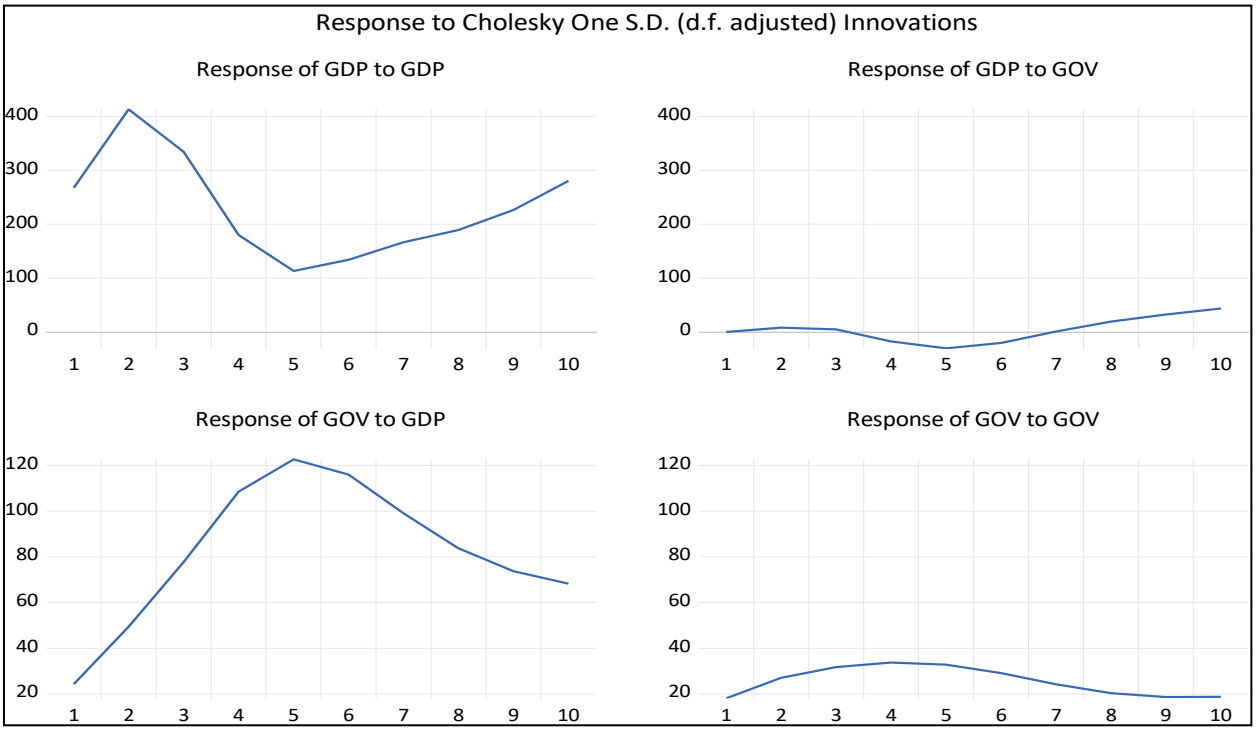
First, if the increase in government spending only keeps up with the rate of inflation, it does not increase government spending in real term and, therefore, does not affect the GDP.

Second, if most of the increase in government spending goes to giving tax cuts to very rich people, it does not increase consumer spending and, thereby the aggregate demand, in a significantly way as the marginal propensity to consume of high-income people is lower than that of the low-income people and, therefore, does not affect the GDP.

Third, if there is uncertainty in the economy due to recession or any other reason, stimulus checks given to low-income people in an attempt to boosting the GDP are not all spent and, therefore, any increase in government spending in the midst of uncertainty fails to positively affect the economy in a significant way.

In order to test the robustness of our findings, we applied a one standard deviation positive shock to our model variables and measure their impulse responses. The following plots show the impulse responses of each of our model variables.

The impulse response of GDP to GOV (the graph in the top right panel) shows that a one standard deviation positive shock to GOV has no effect on GDP up to period-3, has a negative effect in period-4 & 5, and then has a persistent positive effect from period-6 onward.



Also, the coefficient associated with the error-correction term, ECT, is found to be negative but insignificant at 5% significance level, which implies that any short term fluctuation in US GDP will not be adjusted toward its long-run value. However, it won't drift away from its long-run value either.

5. SUMMARY AND CONCLUSION

Data on US government spending over the period from 1980 to 2020 clearly indicates that there is a sustained rise in US government spending with a 6-fold jump in 2020 compared to that in 1980. In this period, the US economy experienced a decline in real GDP in 2009 and 2020.

While the fall in real GDP in 2009 was attributed to the housing market crash and the rise in oil prices, the one in 2020 is attributed to COVID-19 pandemic.

Also, while a small increase in government spending on year-on-year basis is a regular phenomenon with the expansion in government activities due to increasing population, big spikes in government spending is largely targeted to boost the nation's GDP in an attempt to take the economy out of recession or to stimulate a sluggish economy.

But the question arises as to whether such a big increase in government spending does really boost the nation's GDP. In this study, we investigate the short-term and the long-term impact on US GDP of increase in US government spending.

Since all our models variables, U.S. GDP (GDP) and U.S. government spending (GOV) have been found to be cointegrated of at least order one, we estimate a vector error correction model (VECM) on the data ranging from 1980 to 2020. In the long run equation, the coefficient associated with the variable GOV_t has

been found to be positive and significant implying that any increase in the government spending improves the nation's GDP in the long run. In the short-run equation, on the other hand, the coefficient of the

variables ΔGOV_{t-1}, ΔGOV_{t-2}, and ΔGOV_{t-3}, have been found to be either positive or negative but insignificant at 5% level, implying that any increase in US government spending has no effect on the nation's GDP in the short run.

Failure of any boost in government spending to positively affect the GDP in the short run can be attributed to several factors. For example, if the increase in government spending only keeps up with the rate of inflation, it does not increase government spending in real term and, therefore, does not affect the GDP.

Also, if most of the increase in government spending goes to giving tax cuts to very rich people, it does not increase consumer spending in a significant way as the marginal propensity to consume of rich people is lower than that of the lower-income people and, therefore, does not affect the aggregate demand and, thereby, the GDP.

Similarly, if there is uncertainty in the economy due to recession or any other reason (e.g. a pandemic), stimulus checks given to low-income people in an effort to boost the GDP are not all spent and, therefore, a government stimulus spending fails to positively affect the economy (GDP) in a significant way.

Findings of this study have several policy implications: (a) fiscal policy may not be short-run solution to a sluggish economy; (b) for a fiscal policy to be effective, the increase in government spending should exceed the rate of inflation; and (c) any fiscal stimulus must target the low-income groups whose marginal propensity to consume is relatively high for it to be effective in the short run.

Our study has certain limitations as it does not investigate into the reasons for the failure of government stimulus spending to boost the GDP in the short run. So, future studies can be focused on those areas, for example, how the increased income from a tax cut or stimulus checks are spent. Also, our study does not examine the income distributional aspects of government stimulus spending.

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FINANCE COMMITTEE, FINANCIAL DECISIONS, AND FIRM PERFORMANCE

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dx.doi.org/10.18374/JIFE-21-2.3

ABSTRACT

This paper studies whether a stand-alone finance committee is beneficial to shareholders and which finance committee characteristics play a key role. Using a sample of the Standard and Poor's 500 companies, we find that simply establishing a finance committee may not be beneficial. However, in firms with an established finance committee, firm performance improves if the chair of the finance committee is independent and the number of the chair's active board memberships is limited to three or fewer. The number of committee memberships the chair has in the same company does not negatively affect firm performance. The finance committee chair simultaneously serving on an audit committee does not significantly improve firm performance. Finally, finance committee size does not play a role in firm performance and finance decisions.

