The Southern Business and Economic Journal would like to thank the following individuals for their evaluation of articles in the current issue of the *Journal.*

Tarek ElBadawy
Auburn University at Montgomery

Joeseph Newman
Auburn University at Montgomery

Mariano Runco
Auburn University at Montgomery

Walter Smith
Auburn University at Montgomery

THE SOUTHERN BUSINESS AND ECONOMIC JOURNAL

Indexed in PAIS Bulletin and EBSCO Publishers Online ISSN: 0743779X

Volume 42, Number 1 2019

Articles

Published by the Auburn University at Montgomery College of Business

Firm Location and Corporate Governance Differences: Evidence from the Pre-SOX Environment

Steve A. Garner
Tennessee Technological University

Paul D. Hutchison
University of North Texas

Binod Guragai
Texas State University

Abstract

This study examines the effect of U.S. firms' geographic location on their corporate governance practices. Using hand-collected data, this study finds evidence that rural firms are less likely to have CEOs as the chair of the board of directors and more likely to hire Big 4 auditors compared to matched urban firms prior to the implementation of the Sarbanes-Oxley Act of 2002 (SOX). Linguistic analyses of the Management Discussion and Analysis (MD&A) section shows that rural firms' MD&A has a more pessimistic tone than those of the matched urban firms. To understand the implications of corporate governance differences, this study examines whether there are different stock market reactions to urban and rural firms around key event dates relative to the enactment of the SOX. In key SOX events, urban firms experience marginally significant negative market reactions to SOX events compared to rural firms, suggesting that urban firms are perceived to have weaker governance at the top of the organisation when compared to rural firms prior to SOX. Results from this study should be of interest to regulators and investors.

Introduction

The purpose of this study is to investigate the effect of U.S. firms' geographic location, whether urban or rural, on their corporate governance practices.[1] This research posits that, due to geographical

---

[1] Following Loughran and Shultz (2005), this study defines an "urban" firm as one that is headquartered in a metropolitan area and a "rural" firm as one that is headquartered 100 miles or more from any metropolitan area. A metropolitan area is one that has a population of at least one million.

distance, rural firms experience more monitoring-related agency problems compared to urban firms. As suggested by efficient contracting theory, rural firms then should compensate for agency problems by implementing strong corporate governance mechanisms. This conjecture is tested by hand-collecting various measures of corporate governance characteristics from firms' proxy statements and annual reports. To understand the differences in narrative disclosures, linguistic style of the Management Discussion and Analysis (MD&A) of rural and urban firms is also examined following Loughran and McDonald (2011). Prior studies suggest that corporate governance characteristics affect various dimensions of firms, including disclosure choices, transparency of financial reporting, and informativeness of reported earnings (Wang & Hussainey, 2013; Zhijun, Liu, & Noronha*,* 2016). As such, this study examines how corporate governance characteristics might be affected by firm's geographical location.

Prior studies have examined market reaction to the debate and ultimate passage of SOX legislation using various dimensions. For example, Zhang (2007) shows that cumulative abnormal returns (CAR) around legislative events leading to the passage of the SOX (SOX events, hereafter) is significantly negative. Zhang (2007) suggests that such negative return is an indicator that SOX legislation imposes net cost to the firms. In another study, Filbeck, Gorman, and Zhao (2011) show that the initial negative market reaction to SOX events is significantly more negative for non-regulated industries compared to regulated industries, suggesting that investors perceive SOX to be more costly to the firms that require more investment in the compliance of stronger governance. The current study complements these prior studies by examining whether there are different stock market reaction to SOX events for urban and rural firms. Conditional on the findings that rural firms have stronger governance than urban firms prior to SOX, this study posits that rural firms experience less negative stock market reaction to SOX events compared to urban firms. Empirical results generally support this hypothesis.

Researchers and practitioners have often cited that SOX is one of the most wide-reaching regulation event in the United States (Ribstein, 2002; Romano, 2005; Zhang, 2007). The passage of the SOX vastly changed control mechanisms and governance characteristics within firms (Zhang, 2007). Although many studies have examined various factors associated with SOX events, prior studies have not examined whether investors perceive SOX events differently, conditional on firm geographic location. To understand this issue empirically, this study specifically uses the setting of pre-SOX environment where corporate governance differences are more likely to be observed between rural and urban firms. Using pre-SOX environment also allows researchers and practitioners to understand any implications of such governance differences in determining the market reaction to regulatory changes.

Analyses in this study use financial and other data from Compustat, CRSP, and Edgar databases. Rural firms are matched with similar urban firms based on industry and sales growth. Overall, this study compares 101 rural firms with 101 matched urban firms.[2] This study finds evidence that rural firms are less likely to have CEOs as the chair of the board of directors (i.e., CEO duality) and more likely to hire Big 4 auditors compared to matched urban firms in the pre-SOX environment. Results also suggest that rural firms use more pessimistic tone in their MD&As compared to urban firms. Furthermore, the stock market generally reacts less negatively to rural firms compared to urban firms around key SOX events.

Prior literature shows that geographic location affects a wide range of economic behaviors. For example, prior research has found that the physical distance between economic agents is associated with information asymmetry, visibility, and monitoring costs (Ivkovic & Weisbenner, 2005; Kedia & Rajgopal, 2011). Studies have also found that investors tend to prefer stocks of firms whose headquarters are located in close proximity to them (Coval & Moskowitz, 1999). Studies also show that geographical location affects earnings management behavior (Shi, Sun, & Luo 2015), audit quality (Choi, Kim, Qiu, & Zang 2012; Lopez & Rich, 2017), and enforcement actions by the Securities and Exchange Commission (Kedia and Rajgopal, 2011). Our study complements these studies in accounting literature by examining the effects of geographic location on the strength of corporate governance.

This study also contributes to the literature that examines the cross-sectional variation in the wealth effects around the announcement and passage of the SOX (Wintoki, 2007; Zhang, 2007; Filbeck et al., 2011). Prior studies suggest that CEO duality is one major element of

---

[2] The small sample size in this study stems from the restrictive definition of rural firms. That is, a relatively small number of firms meeting the data requirements were at least 100 miles or more from any metropolitan area with at least one million people.

corporate governance and that various firm characteristics and operating environment affect the choice of CEO duality (Ghosh, Karuna, & Tian, 2015). The current study adds another dimension in this research area and shows that firm's geographical location may influence the choice of CEO duality. In recent years, the SEC has emphasized more clarity in the writing style and data presentation of the MD&A to make corporate disclosures more readable and relevant to investors. In this line, many studies have investigated various dimensions of the readability of financial statements, including 10-Ks for firms (Loughran and McDonald, 2011). The current study adds to this literature by implementing a qualitative approach to examine whether the narratives in firms' MD&A differ between urban and rural firms.

Literature Review and Hypothesis Development

Geographic Location and Corporate Governance

Despite technological advances, distance has been shown to affect various aspects of corporate practices and investors' stock preferences (Bamber & Odean, 2008; John, Knyazeva, & Knyazeva, 2011). For example, John et al. (2011) find that rural firms are pre-committed to higher dividends in order to mitigate agency conflicts. Research alsoshows that investors prefer local stocks and that such preference is predominantly information-driven (Coval & Moskowitz, 2001; Ivkovic & Weisbenner, 2005; Bamber & Odean, 2008).[3] Malloy (2005) shows that analysts make more accurate forecasts when firms are in close physical proximity to the analysts. In another study, Choi et al. (2012) show that local auditors provide higher quality audit services than non-local auditors and suggest that informational advantages associated with local audits enable auditors to better constrain management's earnings reporting behavior. For the purpose of this study, we consider urban firms as being more local since they are in close proximity to more investors and analysts.

Efficient contracting theory suggests that firm will choose various methods, such as the use of higher corporate governance quality, to minimize agency costs (Holthausen, 1990). If rural firms are more likely to experience the monitoring-related agency costs as argued in Holthausen (1990), efficient contracting hypothesis holds that these

[3] Prior studies generally consider "local" firms as those that are headquartered in the same city as the investor.

rural firms should implement stronger corporate governance. Consistent with this argument, Healy and Palepu (2001) argue that better corporate disclosure and other governance mechanisms would increase analyst following and thereby increase urban institutional investors' knowledge about rural firms. This would reduce the amount of information asymmetry between the investor and the rural firm, decreasing firm's cost of capital and increasing the market value of the firm (Merton, 1987; Verrecchia, 2001). In sum, if rural firms make governance decisions consistent with the expectations of efficient contracting theory, these firms should have corporate governance practices of higher quality than those of urban firms.