Keywords: *Finance Committee, Board Committees, Firm Performance, Financial Decisions*

1. INTRODUCTION

The board of directors has two main responsibilities: advisory and oversight. To better serve shareholders, firms form various board committees that perform oversight functions and monitor the specific activities of the firm and management. The ultimate goal of the various committees is to improve firm performance and create value for shareholders. All boards of publicly traded companies in the United States are required by the Sarbanes-Oxley Act and stock exchange regulations to establish three standing committees: audit, compensation, and nominating/governing committees. Some companies have voluntarily formed specialized board committees such as finance, executive, risk, science and technology, strategic planning, corporate social responsibility related, etc., of which the most popular and prevalent is the finance committee.

One major reason for the increasing popularity of finance committees is that "*audit committees are overburdened by their increased obligations to oversee the details of the reporting and compliance processes. As a result, the audit committee no longer has enough time to seriously consider broader financial topics. If directors are going to have meaningful input into the broad financial issues faced by any public company, they need to form a finance committee with the time and expertise to address the issues."* (https://www.cfo.com/governance/2017/05/create-finance-committee-every-public-company/) In addition, firms with complex business models tend to have a large board, which is more likely to establish specialized committees such as a finance committee to mitigate costs and effectively perform monitoring roles (Boone, Field, Karpoff, & Raheja, 2007; Coles et al., 2008; Linck, Netter, & Yang, 2008). Having multiple specialized board committees may maximize the contributions and talents from board members and improve corporate governance (Spira and Bender, 2004).

The role of the finance committee is broad. For example, the finance committee of 3M states that it "assists the Board with its oversight of the Company's financial structure, including its overall capital structure, sources and uses of funds and related cash and financing plans, the Company's financial condition and capital strategy, and financial risk management." The responsibilities and roles also include monitoring, reviewing and evaluating dividends, stock repurchases, short- and long-term borrowings, mergers and acquisitions, capital allocation, funding and liquidity strategies, etc.

Board of Director research primarily focuses on audit committees and compensation committees with only a few papers investigating specialized committees such as the finance committee. The importance of finance committees is indicated in publicly traded companies' proxy statements. For example, Duke Realty Corp's finance committee met 10 times while the Board of Directors in the firm met only 8 times in 2018. The Hershey Company's audit committee met 7 times while the finance committee met 11 times. All directors except one in Eastman Chemical also serve on the finance committee. Fifth Third Bancorp's finance committee chair has the highest retainer among all committee chairs. Klein (1998) finds that important committees such as the finance committee influence corporate performance more than the overall board. Because of the complexity of financial challenges a company faces and a rapidly changing global economy, this paper exams whether the finance committee creates value for shareholders and what finance committee characteristics benefit shareholders.

Peterson and Philpot (2013) is one of the few papers that examines finance committees and firm financial performance. In their paper, they examine the configuration and effectiveness of finance committees and their correlation to firm performance using a sample of large United States firms. They use performance measures including market return, operating margin, and cash flows in their sample of Fortune 500 companies. Our paper differs from theirs in these major aspects: sample, performance measures, financial decisions, and characteristics of finance committee chairs. First, our sample is the S&P 500. Second, we focus on long-term performance. Third, we examine financial management decisions such as capital structure, dividends, working capital, and capital expenditures. Finally, we investigate busyness of finance committee chairs, size of finance committee, and the interaction between the audit committee and the finance committee.

Our results suggest that establishing a finance committee may not always be in the best interest of shareholders if the firm wants to improve firm performance or make better financial decisions. If a firm already has a stand-alone finance committee, the firm should choose a finance committee chair who is independent and has fewer external board memberships. Simultaneously having more than three board memberships makes the finance committee chair less effective in performing her roles. However, if a chair simultaneously serves on multiple committees in the same company, firm performance is not negatively affected. Finally, the size of the finance committee has no impact on firm performance and finance decisions in general.

The results of this paper are important to regulators and companies and have implications for various stakeholders. First, they suggest that firms should not be required to establish a stand-alone finance committee. Second, limiting the number of active external board memberships that a director currently has benefits shareholders. Finally, regulations should not be imposed to limit the number of committee memberships in the same company for a finance committee chair because firm performance is not negatively affected.

The remainder of the paper proceeds as follows: Section 2 reviews literature on board committees and presents our hypothesis development. Section 3 includes data collection and the methodology. Section 4 analyzes data and discusses the findings. Lastly, Section 5 concludes the research and lists limitations and policy implications.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Firms form specialized committees mainly for firms' strategic areas that need additional oversight or planning. Ames, Hines, Sankara (2018) and Bates and Leclerc (2009) find risk committees improve boards' risk management function and financial performance ratings. Another study conducted by Halim et al. (2017) also investigates the association between management committee and firm performance and the results indicate that management committees have a positive effect on firm performance. As Fama and Jensen (1983) states, the board of directors plays a role to reduce potential agency problems and maximize firm value, logically we believe a finance committee will do the same. In our paper, we use a sample of finance committees in the S&P 500 to hypothesize that:

H1: A stand-alone finance committee adds value to a firm (better accounting and market performance, more investment, etc.)

The Sarbanes-Oxley Act requires audit committees to disclose whether at least one audit committee member is a financial expert thus creating the expectation that at least one member will be an expert. According to the 2010 amended Regulation S-K, companies must disclose director qualifications such as diversity and professional experience. However, the academic evidence on financial expertise is mixed.

Erkens et al. (2012) and Güner, Malmendier, and Tate (2008) find that commercial bank directors do not increase firm value and bankers use their directorships to protect their bank employers, not the companies hiring them as outside directors.

Davidson, Xie, and Xu (2004) and Huang, Jiang, Lie, and Yang (2014) argue that directors with investment banking experience benefit companies in merger-and-acquisition activities in terms of higher returns and lower takeover premiums.

Defond, Hann, and Hu (2005) finds that more audit committee members with financial expertise positively affect market performance. Agrawal and Chadha (2005) and Krishnan (2005) find that firms have fewer restatements and fewer internal control problems if an audit committee member has more financial expertise.

H2: A finance committee chair who also sits on the audit committee or is more experienced positively affects firm performance

Cheng (2008) examines the association between board size and the variability of corporate performance. His research findings suggest that firms with larger boards have lower unevenness in corporate performance. The results further indicate that larger boards allow for in-depth deliberation and the selected options are less risky leading to less variability in corporate performance.

Coles, Daniel, and Naveen (2008) finds that board size is negatively correlated with firm value among simple firms but positively correlated with firm value for complex firms. Another study conducted by Eisenberg, Sundgren, and Wells (1998) assesses larger board size and decreasing firm value in small firms.

Similar empirical studies conducted by Guest (2009) and Yermack (1996) show a negative correlation between board size and firm profitability and value. We hypothesize:

H3: The size of a finance committee negatively affects firm performance.

Core et al. (1999), Shivdasani and Yermack (1999), Fich and Shivdasani (2006), and Falato, Kadyrzhanova and Lel (2014) find a negative relation between board busyness and firm performance.

Field, Lowry and Mkrtchya (2013) states that “busy directors” are not effective monitors for shareholders. Grathwohl and Feicha (2014) find that committee overlaps between audit and compensation committees cause problems such as accounting information manipulation. In our paper, “busyness” is proxied by two measures: the number of committees she serves on in the same company, and the number of active board memberships in other companies a finance committee chair currently has.