Based on the above discussion, the first hypothesis of this study is:

H1: Rural firms have corporate governance mechanisms that are of higher quality than those of urban firms.

The above hypothesized relationship may not exist if managerial opportunism theory dominates the efficient contracting theory. Contrary to efficient contracting theory, managerial opportunism theory suggests that management will act in a way that provides private benefits to them at the expense of the shareholders. Managers' opportunistic behavior may result in weaker governance choices and non-transparent disclosures. Recent work by Kedia and Rajgopal (2011) supports managerial opportunism theory. They show that firms located farther from the SEC offices are less likely to face SEC investigations. Consequently, managers of firms farther from the SEC offices are more likely to misreport, as shown by more accounting misstatements, compared to the managers of firms closer to the SEC offices. It is possible that managers of rural firms behave more opportunistically, resulting from less external monitoring and less visibility. If opportunistic behavior among managers prevails over efficient contracting theory, it is possible that rural firms will have weaker governance compared to urban firms. Due to the competing arguments of managerial opportunism and efficient contracting theories, empirical examination of the effects of geographical location on corporate governance is warranted.

Market Reaction to SOX Events

To understand the implications of corporate governance differences hypothesized, this study uses event study methodology and examines whether the stock market reacts differently to urban and rural firms around selected legislative events related to the passage SOX. Many prior research studies have reported negative market reaction to accounting regulatory events around policy setting announcements. For example, Zhang (2007) examines 17 legislation events related to the passage of SOX and find that the U.S. firms experience significantly negative abnormal returns around these event dates. Zhang (2007) concludes that investors' negative reaction is an indicator that SOX imposes net cost on these firms. Presumably, the net cost that companies would incur from SOX implementation partially relates to firms' additional investment in improving their existing system of corporate governance. If firms already have stronger governance prior to SOX, the additional cost to such firms would be less than the cost to the firms with weaker governance. As such, firms with stronger corporate governance will experience less negative market reaction compared to those with weaker corporate governance prior to SOX. As the first hypothesis argues, rural firms are likely to have stronger corporate governance than urban firms prior to SOX. If this argument holds, rural firms should be less affected by the implementation of SOX and have less negative market reaction to SOX events compared to urban firms. If this argument does not hold, then a more negative reaction to SOX for rural firms would imply that urban firms exhibit higher levels of governance prior to SOX relative to rural firms.[4] The formal hypothesis is:

H2: The stock market reacts less negatively around SOX legislative events for rural firms relative to urban firms.

Research Methodology

The first hypothesis examines corporate governance characteristics between rural and urban firms. Although there are various readily available measures of corporate governance, such as the G-Index developed by Gompers, Ishii, and Metrick (2003), these measures are restricted to only a few large-size firms for the present study's sample period. For example, the authors were only able to calculate G-Index for only 70 firms out of the 202 firms in the study's sample. To overcome this data limitation, individual measures of corporate

[4] If this argument does not hold, then a more negative reaction to SOX for rural firms would imply that urban firms exhibit higher levels of governance prior to SOX relative to rural firms.

governance are utilized as suggested by Farber (2005), by hand-collecting the data from firms' proxy statements and/or 10-Ks. Below, this study explains various individual measures of corporate governance used in this study.

The first set of individual governance measures relates to the composition of the Board of Directors (BOD). Based upon prior literature, this study uses CEO Duality, percentage of outside directors on the BOD, number of outside directors on the BOD, and number of directors on the BOD as various measures of corporate governance characteristics related to the BOD (Brickley & James, 1987; Baliga, Moyer, & Rao 1996; Brickley, Coles, & Jarrell, 1997).

The second set of individual governance measures relates to audit-related variables. Following prior literature, proportion of Big 4 auditors, number of audit committee meetings, number of audit committee members, and number of outside members on the audit committee in the fiscal year studied are included in this study as corporate governance variables (DeAngelo, 1981; Sommer 1991; Farber 2005).

The third set of variables relate to other variables used in prior literature. Following Farber (2005), the current study uses the percent of stock held by management and directors, as well as the ratio of other audit fees to total audit fees, as potential corporate governance variables. Latridis (2016) showed that companies with stronger corporate governance tend to use more pessimistic language. As such, we use tone in MD&A as an additional measure of corporate governance characteristics. This research follows methodologies suggested by Loughran and McDonald (2011) for linguistic (i.e., optimistic versus pessimistic language) analyses.[5] To test second hypothesis, 17 event dates identified by Zhang (2007) as important legislative events leading to the passage of SOX (see Table 1 for the list of the events) are tested using CARs around day -1 to day +1.

---

[5] Loughran and McDonald (2011) developed a list of 2,337 words that have negative implications and a list of 354 words that have positive implications in a financial sense, and the current study uses these financially oriented lists to capture the linguistic tone (pessimistic or optimistic) of an MD&A report. A count of these words within the MD&A is used to create the tonal variables – M_Pess and M_Poss – that are used in this study. The Loughran and McDonald word lists are available at: https://sraf.nd.edu/textual-analysis/resources/#LM%20Sentiment%20Word%20Lists.

Table 1: Key Legislative Events Leading to the Passage of the SOX

Event Number	Event Number	Description of Event
1	January 17, 2002	Initial proposal of accounting overhaul plan by SEC Chairman.
2	February 2, 2002	Call for changes in rules governing corporations by Treasury Secretary.
3	February 13, 2002	Accounting reform bill introduced by Oxley.
4	February 28, 2002	Legislation more restrictive than Oxley's proposal introduced by House Democrats.
5	March 7, 2002	First public response to accounting scandals by President George W. Bush.
6	March 26, 2002	Alan Greenspan warns against too much government regulation.
7	April 11, 2002	Oxley's bill was scheduled to be voted on by House Financial Services Committee; however, the vote was postponed.
8	April 16, 2002	Committee passed Oxley's bill.
9	April 24, 2002	House passed Oxley's bill.
10	May 8, 2002	Accounting reform bill introduced by Sarbanes to Senate Banking Committee.
11	June 11, 2002	SEC proposed regulation requiring executives to certify financial statements.
12	June 18, 2002	Senate banking committee passed Sarbanes' bill.
13	June 25, 2002	WorldCom scandal exposed.
14	July 8, 2002	Senate debates Sarbanes' bill and President George W. Bush delivers speech on corporate reforms.
15	July 15, 2002	Senate passed Sarbanes' bill.
16	July 18, 2002	House negotiation over Sarbanes’ bill begins.
17	July 24, 2002	House and Senate agree on the final rule and pass SOX.

Sample Selection

Sample for this study includes rural firms and their matched urban firms that are listed on the NYSE, NASDAQ, and AMEX with fiscal year ending prior to the enactment of SOX (i.e., prior to July 30, 2002). Following prior literature, firms are classified as rural versus urban based on firm's corporate headquarters (Coval & Moskowitz 1999; Loughran and Shultz 2005; Pirinsky & Wang 2006; Seasholes and Zhu 2010). Specifically, firm is classified as rural if its headquarter is 100 miles or more from the center of one of the 49 U.S. metropolitan areas of at least one million population according to the Census 2000. Conversely, a firm is classified as urban if it is headquartered in one of the ten largest metropolitan areas based on population size reported in the Census 2000.[6]

Table 2 Panel A presents the sample selection process. Because the definition of a rural firm is restrictive (at least 100 miles from any metropolitan statistical area of at least one million people), the entire population of rural firms available on Compustat for the fiscal year ending prior to July 30, 2002 is 132. Of these, only 101 rural firms have CRSP return data available with a share price of greater than $1. Because this study examines two distinct geographic groups of companies, a concern might arise that other factors correlated with the headquarters location could affect the characteristics of accounting data. To overcome this concern, this study follows Lang, Raedy, and Wilson (2006) and matches rural and urban firms based on industry (two-digit SIC code) and sales growth.

Some rural firms, such as those in the business of building materials and garden supplies, miscellaneous plastic products, textile mill products, and furniture and home furnishings to name a few, did not have an exact industry match from the urban population. If exact industry match was not found, the next closest industry available from the urban group was selected.[7] The plastic products firm from the rural group, for example, was matched with a nondurable products firm in the urban group if exact plastic products firm was not found in the urban group. This process yields a sample of 202 firms (i.e., 101 rural

---

[6] The ten largest consolidated metropolitan statistical areas according to the 2000 census include: New York City, Los Angeles, Chicago, Washington-Baltimore, San Francisco, Philadelphia, Boston, Detroit, Dallas-Fort Worth, and Houston.

[7] There is a total of 6 rural firms that do not have an exact industry matched urban firm. An additional analysis was conducted without these firms. The results are qualitatively similar to those reported using the full sample.

Table 2, Panel A: Sample Selection Process

Number of firms in Compustat with headquarter in rural areas in the fiscal year prior to the enactment of the SOX	132
Less: Firms missing CRSP or Compustat data or firms with share price of less than $1 in the fiscal year end date	(31)
Number of rural firms in the sample	101
Number of matched urban firms in the sample	101
Total number of firms in the sample	202

Table 2, Panel B: Test of Differences of Various Firm Characteristics for Rural and Matched Urban Firms

	Rural Firm	Urban Firm	Test of difference (A-B)
Variables	Mean (A)	Mean (B)	p-value
Fsize	5.981	6.083	0.7222
Roa	-0.013	-0.101	**0.0942**
Lev	1.100	1.670	0.3185
Bm	0.778	0.821	0.7341
Sales growth	0.210	0.290	0.3170

This table presents the t-test of the mean difference between rural and urban matched firms for various firm characteristics. T-test statistics are corrected for unequal variances using the Satterthwaite (1946) approximation. Variables are defined in Table 3 panel A.

and 101 matched urban firms) for the current study.

Table 2 Panel B compares the mean values of rural and matched urban firms for various firm characteristics, including firm size, return on assets, leverage, book to market ratio, and sales growth. As shown there, only return on assets is marginally significantly different between rural and urban firms, providing some support that there are not any major fundamental observable differences in accounting data between rural and matched urban firms.

Descriptive Statistics and Correlation Analysis

Table 3 Panel A shows the descriptive statistics for the sample of firms. As per the table, the mean CAR around 17 SOX events is -0.025, consistent with Zhang's (2007) findings that the market overall reacted negatively to SOX events. Descriptive statistics also show that 0.601 of the sample firms had CEOs who were also the Chairman of the BOD and 0.735 of the directors on Board of Directors were outside directors. On average, there were 8 total directors on board. 0.693 of the firms utilized Big 4 auditors. The average of audit committee members and audit committee outside members is almost equal, suggesting that almost all firms had audit committee members represented by outside members. Table 3 Panel B provides pairwise correlations for various variables used in the regression analyses. Pearson correlations are presented above the diagonal and Spearman correlations are presented below the diagonal. Main variable of interest, *Rural,* is negatively associated with CEO duality and positively associated with Big 4 auditor selection as well as pessimistic tone of the MD&As. These correlations provide some support for H1 that corporate governance of rural firms was stronger than those of urban firms prior to the passage of the SOX.

Results

To test Hypothesis 1, various corporate governance characteristics are examined. Corporate governance characteristics are grouped into Board of Directors-Related Variables (Table 4, Panel A), Audit-Related Variables (Table 4, Panel B), and Other Variables (Table 4, Panel C). As shown in Table 4, three of the various corporate governance variables (CEO Duality, Big 4 auditor, and Pessimistic Tone of the MD&A) are significantly different between rural and urban firms, in the direction as predicted in H1. Although many of the individual governance measures examined are statistically

Table 3, Panel A: Descriptive Statistics for Various Dependent and Independent Variables for All Firms

Variables	**Mean**	**Median**	**Q1**	**Q3**
CEO_Duality	0.601	1.000	0.000	1.000
OutsideDir%	0.735	0.750	0.625	0.857
#OutsideDir	6.237	6.000	4.000	8.000
#Directors	8.338	8.000	6.000	10.000
Big4	0.693	1.000	0.000	1.000
#AudComMeet	4.136	4.000	3.000	5.000
#AudComMbrs	3.561	3.000	3.000	4.000
#AudComOutsideMbrs	3.525	3.000	3.000	4.000
InsideOwn%	0.236	0.159	0.041	0.397
Otherfee%	0.413	0.406	0.233	0.588
M_Pess	0.017	0.014	0.009	0.021
M_Pos	0.007	0.006	0.004	0.008
Fsize	6.032	5.864	4.628	6.969
Lev	1.512	1.671	0.873	4.289
Roa	-0.057	0.025	-0.020	0.058
Bm	0.800	0.634	0.383	0.929
Loss	0.297	0.000	0.000	1.000
Sales_growth	0.137	0.064	-0.153	0.850
CumulativeCar	-0.025	-0.004	-0.114	0.089

Table 3, Panel A presents descriptive statistics for 202 sample firms. Definitions for the variables:

CEO_Duality= indicator variable equal to 1 if CEO is same as Chairman of the Board and 0 otherwise;
OutsideDir%= outside director per cent;
#OutsideDir= number of outside directors;
#Directors= number of directors;
Big4=indicator variable equal to 1 if firm employs Big 4 auditors and 0 otherwise;
#AudComMeet= number of audit committee meetings;
#AudComMbrs= number of audit committee members;
#AudComOutsideMbrs= number of outside directors on audit committee;
InsideOwn%= the per cent of shares held by management and directors;
Otherfee%= per cent of other fees to audit fees;
M_Pess= Pessimistic score of MD&A following Loughran and McDonald (2011);
M_Pos= Optimistic score of MD&A following Loughran and McDonald (2011);
Fsize= natural log of total assets at the end of the sample year;
Lev= firm leverage at the end of the sample year;
Roa= return on assets for the sample year;
Bm= book value of equity to market value of equity at the end of the sample year;
Loss= indicator variable equal to 1 if firm incurred loss in the sample year and zero otherwise;
Sales_growth= firm's sales growth at the end of the sample year compared to the previous year;
CumulativeCar= cumulative abnormal returns over 17 events relative to the passage of the SOX.

Table 3, Panel B: Correlation Analyses for Variables Used in Table 3 Analyses

Variables		1	2	3	4	5	6	7	8	9	10
CEO_Duality	1		-0.094	0.041	-0.126	0.058	0.261	0.028	0.073	-0.077	0.021
			0.189	0.565	0.077	0.416	0.000	0.696	0.305	0.285	0.768
Big4	2	-0.094		-0.045	0.150	0.047	0.088	-0.061	-0.065	0.039	0.127
		0.189		0.527	0.033	0.507	0.215	0.385	0.361	0.580	0.071
M_Pess	3	0.026	-0.007		0.148	-0.066	0.044	-0.113	-0.141	0.034	0.016
		0.717	0.927		0.036	0.352	0.537	0.111	0.046	0.634	0.822
Rural	4	-0.126	0.150	0.158		0.071	-0.025	0.118	-0.024	-0.071	-0.065
		0.077	0.033	0.024		0.319	0.722	0.094	0.734	0.317	0.358
Lev	5	0.169	0.010	-0.088	0.043		0.018	-0.009	-0.063	-0.003	0.109
		0.017	0.882	0.214	0.545		0.798	0.902	0.372	0.962	0.124
Fsize	6	0.248	0.092	0.009	-0.013	0.408		0.108	0.042	-0.094	-0.165
		0.000	0.191	0.903	0.853	<.0001		0.125	0.553	0.184	0.019
Roa	7	-0.018	-0.112	-0.019	0.086	-0.097	0.038		0.019	0.017	-0.485
		0.806	0.112	0.790	0.226	0.170	0.593		0.789	0.813	<.0001
Bm	8	0.025	0.008	-0.121	0.079	0.084	-0.015	-0.155		-0.074	0.112
		0.729	0.909	0.085	0.265	0.236	0.837	0.027		0.296	0.113
Sales_growth	9	-0.021	-0.069	-0.011	0.070	-0.007	-0.024	0.288	-0.240		0.082
		0.772	0.333	0.880	0.324	0.916	0.730	<.0001	0.001		0.245
Loss	10	0.021	0.127	0.012	-0.065	-0.025	-0.156	-0.791	0.025	-0.211	
		0.768	0.071	0.860	0.358	0.723	0.027	<.0001	0.721	0.003	

Table 3, Panel B presents correlation analyses for the variables that are used in Table 3 analyses. Pearson (Spearman) correlations are presented above (below) the diagonal based on a sample of 202 firms. Correlation coefficients are presented on the first row and probabilities on the second row for each variable. Variables are defined in Table 3 Panel A.

insignificant between rural and urban firms, we note that CEO Duality, Big 4 auditor, and pessimistic tone are some of the major variables that are consistently found in the prior literature to be strongly associated with corporate governance strength (Rechner & Dalton, 1991; Farber, 2005; Fan & Wong, 2005; Ghosh, Karuna, & Tian, 2015; Latridis, 2016).