H4: Having more committee memberships in the same company negatively affects firm performance.

H5: Having more director memberships negatively affects firm performance.

According to the Sarbanes-Oxley Act, audit, compensation, and nomination and governance committees are required to only have independent directors but other specialized committees such as the finance committee do not have such a restriction. Current research evidence on director independence and firm

performance is mixed. Xie, Davidson, and DaDalt (2003) compares outside and inside directors on board committees and find that inside directors are better than outside directors on committees focusing on firm-level issues. However, Fogel, Ma, and Morck (2014) finds independent directors create more value and are better monitors.

H6: An independent finance committee chair positively affects firm performance

3. DATA AND METHODOLOGY

3.1 Data

The sample includes firms with an established finance committee among the Standard & Poor's 500 companies in 2019. The S&P 500 represents U.S. domestic large companies in different sectors and listed in different exchanges such as the New York Stock Exchange and the Nasdaq Stock Exchange. Small public companies usually do not establish the committee for various reasons such as simplicity of their businesses and cost considerations.

Firm data such as whether a company has a finance committee, committee size, and firm performance is collected from proxy statements and the Capital IQ database. After deleting missing variables, we find there are 173 firms with an established finance committee. The sample excludes firms with committees such as the investment committee and the merger committee.

3.2 Methodology

The models below are estimated to determine relationships between a finance committee and firm performance and financial decisions.

Performance = β0 + β1 * Committees + β2 * Boards + β3 * Insider + β4 * Age + β5 * Audit Committee + β6 * FC Size + β7 * Firm Size + β8 * Industry Dummy + ε

Performance measures include stock returns and earnings per share growth rates in the last three years, to capture long-term performance. Independent variables include characteristics of the finance committee chair: age, the number of active board memberships, the number of active committee memberships, whether the chair of the finance committee is also on the audit committee in the same company, and whether an insider who is or was an executive in the same company. We also include finance committee size and the size of the firm as independent variables.

To further investigate busyness of finance committee chairs, we create two dummy variables: D_Boards and D_Committees. A board director generally serves on several committees in the same company and also serves on other companies' boards. The second model is as follows:

Performance = β0 + β1 * D_Committees + β2 * D_Boards + β3 * Insider + β4 * Age + β5 * Audit Committee + β6 * FC Size + β7 * Firm Size + β8 * Industry Dummy + ε

To examine the impact of finance committee on various financial decisions, dependent variables are Capital Structure, Liquidity, WACC, and Dividend.

Decisions = β0 + β1 * Committees + β2 * Boards + β3 * Insider + β4 * Age + β5 * Audit Committee + β6 * FC Size + β7 * Firm Size + β8 * Industry Dummy + ε

There are eight variables related to finance committees. FC Size is the number of directors on the finance committee. Insider is a dummy variable that equals 1 if a finance committee chair is or was an executive in a company, or 0 if he is an independent director. Audit Committee is also a dummy variable that equals 1 if a finance committee chair is on the audit committee, or 0 if he is not. Age is the log value of the age of a finance committee chair. Boards indicates the number of active board memberships that a finance committee chair serves on at different companies. Committees is the number of current active committees that a finance committee chair is on at the same company. D_Boards is a dummy variable that equals 1 if

the finance committee chair serves on three or fewer boards, otherwise 0. D_Committees is another dummy variable that equals 1 if the finance committee chair serves on two or fewer committees within the company, otherwise 0.

The second part of Table 1 lists variables related to financial decisions, firm size, and firm market and accounting performance. Firm Size is the log value of total assets. Capital Expenditure is investments in fixed assets. Liquidity is measured by total cash and short-term investments to total assets. Debt-to-equity ratio is a proxy of Capital Structure. WACC is weighted average cost of capital. Dividend is three-year growth rate of dividends per share. Firm performance measures are Stock Return and EPS growth rates in the last three and five years.

TABLE 1 VARIABLES AND DEFINITIONS

Variable	**Definition**
Finance Committee	
FC Size	The number of directors on a finance committee
Insider	A dummy variable that equals 1 if the chair of finance committee is/was an executive in a company and not independent, otherwise 0
Audit Committee	A dummy variable that equals 1 if chair of finance committee sits on audit committee, otherwise 0
Age	Log value of the age of the chair of finance committee
Boards	Number of current active board memberships the chairman of finance committee has
Committees	Number of current active committee memberships the chairman of finance committee has in a company
D_Boards	A dummy variable that equals 1 if chair of finance committee serves on three or fewer than three boards of other companies, otherwise 0
D_Committees	A dummy variable that equals 1 if chair of finance committee serves on two or fewer than two committees in a company, otherwise 0
Firm Performance and Financial Decisions and Characteristics	
Firm Size	Log value of total assets
Risk	Beta of last three years
Capital Expenditure	Three-year growth rate of investments in fixed assets
Liquidity	Total cash and short-term investments to total assets
WACC	Weighted average cost of capital
Dividend	Three-year growth rate of dividends per share
Stock Return 3Yr	Stock return in the last three years
EPS 3Yr	Earnings per share growth rate in the last three years

4. RESULTS

4.1 Descriptive Statistics

Table 2 compares the means of two groups: firms with a finance committee and firms without a finance committee, among the S&P 500 companies. The average total assets of firms with a finance committee are larger than the average total assets of firms without a finance committee but the difference is not significant. The average capital expenditure growth rate in the last three years, 6.5%, among firms with a finance committee is significantly smaller than the average growth rate, 10.30%, of firms without a finance committee. Firms with a finance committee are significantly less liquid (11%) and have a smaller weighted average cost of capital (5.22%) than other firms (14% and 5.85%).

Furthermore, dividend growth rate in firms with a finance committee is also significantly smaller than other firms. Although stock returns of firms with a finance committee are higher than those without a finance committee, the difference is not significant. EPS growth rates and gross profits growth rates, in firms without a finance committee, are significantly better than those performance measures in firms with a finance committee. Two possible reasons for the above results: first, the finance committee alone does not generate better firm performance as measured by the variables chosen in this research; second, firms with a less satisfying firm performance may be more willing to establish a stand-alone finance committee to improve their performance.

TABLE 2 COMPARING MEANS BETWEEN FIRMS WITH A FINANCE COMMITTEE AND FIRMS WITHOUT A FINANCE COMMITTEE

	Mean of FC Firms	Mean of No FC Firms	t value	sig. (2-tailed)
Total Assets	77809.529	72299.489	0.255	0.799
Capital Expenditure	6.5	10.30	-2.173	0.03
Liquidity	0.11	0.14	-3.209	0.012
WACC	5.22	5.85	-3.693	0.001
Dividend	9.76	13.35	-2.598	0.01
Stock Return 3Yr	0.43	0.51	-1.315	0.189
EPS 3Yr	11.85	18.36	-2.273	0.024

Table 3 shows that there are 173 companies, around 35% of the S&P 500 companies, that have a stand-alone finance committee. Panel B lists industry distributions and the percentage of companies with a finance committee in a particular sector among the S&P 500 companies. The majority of firms with a finance committee are concentrated in these sectors: manufacturing (44.5%), transportation and public utilities (19.6%), and finance, insurance and real estate (16.8%). Panel C shows that among all 173 companies with a finance committee, 164 have an independent finance committee chair. In Panel D, 104 finance committee chairs also sit on the audit committee, either being a chair or a member of the audit committee.