Since only CEO Duality, Big 4 auditor, and Pessimistic Tone of the MD&A are significantly different in the univariate tests, this study restricts its regression results presented in Table 5 to these three dependent variables. To examine differences further, this study includes various financial characteristics in the regression analyses. Specifically, the regression models control for firm size, leverage, growth, return on assets, and loss. Logistic regression is utilized for the models where dependent variables are indicators (i.e., *CEO_Duality* and *Big4*). Ordinary Least Squares (OLS) regression is utilized where dependent variable is continuous (i.e., *M_Pess*).

For logistic regression analyses, we test the goodness-of-fit using Likelihood Ratio, Score, and Wald tests. Results for the goodness-of-fit tests are presented in Table 5 and provide support that all three tests reject the global null hypothesis for models where dependent variables are *CEO_Duality* and *Big4*. As shown in Table 5, coefficient of *Rural* is negative and significant at the 10 percent level (p-value = 0.0508) when dependent variable is *CEO_Duality*. Similarly, the coefficient on *Rural* is significant and positive when dependent variable is *Big4* (p-value = 0.0225) and *M_Pess* (p-value = 0.0170). These results provide support for H1.

Table 6, Panel A shows the CARs for rural and urban firm groups around each of the 17 events that occurred during 2002. The results around the 17 individual SOX event dates provide some evidence that with rural firms are less negatively impacted by SOX than are urban firms, but only marginally.

The very first mention of an accounting overhaul plan by SEC Chairman on January 17, 2002 resulted in a CAR of 0.0072 greater for rural firms (0.0004) than for urban firms (-0.0068), and this difference is statistically significant at the 10 percent level. When a more restrictive bill (than previously proposed) was introduced on February 28, rural firms' CAR (0.0193) was 0.0166 greater (at the 10 percent significance level) than urban firms' CAR (0.0027). The House Financial Services Committee's scheduled vote on Senator Oxley's bill on April 11 resulted in a CAR of 0.0223 higher for rural firms (0.0221) than for urban firms (-0.0002), a difference that is

Table 4, Panel A: Board of Directors-Related Variables

	Variables			
Firm	*CEO_Duality*	*OutsideDir%*	*#OutsideDir*	*#Directors*
Rural	0.540	0.740	6.280	8.450
Urban	0.663	0.730	6.190	8.220
t-stat	**-1.98****	0.33	-0.21	0.57

Table 4, Panel B: Audit-Related Variables

	Variables			
Firm	*Big4%*	*#AudComMeet*	*#AudComMbrs*	*#AudComOutsideMbrs*
Rural	0.762	4.160	3.500	3.470
Urban	0.624	4.110	3.620	3.580
t-stat	**2.15****	0.15	-0.80	-0.70

Table 4, Panel C: Other Variables

	Variables			
Firm	*InsideOwn%*	*Otherfee*	*M_Pess*	*M_Pos*
Rural	0.254	0.391	0.019	0.007
Urban	0.217	0.434	0.015	0.006
t-stat	1.13	-1.28	**2.11****	1.24

Table 4 Panel A, B, and C present differences in various corporate governance characteristics between rural and urban firms prior to the implementation of SOX. Variable descriptions are available in Table 3 Panel A. */**/*** represent two-tailed statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 5: Regression Results of Corporate Governance Variables on Firm Location

	DV= CEO_Duality		*DV= Big4*		*DV= M_Pess*	
Variables	Estimate	t-value	Estimate	t-value	Estimate	t-value
Intercept	**-1.3335****	**-2.33**	-0.4448	-0.74	**0.0135*****	**4.13**
Rural	**-0.6288***	**-1.97**	**0.7641****	**2.30**	**0.0044****	**2.41**
Lev	0.0006	0.02	0.0009	0.02	-0.0001	-1.26
Fsize	**0.3070*****	**3.71**	0.1411	1.56	0.0005	1.07
Roa	0.3037	0.16	-0.1190	-0.25	**-0.0051***	**-1.80**
Bm	0.2001	0.95	-0.2124	-1.11	**-0.0002***	**-1.96**
Sales_growth	**-0.0837***	**-1.73**	0.0657	1.23	0.0003	0.64
Loss	0.4595	1.10	0.7937	1.62	-0.0001	-0.05
N	202		202		202	
Pseudo R^2	0.1453		0.0928			
Adj. R^2					0.0715	
Likelihood Ratio (Pr>F)	0.0022		0.0015			
Score (Pr>F)	0.0023		0.0128			
Wald (Pr>F)	0.0036		0.0056			

Table 5 presents regression analysis results where the dependent variables are corporate governance factors that were found to be significantly different between rural and urban firms in Table 4. There are 202 firm-year observations (i.e., 101 rural and 101 urban matched firm-years). Logistic regression is used for indicator dependent variables *CEO_Duality* and *Big4* whereas OLS regression is used for continuous dependent variable *M_Pess*. The main variable of interest in each of the model above is *Rural*, which is an indicator variable set equal to 1 if a firm is rural and 0 if a firm is urban. Other variables are defined in Table 3 Panel A. */**/*** represent two-tailed statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 6, Panel A: CARs for Individual SOX Events

Event Number	Date	Event Window	CAR Rural	CAR Urban	CAR Rural - CAR Urban
1	January 17, 2002	January 16-18	0.0004	-0.0068	0.0072*
2	February 2, 2002	February 1-4	0.006	0.0041	0.0019
3	February 13, 2002	February 12-14	-0.0048	0.004	-0.0088
4	February 28, 2002	February 27-March 1	0.0193	0.0027	0.0166*
5	March 7, 2002	March 6-8	-0.0016	-0.0019	0.0003
6	March 26, 2002	March 25-27	-0.0019	-0.0003	-0.0016
7	April 11, 2002	April 10-12	0.0221	-0.0002	0.0223***
8	April 16, 2002	April 15-17	-0.015	0.0107	-0.0267
9	April 24, 2002	April 24-26	0.0074	0.0031	0.0043
10	May 8, 2002	May 7-9	-0.0042	-0.0007	-0.0035
11	June 11, 2002	June 10-12	0.0081	-0.0133	0.0214***
12	June 18, 2002	June 17-19	0.0022	0.0024	-0.0002
13	June 25, 2002	June 24-26	-0.002	-0.0023	0.0003
14	July 8, 2002	July 8-10	-0.0024	-0.0112	0.0088
15	July 15, 2002	July 15-17	-0.0174	-0.0071	-0.0103
16	July 18, 2002	July 18-22	0.0017	-0.0326	0.0343***
17	July 24, 2002	July 23-25	-0.0068	-0.0101	0.0033*

Table 6, Panel B: CARs Cumulated Over All SOX Events

CAR Rural	-0.0066
CAR Urban	-0.0426
Difference between location groups (CAR Rural - CAR Urban)	**-0.0360****

Table 6 presents the abnormal returns of sample rural and urban firm groups around U.S. legislative events leading to the passage of SOX. Panel A presents the cumulative abnormal returns (CARs) for rural and urban firms around individual events. Individual events are described in Table 1. Panel B presents abnormal returns cumulated over all SOX events. A t-test is performed for the difference between rural and urban abnormal returns. There are 202 firm-year observations (i.e., 101 rural and 101 urban matched firm-years). */**/*** represent two-tailed statistical significance at the 10%, 5%, and 1% levels, respectively.

significant at the 1 percent level.

Further, the SEC proposal requiring executives to certify financial statements on June 11, 2002 ultimately resulted in the passage of Sections 302 and 906 of SOX and represents one of the more significant components in the SOX regulation. This proposal resulted in a CAR of 0.0214 greater for rural firms (0.0081) than for urban firms (-0.0133), and this difference is statistically significant at the 1 percent level. The fact that urban firms experienced significantly negative market reactions to this requirement strongly suggests that urban firms were perceived to have weaker governance among organizational executives when compared to rural firms.