Panel E shows the number of active committee memberships. Almost 95% of chairs serve on more than one committee in a company. The range of active committee memberships is between one and six with an average of 2.8 committees. Our sample shows that only nine out of 173 finance committee chairs serve on one committee in their companies. Panel F lists the number of active board memberships that finance committee chairs have. More than half of all finance committee chairs (60%) have more than three different board memberships. The range of active board memberships is between 1 and 18 with an average of 4.4 boards at the same time. Our sample shows that only 9.8% of finance committee chairs serve on a single board. In Panel G, the age of the finance committee chair is between 43 and 82 with an average age of 64. The number of finance committee members in the sample is between 2 and 9 with an average of 4.5.

TABLE 3 FINANCE COMMITTEE

Panel A: Finance Committees Among S&P 500 Companies	
With a Finance Committee	173 (34.6%)
Without a Finance Committee	327 (65.4%)
Total	500
Panel B: Finance Committees Among Sectors	
Agriculture, Mining, and Construction 3.5%	
Manufacturing 44.5%	
Transportation & Public Utilities 19.6%	
Wholesale and Retail 7.5%	
Finance, Insurance, Real Estate 16.8%	
Services 7.1%	

Panel C Independence of Finance Committee Chair

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	164	53.2	94.8	94.8
No	9	2.9	5.2	100.0
Total	173	56.2	100.0	

Panel D Finance Committee Chair in Audit Committee

	Frequency	Percent	Valid Percent	Cumulative Percent
No	66	21.4	38.8	38.8
Yes	104	33.8	61.2	100.0
Total	170	55.2	100.0	

Panel E Number of Active Committee Memberships

	N	Minimum	Maximum	Mean	Std. Deviation
Active Committee Memberships	170	1.00	6.00	2.7824	.99391

Panel F Number of Active Board Memberships

	N	Minimum	Maximum	Mean	Std. Deviation
Active board memberships	173	1.00	18.00	4.4220	2.75575

Panel G Age

	N	Minimum	Maximum	Mean	Std. Deviation
Age	170	43.00	82.00	63.8588	8.15116

Panel H Size of Finance Committee

	N	Minimum	Maximum	Mean	Std. Deviation
FC Size	173	2.00	9.00	4.4798	1.20845

Table 4 shows the correlation matrix of performance and finance committee variables. The size of finance committee is found to be negatively and significantly correlated with Liquidity but positively and significant correlated with the number of active committee memberships a finance committee chair has. Insider and Audit Committee are significantly and negatively correlated, indicating that a finance committee chair also serving on audit committee cannot be an insider.

Age and Capital Expenditures positively correlate. Firm Size has a positive correlation with Boards but negative correlations with WACC and Stock Return 3Yr. A finance committee chair in a larger firm may have more board memberships in other firms.

Larger firms have smaller cost of capital and stock returns. Higher Capital Expenditures is associated with a higher Stock Return. Liquidity is positively associated with WACC, Stock Return, and EPS. The performance measures are positive and significantly correlated with each other.

TABLE 4 CORRELATIONS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) FC Size	1												
(2) Insider	-0.028	1											
(3) Audit Committee	0.043	-.243**	1										
(4) Age	0.125	0.036	-0.088	1									
(5) Boards	-0.075	-0.118	-0.051	0.11	1								
(6) Committees	.316**	-0.134	-0.004	0.102	-0.074	1							
(7) Firm Size	0.005	0.065	-0.089	0.042	.166*	0.029	1						
(8) Capital Expenditures	0.011	0.006	0.053	.181*	0.04	0.142	-0.097	1					
(9) Liquidity	-.183*	-0.061	0.136	0.004	-0.109	-.165*	0.022	-0.09	1				
(10) WACC	-0.034	0.023	0.126	0.05	-0.139	-0.035	-.230**	0.131	.208**	1			
(11) Dividend	-0.011	-0.04	-0.046	0.049	-0.111	.177*	-0.032	-0.046	.232**	0.005	1		
(12) Stock Return 3Yr	-0.033	-0.139	0.112	0.126	-0.096	-0.028	-.162*	.198*	.344**	.277**	.425**	1	
(13) EPS 3Yr	0.079	-0.157	0.157	0.014	-0.157	0.031	-0.079	0.044	0.154	0.118	0.168	.274**	1

** and * indicate significance at the 0.01 and the 0.05 levels (2-tailed) respectively.

4.2 Regression Analysis

In the first regression in Table 5, the firm performance measure is three-year stock returns. The coefficient of Age is positive (0.011) and significant at the 5%, indicating that more experienced a chair is, the better the stock return. The coefficient of the number of active board memberships a finance committee chair currently has is significantly negative (-0.030), which indicates that the more active board memberships a finance committee chair currently has, firm performance measured by three-year stock return is worse. The coefficient of Firm Size is significantly negative (-0.138), suggesting that smaller firms outperform larger firms. The coefficients of Committees, Audit Committee, and FC Size are all insignificant.

To find the optimal numbers of board memberships and committee memberships, in the second regression, two dummy variables, D_Boards and D_Committees, replace Board Memberships and Committee Memberships in the first regression. The coefficient of D_Boards is positive (0.187) and significant, a result showing that if a finance committee chair has three or fewer than three active board memberships, firm performance is better. However, the coefficient of D_Committees is insignificant, suggesting that the number of committee memberships that a finance committee chair has in the same company does not affect firm performance significantly. The coefficient of Insider, a dummy variable, is also significant and negative (-0.346), suggesting that an independent chair of a finance committee improves firm performance. The coefficients of D_Committees, Audit Committee, and FC Size are all insignificant again.

In Regression 3, the dependent performance measure is the three-year growth rate of earnings per share, the coefficient of Boards, the number of active board memberships that a finance committee chair actively has, is significantly negative (-1.775), which indicates that the more active board memberships a finance committee chair currently has, the firm performance measured by three-year growth rate of EPS is worse. The coefficient of Insider, a dummy variable, is also significant and negative (-19.347), suggesting that having an independent chair of finance committee positively affects firm performance. Age does not affect firm performance measured by the three-year EPS growth rate. In the fourth regression, the coefficient of D_Boards is positive (8.586) and significant again.

TABLE 5 FIRM PERFORMANCE AND FINANCE COMMITTEE

	Stock Return 3Yr	Stock Return 3Yr	EPS 3Yr	EPS 3Yr
(Constant)	0.608	0.297	13.481	-0.479
Firm Size	-0.138*	-0.133*	-1.871	-1.435
Risk	-0.136**	-0.130*	-2.712	-2.591
Age	0.011**	0.011**	0.192	0.176
Audit Committee	0.105	0.111	65.958	6.609
Committees	-0.010		-0.301	
Boards	-0.030*		-1.775**	
D_Committees		0.030		0.498
D_Boards		0.187**		8.586**
FC Size	-0.040	-0.032	1.135	1.324
Insider	-0.314	-0.346*	-19.347*	-20.112*
Industry	Included	Included	Included	Included
R Square	0.122	0.129	0.092	0.078
F -test	2.475	2.630	1.586	1.318
Sig.	0.011	0.007	0.125	0.233

***, **, and * indicate significance at 1%, 5%, and 10% levels respectively.

In summary, the age of finance committee chairs, a proxy of their experiences plays an important role to improve market performance. The role of a finance committee chair sitting on audit committee in the same company may be beneficial. No strong evidence supports that the interaction between the two committees benefits firm performance. A smaller finance committee does not affect firm performance, either market or accounting performance. Serving on multiple committees in the same company does not significantly affect performance, either in a positive or negative way. An independent finance committee chair plays a vital role for better stock performance and accounting performance. If a company has a finance committee chair who simultaneously serves on different boards in different companies, the company would experience worse firm performance.

Table 6 examines the effect of finance committee characteristics on capital expenditures, liquidity, cost of capital, and dividends. The first regression investigates the relation between capital expenditure and finance committee characteristics. The coefficient of Age, a proxy of experience among finance committee chairs, is positive (0.323) and significant at the 5% level. The more experience a finance committee chair has the higher the level of capital expenditure in a company. The coefficient of Committees is positive (2.357) and significant at the 10% level. The more active committee memberships a finance committee chair currently has in a firm, the more the amount of capital expenditure is spent.

When Liquidity is the dependent variable, the coefficients of Boards, Committees, and FC Size are all negative and significant. The more board memberships or committee memberships a finance committee chair has, the less liquid a firm is. The smaller the size of a finance committee, the more liquid a firm is.

In the third regression, the coefficient of Risk is positive (1.681) and significant, showing a riskier firm has higher cost of capital. Age, a proxy for experience of a finance committee chair, positively affects WACC. A finance committee chair on Audit Committee also significantly affects WACC. The number of active board memberships and WACC have an inverse relation (-0.109), suggesting that the more active board memberships a finance committee chair currently has the smaller the cost of capital. In the last regression, the coefficient of number of current committee memberships is positive (1.955) and significant, indicating that a firm has a higher growth rate of dividends per share if a finance committee chair currently has more committee memberships in a company. In Table 6, Insider has no impact on financial decisions such as capital expenditure, liquidity, capital structure, cost of capital, and dividend growth.

TABLE 6 FINANCE COMMITTEE ON CAPITAL EXPENDITURE, LIQUIDITY, WACC, AND DIVIDEND

	Capital Expenditure	Liquidity	WACC	Dividend
(Constant)	-36.028	0.228**	3.993***	16.869*
Firm Size	1.984	-0.016	-0.152	-2.080
Risk	1.734	0.008	1.681***	-1.377
Age	0.323**	0.001	0.025*	0.059
Audit Committee	2.612	0.025	0.416*	-1.025
Committees	2.357*	-0.014*	-0.189	1.955**
Boards	0.233	-0.006*	-0.109**	-0.463
FC Size	-0.905	-0.014**	-0.043	-0.690
Insider	3.962	-0.036	-0.178	-1.781
Industry Dummy	Included	Included	Included	Included
R Square	3.177	0.100	0.382	0.073
F-test	1.536	1.977	10.989	1.184
Sig.	0.141	0.045	0.000	0.310

***, **, and * indicate significance at 1%, 5%, and 10% levels respectively.

Our results find that among the S&P 500 companies, simply establishing a stand-alone finance committee does not add value to shareholders in that a finance committee does not yield better firm performance. However, certain characteristics of finance committee chairs play an important role on firm performance and financial decisions. A more experienced finance committee chair would positively affect firm performance. Independence of finance committee chairs significantly affects firm performance. A finance committee chair simultaneously serving on several committees in the same company does not negatively affect firm performance. Unlike committee memberships in the same company, too many active external board memberships have a negative impact on firm performance. Finally, the size of a finance committee does not significantly affect financial performance.

5. CONCLUSIONS, IMPLICATIONS, AND LIMITATIONS

In this study, we use S&P 500 companies as an example to examine finance committees, the most popular specialized board committee. This study specifically examines the role and characteristics of finance committees to determine if this specialized board committee creates value for shareholders. We focus on the size of finance committees and the characteristics of the finance committee chair: age, committee memberships, board memberships, independence.

The findings suggest that just establishing a finance committee may not matter to firm performance in general. However, if a firm chooses to have a stand-alone finance committee to improve firm performance, the firm should make sure that the finance committee has two characteristics: (1) independent chair and (2) a finance committee chair with fewer active external board memberships. A chair simultaneously serving on multiple committees within a company does not negatively affect performance. The size of the finance committee does not impact performance and finance decisions made in a firm.

Our results have implications for stakeholders such as companies, corporate executives, industry or government policy makers, and investors. First, there is no need for policy makers to require a stand-alone finance committee. Benefits of establishing one may not justify costs. Second, there should be a limit on the number of board memberships a director has. Our results show that if a director serves more than three boards in different companies at the same time, firm performance decreases. Third, it would be beneficial that a director serves on multiple committees in a same company because firm performance is not negatively affected, which may minimize costs such as additional director compensation.

Our paper is subject to several limitations. First, our sample only includes 500 companies in the S&P 500 Index in 2019. In the future, more companies should be included to test the results. Second, the dates of establishing a finance committee in the sample should be identified to conduct event study to better understand the effect of finance committee, firm performance, and financial decisions. The data of the dates, however, could not be found. This is the reason the performance measures in our study are limited to three-year data. Third, the characteristics of all finance committee members, not just the chair of the committee, should be analyzed. Again, the lack of the data prevents further examination. Lastly, the pandemic starting in 2020 might affect how businesses operate financially. The unprecedented challenges posed by the pandemic might highlight the importance of finance committees.

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EXAMINING TESTS OF SIGMA AND BETA CONVERGENCE ACROSS STATES' FIREARM BACKGROUND CHECK RATES

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dx.doi.org/10.18374/JIFE-21-2.4

ABSTRACT

Utilizing techniques to measure sigma and beta convergence from the economic growth literature, this study tests for convergence across U.S. states in their rates of firearm background checks using monthly data from 1999 to 2018. The tests for unconditional beta convergence, along with limited examination of conditional beta convergence, find evidence of beta convergence across state rates of firearm background checks, indicating states with lower rates in 1999 had higher growth rates in background checks over the sample. The sigma convergence tests, however, find divergence over time with a rising trend in the dispersion of background check rates starting in November 2012. While untangling the causes of this accelerating dispersion is beyond the scope of this study, the finding of a break in trend of sigma dispersion coinciding with the 2012 Presidential election date, along with mass shootings in Aurora, Colorado and Sandy Hook, suggests rising political polarization may be playing a role.

Keywords*: firearm background checks, convergence, structural break, state-level data*

1. INTRODUCTION

With an estimated nearly 400 million guns in circulation (Small Arms Survey, 2020) and over 40% of U.S. households owning guns (Saad, 2020), the U.S. is the most armed country (in per capita terms) in the world.

The U.S. gun industry, which contributes over $63 billion to the economy (The Firearm Industry Trade Association, 2020), saw record sales in 2020 during the Coronavirus pandemic and George Floyd protests (Kim and Phillips, 2021 Lyons et al., 2021).

Even with the level of gun prevalence in US households, there are few topics as politically divisive nationally as gun control. A 2017 Pew Research Center Survey (Parker et al., 2017) shows gun control is the second most divisive topic among Republicans and Democrats, behind only building a wall along the border with Mexico.

Miller (2019) analyzes responses to gun-related questions form the General Social Survey (GSS) and shows gun control became more politically divisive during President Obama's tenure.

A few reasons may explain the recent polarization of the subject. Jouet (2019) describes the historical context of the Second Amendment, and the right to bear arms to protect America from perceived "existential threats" by some groups. The effect guns have on various crime rates may also contribute to polarization (Harcourt, 2001).

Gun rights advocates mention the deterrent effect guns may have on crime. Gun control advocates argue more guns lead to more crime, noting the high level of gun ownership and number of firearm-related violent crimes compared to other developed nations (Grinshteyn and Hemenway, 2016; Hemenway and Miller, 2000).

Empirical studies have found evidence for both sides. In a famous study, Lott and Mustard (1997) use state level data from 1977 to 1992 and find states with concealed carry laws experience fewer violent crimes.