The most critical legislative activities related to the passage of SOX occurred in July 2002 (Zhang, 2007). President George W. Bush made a radio address on July 20, urging Congress to pass a final bill before the fall recess (Melloan, 2002). This event is significant because, at this point, the market became reasonably certain that securities legislation was imminent. Around this important event window, rural firms experienced a positive CAR of 0.0017, while urban firms experienced a negative CAR of -0.0326; this 0.0343 difference is significant at the 1 percent level. While rural firms experienced positive returns with tightened regulation on the horizon, urban firms' returns were extremely negative; such a reaction is again indicative of weak investor confidence in urban firms' ability to handle increased regulation in a cost-efficient manner. Final legislation was agreed upon and passed by the House and Senate on July 24. Around this final passage of SOX, rural firms have CAR of -0.0068, and urban firms have CAR of -0.0101. This difference of 0.0033 is significant at the 10 percent level. It is interesting that the first and last events associated with SOX passage both correspond with significantly higher returns for rural than for urban firms. Collectively, the individual results indicate that rural firms may be more prepared to bear the costs imposed by SOX regulation compared to urban firms.

Next, Table 6, Panel B presents the CARs cumulated over all SOX events and provides results from a t-test of the difference between rural and urban firm groups. The summation of abnormal returns over all 17 events results in a -0.0066 CAR for rural firms and in a -0.0426 CAR for urban firms, and this 0.0360 difference is statistically significant at the 5 percent significance level. Therefore, market reaction tests provide some support for Hypothesis H2.

Conclusion

The purpose of this study is to examine whether a firm's corporate governance practices are influenced by firm location in the pre-SOX environment and whether such influence is visible in investors' perception during SOX regulatory events. We show that, prior to SOX implementation, rural firms are less likely to have CEOs as the chair of the board of directors and more likely to hire Big 4 auditors. Rural firms are also more likely to issue pessimistic a MD&A.

Findings relating to Hypothesis H2 suggest that CARs associated with the passage of SOX are significantly less negative for rural firms than for urban firms, consistent with the idea that market participants perceive rural firms as having stronger governance prior to SOX compared to urban firms. In sum, the focal findings of this study are that rural firms, in comparison with matched firms located in urban areas, choose to employ quality corporate governance and more transparent corporate disclosure strategies, including appropriate use of tone, to mitigate challenges relating to dispersed geography. The authors of this study are not aware of any accounting inquiry that has empirically investigated how rural firms compensate for their geographic dispersion disadvantages, such as monitoring agency conflicts and capital creation challenges. In light of these findings, as well as the gap in the accounting literature that this research addresses, the authors believe that the results of this inquiry contribute to accounting literature related to the influence of dispersed geography on corporate strategy.

This study has some limitations. First, not all the negative CARs documented by Zhang (2007) can be directly attributed to SOX and, thus, might not be indicative of a firm's corporate governance quality. It is also possible that other regulatory events could affect rural and urban firms differently than SOX did. Future research might examine other regulatory events and their impact on rural and urban firms. We also limited our sample to pre-SOX environment to understand the implications of corporate governance differences on market reaction to the passage of SOX. It is possible that these governance differences are different in the post-SOX environment. Future research can examine such possibility. Additionally, differences in narrative components of the disclosure could be firm specific and not indicative of overall disclosure quality. This study captured only the linguistic tone and not the overall quality of the reports to investors. Finally, the definitions for "urban firm" and "rural firm" may also not be clearly defined and thus, generalizability to firms is limited based upon the definitions in this study. Future research could explore a wider variety of geographic variables and thereby increase generalizability of this area of research.

References

Baliga, B. R., Moyer, R. C., & Rao, R. S. (1996). CEO duality and firm performance: What's the fuss? *Strategic Management Journal*, *17*(1), 41-53.

Bamber, B. M., & Odean, T. (2008). All that glitters: The effect of attention and news on the buying behavior of individual and institutional investors. *Review of Financial Studies*, *21*(2), 785-818.

Brickley, J. A., & James, C. M. (1987). The takeover market, corporate board composition, and ownership structure: The case of banking. *The Journal of Law and Economics*, *30*(1), 161-180.

Brickley, J. A., Coles, J. L., & Jarrell, G. (1997). Leadership structure: Separating the CEO and CHA of the board. *Journal of Corporate Finance*, *3*(3), 189-220.

Choi, J. H., Kim, J. B., Qiu, A. A., & Zang, Y. (2012). Geographic proximity between auditor and client: How does it impact audit quality? *Auditing: A Journal of Practice & Theory*, *31*(2), 43-72.

Coval, J. D., & Moskowitz, T. J. (1999). Home bias at home: Local equity preference in domestic portfolios. *The Journal of Finance*, *54*(6), 2045-2073.

Coval, J. D., & Moskowitz, T. J. (2001). The geography of investment: Informed trading and asset prices. *Journal of Political Economy*, *109*(4), 811-841.

DeAngelo, L. E. (1981). Auditor size and audit quality. *Journal of Accounting and Economics*, *3*(3), 183-199.

Fan, J. P., & Wong, T. J. (2005). Do external auditors perform corporate governance role in emerging markets? Evidence from east Asia," *Journal of Accounting Research*, *43*(1), 35-72.

Farber, D. B. (2005). Restoring trust after fraud: Does corporate governance matter? *The Accounting Review*, *80*(2), 539-561.

Filbeck, G., Gorman, R., & Zhao, X. (2011). SOX and the regulated firm. *Journal of Accounting and Public Policy*, *30*(6), 526-550.

Ghosh, A., Karuna, C., & Tian, F. (2015). Causes and consequences of the CEO also being the chair of the board. *Journal of Management Accounting Research*, *27*(2), 197-223.

Gompers, P., Ishii, J., and Metrick, A. (2003). Corporate governance and equity prices. *Quarterly Journal of Economics*, *118*(1), 107-156.

Healy, P. M., & Palepu, K. G. (2001). Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. *Journal of Accounting and Economics*, *31*(1–3), 405-440.

Holthausen, R. W. (1990). Accounting method choice: Opportunistic behavior, efficient contracting, and information perspectives. *Journal of Accounting and Economics*, *12*(1), 207-218.

Ivkovic, Z., & Weisbenner, S. (2005). Local does as local is: Information content of the geography of individual investors common stock investments. *Journal of Finance*, *60*(1), 267-306.

John, K., Knyazeva, A., & Knyazeva, D. (2011). Does geography matter? Firm location and corporate payout policy. *Journal of Financial Economics*, *101*(3), 533-551.

Kedia, S., & Rajgopal, S. (2011). Do the SECs enforcement preferences affect corporate misconduct? *Journal of Accounting and Economics*, *51*(3), 259-278.

Lang, M., Smith Raedy, J., &Wilson, W. (2006). Earnings management and cross listing: Are reconciled earnings comparable to US earnings? *Journal of Accounting and Economics*, *42*(1-2), 255-283.

Latridis, G. E. (2016). Financial reporting language in financial statements: Does pessimism restrict the potential for managerial opportunism? *International Review of Financial Analysis*, *45*, 1-17.

Lopez, D. M., & Rich, K. T. (2017). Geographic distance and municipal internal control reporting. *Advances in Accounting*, *36*, 40-49.

Loughran, T., & McDonald, B. (2011). When is a liability not a liability? Textual analysis, dictionaries, and 10-Ks. *The Journal of Finance*, *66*(1), 35-65.

Loughran, T., &Schultz, P. (2005). Liquidity: Urban versus rural firms. *Journal of Financial Economics*, *78*(2), 341-374.

Malloy, C. J. (2005). The geography of equity analysis. *The Journal of Finance*, *60*(2), 719-755.

Melloan, G. (2002, July 23). Can capitalism survive election year politics? *Wall Street Journal*, pp. A15.

Merton, R. C. (1987). A simple model of capital market equilibrium with incomplete information. *The Journal of Finance*, *42*(3), 483-510.

Pirinsky, C., & Wang, Q. (2006). Does corporate headquarters location matter for stock returns? *The Journal of Finance*, *61*(4), 1991-2015.

Rechner, P. L., & Dalton, D. R. (1991).CEO duality and organizational performance: A longitudinal analysis. *Strategic Management Journal*, *12*(2), 155-160.

Ribstein, L. E. (2002). Market vs. regulatory responses to corporate fraud: A critique of the Sarbanes-Oxley Act of 2002. *Journal of Corporation Law*, *28(1),* 1-48.

Romano, R. (2005). The Sarbanes-Oxley Act and the making of quack corporate governance. *The Yale Law Journal, 114*(7)*,* 1521-1611.

Satterthwaite, F. E. (1946). An approximate distribution of estimates of variance components. *Biometrics Bulletin*, *2*, 110–114.

Seasholes, M. S., & Zhu, N. (2010). Individual investors and local bias. *The Journal of Finance*, *65*(5), 1987-2010.

Shi, G., Sun, J. & Luo, R. (2015). Geographic dispersion and earnings management. *Journal of Accounting and Public Policy*, *34*(5), 490-508.