Results from Lott, Plassmann, and Whitley (2002), Plassmann and Whitley (2003), Lott and Whitley (2003) also find states with more relaxed gun laws or higher household gun prevalence experience fewer crimes.

Duggan (2001), Cook and Ludwig (2006) and Monuteaux et al (2015) find a positive association between gun prevalence (or relaxed state gun laws) and crime rates. Other papers including Kovandzic, Marvell, and Vieraitis (2005) and Moody and Marvell (2005) find no relationship between gun prevalence and crime.

Despite the divisiveness of the topic, there is some common ground between Democrats and Republicans regarding gun control. According to a 2018 Pew Research Center Survey, 86% of Democrats and 83% of Republicans favor banning firearms for individuals on federal watchlists. In addition, 91% of Democrats and 79% of Republicans favor mandatory background checks for buyers at gun shows, i.e. closing the "gun show loophole."

This paper adds to the gun-related literature by estimating convergence of background check rates across US states from 1999 to 2020 using sigma (σ) and beta (β) convergence estimation methods in economic growth literature (Simionescu, 2014; Blaško 2016; Haller, 2019).

Federal policy makers may be interested in disparities regarding gun availability across states, as increasing disparities may reflect increasing polarization regarding federal gun control laws.

Increased polarization may make it more difficult to pass federal gun control policies in a bipartisan manner. Results indicate gun availability beta convergence over the sample period and increasing sigma divergence since 2012. Policy recommendations are included in the Conclusion.

The rest of the paper is organized as follows: Section 2 Data, Section 3 Methods and Results, and Section 4 Conclusion.

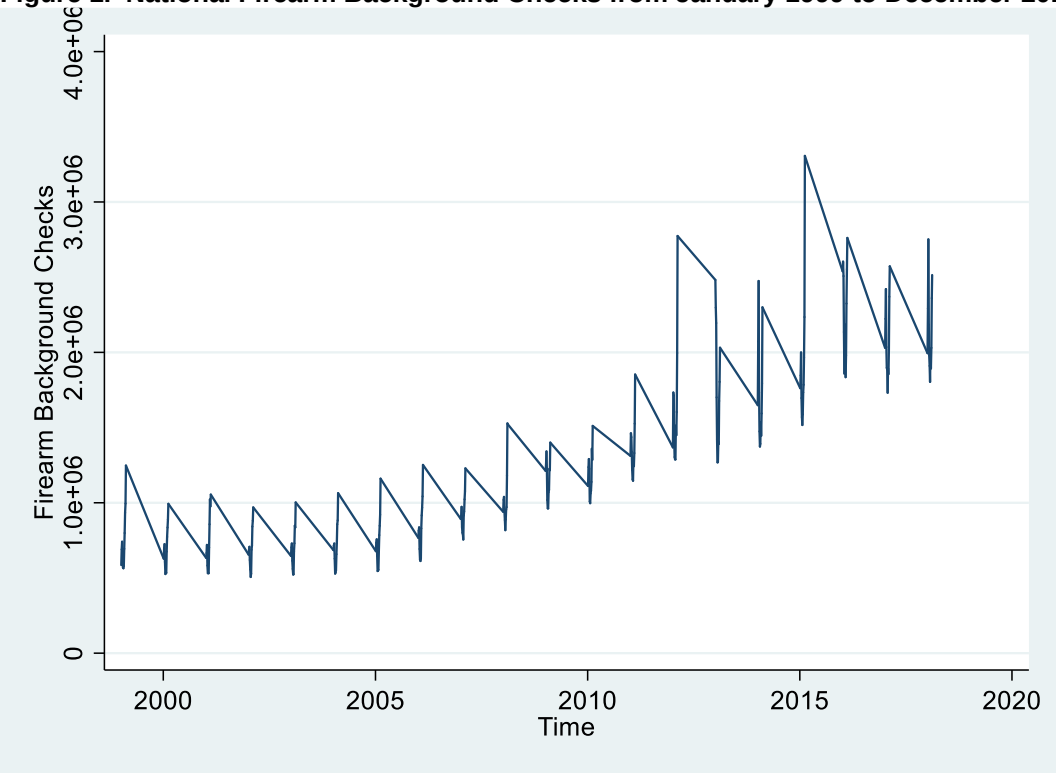
2. DATA

The passage of The Brady Handgun Violence Prevention Act in 1993 mandated federal background checks on potential firearm buyers followed by the publicly available database National Instant Criminal Background Check System (NICS).

The NICS includes the monthly number of state background checks since November 1998 and is maintained by the Federal Bureau of Investigation (FBI). Figure 1 includes the number of background checks nationally over the sample period.

We observe the rate of background checks accelerating around 2005-2006 and it is nearly three times higher at the end of the sample period than at the beginning. We also observe a seasonal pattern, with background checks peaking around December and falling in the summer months.

Figure 1. National Firearm Background Checks from January 1999 to December 2018



For more context, Table 1 provides state data on the change in firearm background check rates from 1999 to 2018. Nationally, 2018 background checks were 2.85 times higher than in 1999, and 10 states with larger increases.

These top 10 states account for 60.5% of the national rise in background checks from 1999 to 2018 despite representing only 18.8% of the national background checks in 1999. Kentucky, Illinois, and Florida are the only states that represent over 5% of the national change in background checks since 1999.

In contrast, the bottom 17 states in Table 1 collectively accounted for less than ten percent of the gains in national background checks from 1999 to 2018 even though these states represented 40.5% of 1999 national background checks.

The pattern of states at the top or bottom of Table 1 defies simple characterization as each group contains a mix of states in terms of their political orientation, region, share of rural population, et cetera. Identifying specific state characteristics explaining the variation in changes in state background checks is beyond the scope of this paper.

TABLE 1. CHANGE IN FIREARM BACKGROUND CHECKS BY STATE

		Actual Firearm Background Checks			Ratio 2018 /	% of National Change	Cumulative % of National Change
Rank	State	1999	2018	Change	1999	Change	Change
1	Kentucky	248,212	4,912,441	4,664,229	19.79	27.9%	27.9%
2	Massachusetts	24,314	211,295	186,981	8.69	1.1%	29.1%
3	Illinois	484,848	2,831,447	2,346,599	5.84	14.1%	43.1%
4	Washington	133,674	627,301	493,627	4.69	3.0%	46.1%
5	Indiana	203,182	896,148	692,966	4.41	4.2%	50.2%
6	Florida	279,700	1,203,145	923,445	4.30	5.5%	55.8%
7	Utah	77,718	295,858	218,140	3.81	1.3%	57.1%
8	Minnesota	177,929	604,078	426,149	3.40	2.6%	59.6%
9	New Hamp.	37,711	120,889	83,178	3.21	0.5%	60.1%
10	South Dakota	31,327	90,693	59,366	2.90	0.4%	60.5%
11	Delaware	17,594	47,723	30,129	2.71	0.2%	60.6%
12	Hawaii	5,343	14,088	8,745	2.64	0.1%	60.7%
13	Tennessee	264,214	694,101	429,887	2.63	2.6%	63.3%
14	Idaho	79,914	207,320	127,406	2.59	0.8%	64.0%
15	Wisconsin	179,340	452,520	273,180	2.52	1.6%	65.7%
16	New Jersey	38,601	93,124	54,523	2.41	0.3%	66.0%
17	Ohio	297,597	717,475	419,878	2.41	2.5%	68.5%
18	Missouri	206,636	496,184	289,548	2.40	1.7%	70.2%
19	Rhode Island	10,677	25,030	14,353	2.34	0.1%	70.3%
20	Virginia	208,554	476,760	268,206	2.29	1.6%	71.9%
21	Oregon	160,358	359,682	199,324	2.24	1.2%	73.1%
22	Texas	710,025	1,571,632	861,607	2.21	5.2%	78.3%
23	Arizona	173,548	377,838	204,290	2.18	1.2%	79.5%
24	North Dakota	29,864	62,334	32,470	2.09	0.2%	79.7%
25	Iowa	92,222	189,159	96,937	2.05	0.6%	80.3%
26	Nevada	62,375	127,434	65,059	2.04	0.4%	80.7%
27	Colorado	257,308	524,770	267,462	2.04	1.6%	82.3%
28	Connecticut	87,209	177,690	90,481	2.04	0.5%	82.8%
29	Maine	47,160	93,360	46,200	1.98	0.3%	83.1%
30	Oklahoma	169,436	332,291	162,855	1.96	1.0%	84.1%
31	South Carolina	145,493	280,749	135,256	1.93	0.8%	84.9%
32	Alabama	246,756	474,294	227,538	1.92	1.4%	86.3%
33	New York	186,627	358,614	171,987	1.92	1.0%	87.3%
34	Pennsylvania	541,555	1,021,943	480,388	1.89	2.9%	90.2%
35	Vermont	22,218	41,550	19,332	1.87	0.1%	90.3%
36	Alaska	43,073	78,761	35,688	1.83	0.2%	90.5%
37	West Virginia	134,471	241,678	107,207	1.80	0.6%	91.1%
38	North Carolina	309,707	529,916	220,209	1.71	1.3%	92.5%
39	Wyoming	35,476	60,150	24,674	1.70	0.1%	92.6%
40	New Mexico	94,406	156,853	62,447	1.66	0.4%	93.0%
		1999	2018	Change	Ratio	% National	% Cumltv
41	Maryland	91,381	151,470	60,089	1.66	0.4%	93.3%
42	Kansas	106,108	172,047	65,939	1.62	0.4%	93.7%
43	Montana	73,027	117,607	44,580	1.61	0.3%	94.0%
44	Michigan	307,769	489,957	182,188	1.59	1.1%	95.1%
45	Louisiana	196,015	307,192	111,177	1.57	0.7%	95.8%
46	Nebraska	47,959	74,477	26,518	1.55	0.2%	95.9%
47	California	883,144	1,297,132	413,988	1.47	2.5%	98.4%

48	Mississippi	182,114	247,278	65,164	1.36	0.4%	98.8%
49	Arkansas	184,616	248,439	63,823	1.35	0.4%	99.2%
50	Georgia	409,810	549,532	139,722	1.34	0.8%	100.0%
	National	9,038,315	25,733,449	16,695,134	2.85		

The state of Kentucky experienced the largest increase in background checks over the sample period, representing over 28% of the national change in background checks from 1999 to 2018. Lang (2013) notes that Kentucky implemented random background checks during 2006 which may account for its share of the change in national background checks in Table 1 as well as the acceleration of national background checks observed in Figure 1 around the same time. Lang (2013) also mentions that random background checks in Kentucky may overstate the gun availability in that state.

While not all firearm background checks result in a firearm purchase, Lang (2013) shows background checks are a proxy for gun availability. The lack of gun prevalence availability data requires researchers to use proxies instead; the most popular in recent years is the percent of suicides committed by firearm, FS/S (Hemenway and Miller, 2000).

FS/S has been criticized as a proxy (Duggan, 2001; National Academy of Sciences, National Research Council, 2004) so other proxies like background checks have been included in studies. Additional proxies include subscriptions to the magazine Guns and Ammos and background checks plus per capita hunting licenses (Duggan, 2001). Recent studies using firearm background checks as a proxy for state gun ownership or gun sales include Briggs and Tabborak (2013), Lang (2013), Lang (2016), and Levine and McKnight (2017).

3. METHODS AND RESULTS

While we have established a rising number of firearm background checks nationally as seen in Figure 1 and Table 1, this does not by itself imply that there is divergence or convergence across states in their rates of background checks. We investigate this issue using the widely cited concepts of β and σ convergence from the literature on per capita income or wealth convergence across nations or subnational regions over time (Barro and Sala-i-Martin, 1992; Mankiw, Romer, and Weil, 1992; Barro, 1996; Dobson and Ramlogan, 2002; Barro and Martin, 1992). The notion of σ convergence is that the dispersion across the cross-sectional units declines over time (Young, Higgins, and Levy, 2008; Furceri, 2005). With β convergence poor countries grow faster than rich countries (Vu, 2013; Kangasharju, 1998; Dvoroková, 2014).

While predominately appearing in growth literature, recent studies estimate convergence rates among other variables. This methodology has been used to measure cross-country convergence of labor productivity (Freeeman and Yerger, 2001; Kinfemichael and Morshed, 2019), wine consumption (Dal Bianco, Boatto, and Caracciolo, 2014) and population aging (Kashnitsky, de Beer, and van Wissen, 2017). Janssen et al. (2016) uses σ and β convergence to measure the mortality rate conversion across regions in the Netherlands. The authors mention that if lawmakers have better information about disparities regarding mortality rates lawmakers can make better decisions regarding health care allocations across various regions.

To test for sigma convergence, we convert the state-level monthly data on firearm background checks into background checks per 10,000 population. The monthly population state-level population estimates used in the calculation were linearly interpolated from annual census state-level population data (Bureau, 2020). Then, for each month we compute the coefficient of variation, which is the standard deviation divided by the mean, in the firearm background checks per 10,000 population across the 50 states as our sigma dispersion measure. This is shown in Figure 2 which clearly indicates that there has not been sigma convergence across U.S. states in their rates of firearm background checks. Instead, it appears there has been divergence as the coefficient of variation in background check rates is two to three times higher in the latter part of the sample. As there appears to be both a seasonality pattern to the data, and an upward shift in the dispersion measure, we run the Supremum Wald test for unknown structural breaks

from Andrews (1993), allowing both the intercept and coefficient on trend to change. We first regress the coefficient of variation for monthly background checks on a trend and monthly dummy variables. These results are shown in the first three columns of Table 2. Next, we estimate the Supremum Wald test of Andrews (1993) and identify a structural breakpoint at November 2012. This break is highly statistically significant given the Supremum Wald test statistic of 117.0 ($p < .0001$).

We next rerun the regression allowing for both a change in intercept and a change in trend coefficient beginning in November 2012. These results are shown in columns 5-6 of Table 2. The model's fit improves notably from an adjusted R-squared of 0.59 to 0.73. The monthly dummy variables indicate some seasonal sigma convergence (smaller coefficient of variation) in November and December. After allowing for shift in intercept, the trend coefficients indicate σ divergence, not convergence, throughout the sample period, but the rate of divergence accelerates in the latter period. In the earlier period the statistically significant trend coefficient is 0.0064 while in the later period it remains significant and more than doubles to 0.0064 + 0.0075 = 0.0139.

While we do not attempt to fully explain the November 2012 break it is worth noting that two mass shootings, the Aurora, Colorado movie theater and Sandy Hook shootings occurred in July and December of that year. Thus, the Aurora movie theatre mass shooting predated the structural break by four months, and the Sandy Hook mass shootings occurred one month after the November 2012 break. In response to these mass shootings, President Obama proposed tougher gun control legislation in early 2013. Although no major gun legislation was passed during President Obama's tenure, several studies show that gun sales tend to spike immediately following mass shootings or new gun control legislation proposals (Callcut, Rachael A., et al., 2019; LaPlant, Lee Jr., and LaPlant, 2021; Wallace, 2015; Porfiri et al., 2019).