Sommer, A. A. (1991). Auditing audit committees: An educational opportunity for auditors. *Accounting Horizons*, *5*(2), 91-93.

Verrecchia, R. E. (2001). Essays on disclosure. *Journal of Accounting and Economics*, *32*(1), 97-180.

Wang, M., & Hussainey, K. (2013). "Voluntary Forward-Looking Statements Driven by Corporate Governance and Their Value relevance," *Journal of Accounting and Public Policy*, *32*(3), 26-49.

Wintoki, M. B. (2007). Corporate boards and regulation: The effect of the Sarbanes-Oxley Act and the exchange listing requirements on firm value. *Journal of Corporate Finance*, *13*(2-3), 229-250.

Zhang, I. X. (2007). Economic consequences of the Sarbanes-Oxley Act of 2002. *Journal of Accounting and Economics*, *44*(1), 74-115.

Zhijun, L., Liu, M., & Noronha, C. (2016). The impact of corporate governance on informative earnings management in the Chinese market. *Abacus*, *52*(3), 568-609.

State Economies and Women's Economic Parity: How are They Related to States' Sexual Harassment Claims Before and After #MeToo?

Lara Gardner
Southeastern Louisiana University
Rusty Juban
Southeastern Louisiana University

Abstract

This paper analyzes annual female and male sexual harassment charges in all fifty states from 2000 to 2018. The data was analyzed using panel regression methods that allow us to control for observed and unobserved state characteristics. For a year after the "#MeToo" movement began, in October 2017, sexual harassment charges were statistically significantly higher for females, but not males. Other state characteristics were identified that were also related to the number of formal sexual harassment charges within states, and we determined the leading causes of variations in sexual harassment charges across and within states over time. One hopes that after the "#MeToo" movement, which began in October 2017, businesses would focus on creating a positive workplace environment where sexual harassment is eliminated. As businesses and government leaders within a state identify and learn more about the factors that are related to sexual harassment and victims' willingness to report it, they can develop proactive and effective mechanisms for ending a practice that has high costs for both employees and businesses.

Introduction

Businesses have a financial interest in implementing workplace policies that are ethical and conform to legal standards, in order to boost employee retention and to avoid costly litigation. Yet what happens when organizations abuse their power? The "MeToo" movement in the United States highlighted the plight of employees who suffered sexual harassment, in some cases for years, at the hands of the rich and powerful. Beginning on social media in October 2017, "MeToo" allegations against prominent movie producer Harvey Weinstein and other executives dominated headlines for the remainder of 2017 and through 2018 (Dastagir, 2019). For many people, the movement revealed that sexual harassment in the workplace was far more prevalent than previously thought, in both the public and private sectors, and that most occurrences of sexual harassment go unreported. The Equal Employment Opportunity Commission (EEOC), the federal agency that receives formal complaints of sexual harassment in the workplace, even established a task force on the study of harassment in the workplace to investigate why so much harassment persists in the U.S. labor force, and why so many cases of sexual harassment are not reported (EEOC, 2016).

Before the "MeToo" movement, the number of formal sexual harassment claims made by women to the EEOC and other government agencies had been steadily declining every year since 2009. Yet in the EEOC fiscal year of 2018, which begins in October 2017 and ends in September 2018, female sexual harassment charges increased from 6,969 to 7,947 (a 14 percent increase) and male sexual harassment charges increased from 1,629 to 1,764 (an 8.3 percent increase) (EEOC, 2019a). This time period coincides with a swell of social media attention on October 15, where "#MeToo" was used in 12 million Facebook posts over a 24-hour period (CBS, 2017). Many people attribute the increases in sexual harassment charges to the impact of the "MeToo" movement, in part because sexual harassment claims had been steadily declining, and because of the downward trends in *other* types of charges from 2017 to 2018. For example, race-based discrimination charges decreased 13.8 percent (EEOC, 2019b) and sex-based discrimination (not including sexual harassment) decreased 9.9 percent from 2017 to 2018 (EEOC, 2019c; EEOC, 2019d).

The purpose of this study is to examine how sexual harassment charges vary over time and across states for both male and female employees, particularly in response to media events such as those seen in the highly publicized "MeToo" movement. In the U.S. the number of sexual harassment charges differ significantly across states, even after adjusting for the number of employees within a state. States also have different trends in the number of charges reported over time. For the purposes of this study, we examined annual sexual harassment claims, by state, that were filed with the EEOC from 2000 to 2018. Our first objective is to determine whether observed, measurable state characteristics are related to states' sexual harassment charges. Our second objective is to examine why the number of sexual harassment charges (per 10,000 employed) varied across and within states over time. A panel-data analysis allows us to control for year-specific and state-specific factors that affected changes in the number of charges over time and/or across states. Also, we separated the claims made by females and males, a process rarely available in studies drawing from a single company due to the infrequence of male versus female claims.

Filing a sexual harassment claim is an important decision for an employee and can lead to serious consequences for all parties involved. Certainly, a better understanding of the claiming process, including the external factors or environmental conditions that favor an employee to seek remediation against their employer, is an area that warrants study. Also, the ability to assess claims by gender is a significant contribution to the literature as very few studies have examined female and male claims separately. If factors such as state- and year-specific unemployment rates influence the number of charges within a state, we can use that information to predict future charges; for example, how sexual harassment charges should be expected to change during periods of recession/expansion and other societal level changes (e.g. the "MeToo" movement). Predictions from empirical models of sexual harassment charges may help state officials to learn which factors contribute to higher charges within a state, and to address those factors in ways that will result in less sexual harassment. Another important contribution of this research is that results from our model can help researchers predict how a social movement influences peoples' willingness to file sexual harassment charges. These predictions can be used by government agencies to prepare for any influx in cases that may result from the social movement. For example, the #MeToo movement motivated victims to step forward and submit charges against their accuser.

Data and Empirical Methods

Trends in Female and Male Sexual Harassment Charges, and #MeToo

Our data on sexual harassment charges reflect charges filed with the Equal Employment Opportunity Commission and the state and local Fair Employment Practices Agencies (FEPA) around the United States that have a work sharing agreement with the EEOC. The charges filed are alleging sexual harassment and are recorded separately by the gender of the person making the claim. Figures 1a. and 1b. show *total* sexual harassment charges reported by females and males, respectively, compared to the number of charges per 10,000 people employed. Data on state employment are available from the Current Population Survey collected by the Bureau of Labor Statistics (BLS, 2019a).

Nationally, total female sexual harassment charges range from a high of 13,333 in the year 2000 to a low of 6,969 in 2017 (EEOC, 2019a). Total male charges were highest in 2002, at 2,168, but lowest in 2017, at 1,629. For both males and females, the number of charges had a strong downward trend over this time period, even though the number of females and males in the labor force substantially increased. Female sexual harassment charges only increased from the previous year's number of charges in 2007, 2008, and 2018. Male charges show more variation over time, with increases from the previous year's number of charges in 2001, 2002, 2006, 2007, 2008, 2012, and 2018.

Figures 1a. and 1b. indicate that sexual harassment charges were higher in 2018 for both males and females. There is a perception that the claims filed in 2018 are no less credible than the claims filed in previous years, because the EEOC filed more than 50 percent more lawsuits alleging sexual harassment in 2018 than in 2017 (EEOC, 2018). To investigate the trends in charges during the "MeToo" era more closely, we examined the changes in charges across all states in FY 2018. In Figure 2., states are sorted by the percent change in sexual harassment charges from 2017 to 2018, from the largest decreases in charges on the left to the largest increases on the right. Across all 50 states and the District of Columbia, three states experienced no change in formal charges from 2017 to 2018, and twelve states saw a decline in sexual harassment charges (although nine of the twelve had less than 100 charges in both years, causing any small change in the level of charges to result in a large percent change). Figure 2. provides an example of the different trends occurring across the states that we strive to explain in our empirical analyses.

What Factors are Related to Differences Across States?

Our first objective is to determine whether certain observed state characteristics are statistically related to sexual harassment charges that vary across our 50 states (and D.C.) and over 19 years of data. In our empirical model, the number of charges per 10,000 employed in each state-year are regressed on several observed state characteristics, year indicators, and state indicators in a pooled time-series model.[1]

---

[1] We suspect that these models will have heteroskedasticity, because there is a large range in charges per 10,000 employed across the states. Autocorrelation is also likely to be present within each state. Therefore, for our empirical model we use Prais-Winsten regressions with panel-corrected standard errors and autoregressive errors. Specifically, the regressions are estimated with the assumptions the disturbances are heteroskedastic and

The state indicators will capture unobserved characteristics of each state that are constant over time, to the extent that these unobserved characteristics are common within the state; for example, cultural views on the role of women in supervisory positions, cultural views on men asserting power through sexual harassment, workers' religiosity, and workers' rights consciousness (awareness of and willingness to asset their own rights).

The time indicators will capture trends that occurred over time across the nation, such as national policy changes (although there were no new EEOC laws during this time period). The time indicator for the year 2018 captures change introduced by the "MeToo" movement, and we expect sexual harassment charges to be significantly higher in 2018. The #MeToo movement brought a greater awareness of the prevalence of sexual harassment, a significant increase in the number of Americans who felt that sexual harassment in the workplace is a serious problem, and a perception that harassment allegations would be taken more seriously than in the past; all of which encouraged sexual harassment victims to come forward with their stories (Gurchiek, 2019; Gibson and Guskin, 2017). As a result of the "MeToo" movement, we hypothesize that the coefficient on the indicator for year 2018 will be positive and statistically significant for both females and males, reflecting higher sexual harassment charges in 2018 relative to the base year of 2017.

There has been a significant body of research evaluating the causes of sexual harassment that has concluded that sexual harassment is a method used by men to exert power over women (MacKinnon, 1979; Uggen and Blackstone, 2004; McLaughlin, Uggen and Blackstone, 2009). Uggen and Blackstone (2004) found empirical support for the vulnerable-victim hypothesis, which theorizes that sexual harassment results from women's oppression and subordinate position to men. This suggests that less sexual harassment will occur in states where more women advance into upper-level positions within the organization. However, other studies have supported the power-threat hypothesis, which suggests that as women obtain more positions of power within an organization, men will react as though women's advancement in the workplace is a threat to their manhood, their livelihood, and/or the way men perceive their role in the workplace, and will consequently use sexual harassment as a way to assert their dominance (Willer, 2005; Cassino, 2017; Chamberlain, Crowley,

---

contemporaneously correlated across panel, and within panels there is first-order panel-specific autocorrelation.

Tope, and Hodson, 2008).

To test these theories, we include two measures of women's progress towards economic parity within a state: the ratio of female to male earnings, and the percent of supervisors in a state who are women. McLaughlin, Uggen and Blackstone (2012) found that women supervisors, relative to non-supervisors, are more likely to report harassing behaviors. Data on state- and year-specific earnings is available from the BLS, where earnings are measured as the median usual earnings of full-time wage and salary workers, by gender (BLS, 2019c). State-specific data on the number of males and females in supervisor positions is available from the U.S. Census Bureau (2019a), but only for years 2005 to 2018. The expected signs for the coefficients on states' ratio of female to male earnings, and the percent of female supervisors, are unclear, *a priori*. Negative coefficients for these two right-hand side variables would support the vulnerable-victims hypothesis, while positive coefficients would support the power-threat hypothesis. The data and empirical methods used in our analysis will allow us to determine which hypothesis is supported by the state data over this time period.

During the time period of our analysis, one mild recession occurred in 2001 and the worst recession since the Great Depression occurred from December 2007 to June 2009. In Figures 1a. and 1b., the trends indicate that both female and male sexual harassment claims increased immediately before the recession and through 2008, but decreased after 2008 to 2011. This trend in claims fits the theory suggested by Siegelman and Donohue (1995), that workers might be more willing to complain about sexual harassment when the unemployment rate is low, knowing that it is "more costly for their employer to retaliate against them at such times" (page 452). During periods of high unemployment, workers may be fearful that filing a complaint would lead to retaliation and job loss, and replacement jobs would be difficult to find. Annual unemployment rates for females and males are from the Bureau of Labor Statistics (2019a). We hypothesize that when states experience higher unemployment, the number of sexual harassment charges filed within the state are lower because workers fear retaliation and job loss from reporting, and because the prospects of finding alternative employment are lower.

Filing a sexual harassment claim with the EEOC or Fair Employment Practice Agencies may not be the only recourse for an individual who feels they are being mistreated in the workplace. If an employee is a member of a union, there may be a process whereby the individual can request assistance from the union in resolving a dispute caused by sexual harassment. Therefore, we constructed a variable to represent the percent of employees within a state-year who are members of a union (BLS, 2019b).[2] This data is not separated by gender, so there is one rate for both males and females in each state-year. If unions assist workers in resolving sexual harassment complaints within the workplace, the coefficient on the percent of union employees within a state-year will be negative and statistically significant.

While unions typically have grievance procedures for union members who feel they are being sexually harassed by another union member, unions also have a duty to protect the rights of members who are accused of such conduct. Many have reported that when women have tried to grieve the conduct of a fellow union member, the unions seem to do more to protect the jobs of the accused than the women they sexually harassed (Avendaño 2018; Cooper 2019). When union officials, women's advocates, and legal experts in the entertainment industry were interviewed and asked why labor unions didn't do more to stop sexual harassment, the reasons given centered around a reluctance by victims to report harassment to anyone, including union representatives, for fear of retaliation (Kullgren 2017). Although unions could assist a union member with claims, by facilitating discussions between the accuser and the employer or through private arbitration, unions have either tried to stay uninvolved in cases involving sexual harassment, or focused on defending the rights of the accused at least as much as those of the accuser (Cooper, 2019; Kullgren, 2017; Avendaño, 2019). Therefore, it is unclear whether states with more unionization will also have higher or lower sexual harassment charges.

Previous studies have found that women in male-dominated work settings experience more harassment than those not working in male-dominated work settings (Fitzgerald, Fritz Hulin, Gelfand and Magley, 1997; Uggen and Blackstone 2004). Using data from the U.S. Census Bureau (2019b), we determined the number of women and men in male-dominated industries within each state and year, where we define a male-dominated industry as one in which males constitute more than 50 percent of employees, and constructed a variable for the percent of all employed women in each state-year who work in a male-

[2] Previous work has found that unionization does not have a statistically significant relationship with unemployment in the U.S., so we can use both unionization and unemployment as right hand side variables in our empirical analyses (Taylor, Tew, Crawford, and Kern, 2013).

dominated industry.[3] This data is only available for 2005 to 2018. We hypothesize the coefficient on states' percentages of females who work in male-dominated industries will be positive in the model for females, supporting results from previous studies. No previous studies, that we are aware of, have explored how the rate of males' sexual harassment charges may differ when more females are present in male-dominated industries. One possible theory is that having more females in the workplace may result in more ethical training for employees on appropriate conduct, thus reducing the rate of sexual harassment against males. If that theory is supported by the data, we should see a negative coefficient on this right-hand side variable for male sexual harassment charges.

The final right hand side variable we include in these analyses is the percent of female (or male) employees who are under the age of 35 in a state-year. Previous empirical studies suggest that sexual harassment occurs more frequently against younger, single females than older, married women (De Coster, Estes, and Mueller 1999; Gutek 1985). Thus, we hypothesize that the coefficient on this right-hand side variable will be positive and statistically significant for females. Although previous studies have not tested whether younger males are more likely to be harassed than older males, we expect that, following the empirical evidence for females, states that have a higher percent of male employees under the age of 35 will also have higher male sexual harassment charges, all else equal. Data on the percent of female and male employees under the age of 35 are available from the BLS (2019a).

Why do Sexual Harassment Charges Vary Across States?

Our second objective is to examine the source of variation in charges across states. To examine why sexual harassment charges vary across states, we pool the observations across time, estimate a series of panel OLS regressions, and report the R^2 from each model. Our goal is to decompose the total explained variation into incremental components that can be attributed to time, unemployment rates and other measured state characteristics, and all other

[3] Industry classification in this data is based on the North American Industry Classification System (NAICS). We use the most detailed industry classification available in the data. For most industries the state employment data is available at the three-digit or four-digit level, although for a few industries data is available at the five-digit level. For four industries the data is only available at the two-digit level.

unmeasured factors specific to a state. To decompose the variation in charges we use the incremental R^2 method proposed by Theil (1971). The panel regression models are fitted using the generalized least square estimator, and the standard errors allow for intragroup correlation by state because clustering on states produces estimates that are robust to cross-sectional heteroscedasticity and within-panel (serial) correlation (Arellano 1987).

Results

The summary statistics for all dependent and right-hand side variables are shown in Table 1. Two of our explanatory variables, the percent of women in male-dominated industries and the percent of supervisors who are females, are only available beginning in 2005, and are not available for the District of Columbia (D.C.). Given this data restriction we conduct our analyses on two samples: Sample 1., which begins in 2000 and includes data on the fifty states and D.C.; and Sample 2., which begins in 2005 and does not include data on D.C.