FIGURE 2. SIGMA CONVERGENCE MEASURE FROM JANUARY 1999 TO DECEMBER 2018

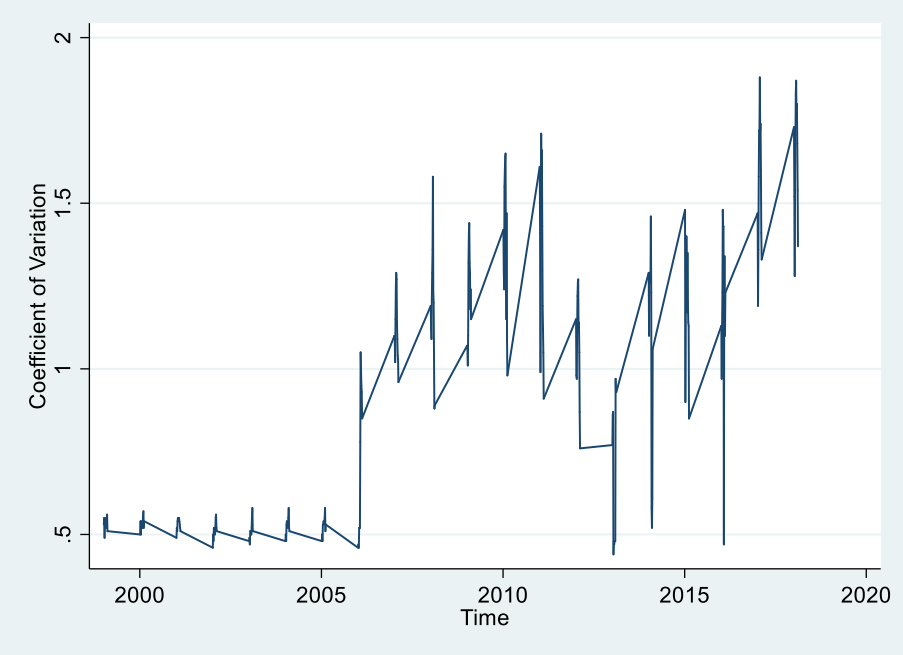


TABLE 2. TESTING FOR CHANGE IN TREND OR SHIFT IN SIGMA CONVERGENCE

Linear Regression				Allow Shift in Intercept & Trend Regression	
	Coeff.	p-value		Coeff.	p-value
Constant	.442	<.001		.358	<.001
Feb	-.091	.282		-.095	.168
Mar	-.109	.197		-.117	.089
Apr	-.030	.721		-.042	.538
May	.049	.559		.033	.631
Jun	.053	.528		.033	.633
Jul	.089	.294		.064	.351
Aug	-.033	.693		-.062	.370
Sep	-.053	.532		-.085	.216
Oct	-.052	.535		-.089	.197
Nov	-.139	.101		-.147	.034
Dec	-.170	.045		-.182	.009
Trend	.005	<.001		.0064	<.001
Change Trend				.0075	<.001
Shift Constant				-1.915	<.001
Adjusted R^2	0.587			0.726	

In addition to σ convergence, unconditional beta convergence is commonly examined in the economic growth literature.

Conceptually, the test is if observations with lower values at the start of the sample period grow faster than observations with higher values at the start which would imply some degree of catching up by the initially lower valued observations. Following Sali-i-Martin (1996) and Raiser (1998), unconditional β convergence for background checks from time period t = 1 to t = T can be tested using the equation,

$$Background_{i,t,t+T} = \alpha + \beta * Background_{i,t} + \varepsilon_{i,t} \quad (1)$$

where $Background_{i,t,t+T} = \ln\left(\frac{Background_{i,t+T}}{Background_{i,t}}\right)$ is state i's growth in background checks from intitial year t to final year T. $\left(Background_{i,t}\right)$ is the natural logarithm of state i's number of background checks in year t. Unconditional β convergence, β<0, implies that lower starting value observations are catching up at least partially by period T. The unconditional beta convergence regression results are shown in columns 1-3 of Table 3. The coefficient on starting values for states background checks, in natural log form, is negative and statistically significant (-0.21, p =.047). This implies beta convergence across states from 1999 to 2018.

Those states with relatively lower rates of firearm background checks in 1999 tended to have a higher rate of growth in background checks from 1999 to 2018 than did states with higher starting values in 1999.

As noted by Sali-Martin (1996) β convergence is a necessary, but not sufficient, condition for σ convergence so our earlier findings of σ divergence is not inconsistent with finding β convergence. It appears that some of the low background check rate states in 1999 not only had faster growth rates, but these higher growth rates continued after those states moved ahead of many other states, contributing to greater σ divergence.

TABLE 3 UNCONDITIONAL AND CONDITIONAL BETA CONVERGENCE REGRESSIONS

Unconditional β Convergence				Conditional β Convergence	
	Coeff.	p-value		Coeff.	p-value
constant	1.384	<.001		2.071	.011
Background $_{i,t}$	-.205	.047		-.296	.036
Clinton				-.009	.337
Adjusted R^2	.061			.060	
Dependent Variable Background $_{i, t, t+T}$ from Equation (1)					

The convergence literature also makes use of the conditional convergence concept in which additional variables that might affect growth are added to the original β convergence equation. As an initial attempt to control for differences across states in their political orientation, we added the variable "Clinton" to the model which was the state's 2016 Presidential vote percentage for Hillary Clinton.

As seen in columns 5-6 of Table 3, the Clinton variable itself is not statistically significant, but the model again finds β convergence with a convergence rate (-0.29, p =.036) that is higher than in the unconditional β convergence model. Very similar results, not reported, were found when the Clinton variable was replaced with a variable measuring Trump's percent of vote / Clinton's percent of vote. In sum, both the unconditional and conditional β convergence tests indicate convergence in firearm background check rates across U.S. states over the 1999 to 2018 period and state political orientation control variables do not alter these results.

4. CONCLUSION

This paper uses β convergence and σ convergence estimation methods to show that firearm background checks have converged across US states from 1998 to 2020 with respect to β convergence but have greater dispersion with respect to σ convergence. Further, states have experienced an increase in firearm background check σ divergence since 2012, the same year as two well-publicized mass shooting events and the 2012 Presidential Election.

Results from this paper suggest public policy makers may continue to have a difficult time passing bipartisan gun control policies at the federal level. As more heavily armed states continue to buy relatively more guns than less-armed states, polarization may persist. Focusing on specific legislative changes, including universal background checks, appears to receive bi-partisan support nationally (Dauster, 2020) and may be a path forward.

Jacobs and Fuhr (2015) describe New York passage of the Secure Ammunition and Firearms Enforcement (SAFE) that includes background checks for all gun purchases in New York. The SAFE Act was passed immediately after the Sandy Hook mass shootings with bipartisan support. As we find σ divergence across states, private sector agents (involved in the production or sales of firearms) may find our results useful in determining the most efficient allocation of funds across states for lobbying purposes.

A more complete understanding of the dynamics driving the σ divergence of firearm background check rates across states is warranted. Future research is encouraged to untangle the relative contributions of factors such as changing rates of gun purchases, changing rates of application for gun carry permits, other changes in laws that impact the frequency of background checks, and demographic variables related to political orientation, population density, age profiles, and education upon firearm background check rates. One limitation of this study is that our data ends in 2018; two years prior to the Coronavirus outbreak. Future research may extend background check data to include the pandemic period.

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