To examine which state-specific characteristics are related to state sexual harassment charges we regressed the number of sexual harassment charges per 10,000 employed on the state–specific characteristics, as well as year and state indicators. Results are shown in Table 2. Regressions are run separately for females and males. As shown in Table 2., sexual harassment claims are lower when a state is experiencing higher unemployment in both the longer and shorter time periods. Although female and male harassment charges increased in 2008, at the beginning of the Great 2008 Recession, the overall effect of a state's unemployment rate is counter-cyclical on charges. This confirms previous suggestions that during periods of higher unemployment, victims of sexual harassment are more concerned about retaliation and/or job loss, and therefore less willing to file formal complaints (Knapp et al., 1997).

This analysis shows that the percent of workers in a state who are members of a union does not have a statistically significant effect on the number of charges for females in either time period, indicating that unions are not a viable alternative (to formal charges) for addressing reports of sexual harassment. This is consistent with interviews and survey results which have found that unions have mixed results (at best) when it comes to handling female union members' sexual harassment charges against other union members. Also, labor unions in the U.S. tend to be highly segmented by gender; that is, many unions are either predominantly male (e.g. pilots' or firefighters' unions) or predominantly female (e.g. teachers' or nurses' unions) (Avendaño 2019). These two facts may explain why states that have a higher union membership do not have significantly lower formal charges.

Union membership has a statistically negative relationship with the number of male charges within a state in the shorter time period. While several studies have investigated questions surrounding females' union membership and the handling of sexual harassment, we are unaware of studies on how unions handle reports of male sexual harassment. Our state-level data cannot explain why states with higher union membership have fewer male charges, so further research is needed to explore this issue.

The ratio of female to male earnings within a state-year was included as a possible indicator of observed disparities in the workplace. In states where women's earnings are a smaller fraction of men's earnings, the perceived disparity may be greater, providing greater motivation to females to report sexual harassment. While the statistical effect of this earnings ratio was not significant in the longer time period, the ratio did have a statistically significant positive effect on female and male charges in the short time period. This is a strong result given that we are including both state and year effects, because the result indicates that even after controlling for unobserved state characteristics and time trends, states that have less disparity in pay between females and males also tend to have fewer sexual harassment charges.

More sexual harassment charges are filed in states that have a higher percentage of female employees under the age of 35, relative to states with fewer female employees under the age of 35. Sexual harassment is distressingly commonplace in young workers' lives; a national survey conducted through the Harvard Graduate School of Education (2018) found that 87 percent of 18 to 25-year-old females reported that at some point in their lives they had been the victim of sexual harassment. Women who experience sexual harassment at a young age are more likely to experience financial stress and stalled or declining earnings, largely due to changing jobs and/or industries as a result of the harassment, according to a study of women aged 29-30 by McLaughlin, Uggen and Blackstone (2017). These authors also reported that their findings did not vary by social class.

Results for the shorter time period indicate that the percent of women working in a male-dominated industry did not have a statistically significant relationship with the number of formal charges within a state. This result is in contrast to previous studies, primarily interview-based, which have determined that sexual harassment is more likely to occur in male-dominated workplaces (Rospenda, Richman, and Nawyn, 1998). While sexual harassment may be more likely to occur, our results may be consistent with others' observations that females are more hesitant to file formal charges in male-dominated work situations, because women are more likely to feel that the charges won't be taken seriously, and/or retaliation could occur in the form of job loss (Knapp et al., 1997; Gurchiek, 2019; Sugerman, 2018).

States which have a higher percent of supervisors who are females also have lower sexual harassment charges from both females and males. This result supports the vulnerable victim hypothesis described earlier. Thus, one could interpret this result (for females) as suggesting that sexual harassment charges are lower in states with a greater percentage of female supervisors because female supervisors are less likely to be sexually harassed than female subordinate workers. However, this may not be a correct interpretation for two reasons. One, most studies have shown that sexual harassment by a person in power, over a subordinate, accounts for a very small fraction of sexual harassment (National Academies of Sciences, Engineering, and Medicine, 2018). And two, many studies have tested and found empirical support for the power-threat model, which suggests that female supervisors who threaten male's dominance are more likely targets of harassment (Chamberlain, et al., 2008; McLaughlin, Uggen and Blackstone, 2012). Although the state indicators in these models capture unobserved state characteristics that are constant over time, we hypothesize that the percent of supervisors who are female is capturing unobserved cultural attitudes towards women supervisors that are changing *within states over time.* For example, perhaps states which have a greater share of female supervisors are states where the cultural attitude has become more accepting of women having supervisory roles, and thus less sexual harassment occurs. This theory is consistent with the power-threat model described above, because in these states men do not feel as threatened by women's nontraditional roles as supervisors. Finally, another possible explanation for this result is that female supervisors, who are typically responsible for ensuring that a work environment is free from harassment, implement policies and procedures that are more effective at discouraging sexual harassment than their male counterparts; this theory would explain the statistically significant results for both females and males.

We measure the overall fit of the models by comparing the predicted charges from the model to the actual charges that occurred using a pairwise correlation coefficient. As shown in the bottom of Table 2, the model predicts female charges better than male charges for both time periods.

Our second objective was to explore the source of variation in sexual harassment charges across states and time. We first regressed sexual harassment charges on the longer time period, Sample 1., using four different specifications of the model for females and males, and then repeated the process using Sample 2. (the shorter time period with two additional variables). The results are shown in Tables 3a & 3b, for females and males, respectively. In the first specification we regressed sexual harassment charges only on state and year indicator variables. The R^2 from these regressions, shown in Panel A., represents the total amount of variation in charges that can be explained by all state-specific and year-specific factors. For females, between 85.1 percent (for Sample 1.) and 86.1 percent (for Sample 2.) percent of the variation in charges can be explained by these two factors.

In the second regression we replaced the state fixed effects with state observed, measured characteristics. The difference between the R^2 from the first and second regression, shown in Panel B. under the second specification, is the incremental variation due to factors that are included in the first regression but not the second; that is, the time-invariant, state-specific factors *other than* the state observed characteristics that we explicitly control for in the second regression. In Sample 1. over 60 percent of the variation in sexual harassment charges among states is due to these state-specific, time-invariant factors for both females and males. This indicates that the majority of the variation in female and male sexual harassment charges is due to characteristics of states that we are not measuring, which could include such factors as cultural views regarding women participating in the work force, religiosity, and/or rights' consciousness.

In the third specification we drop the year indicators so that we can determine the amount of variation in charges that can be explained by time. The differences in the R^2 between the second and third regressions, reported in Panel B. under specification 3, show that in Sample 1. the year indicators explain around 24 percent of the variation in charges for females, but only 4.8 percent of the variation in charges for males. For females, charges changed more systematically over time, as seen in Figure 1., whereas males charges show more variation over time.

In the fourth and final specification we include the year indicators but omit all of the observed, measurable state characteristics (there are four right-hand side characteristics in Model 1. and six in Sample 2.). These observed characteristics accounted for little over 4.5 percent of the variation in charges for females in both Sample 1. and Sample 2. For males, the observed characteristics account for little over 1 percent of the variation in both models. Overall, these observed state characteristics appear to have a small effect on variation in sexual harassment charges per employed individuals across states.

Discussion and Conclusions

Sexual harassment is a serious violation of an employee's rights, whether they are male or female, and can lead to severe consequences for an organization. A better understanding of the societal, organizational, and economic forces which can influence the propensity to file a claim is important to a variety of stakeholders and can ultimately contribute to creating a safer and less stressful work environment. Using state-level data for all fifty states from 2000 to 2018, we found that differences in states' economic conditions and work force characteristics contributed to the number of male and female sexual harassment charges over this time period. While our observed state characteristics had statistically significant relationships to male and/or female charges, over 60 percent of the variation in adjusted sexual harassment charges across states, for females and males, is due to state-specific, time-invariant factors that are separate from the observed, measurable state characteristics included in our analysis. Thus, a considerable amount of variation in charges across states is due to state-specific characteristics that are influencing either the rate at which sexual harassment occurs, the rate at which victims are willing to report it, or both. In future research we would like to build on these results by using additional data on observed, state-specific characteristics to determine whether we can develop a better understanding of the factors that contribute to higher sexual harassment charges within states.

In our empirical models we tested the statistical significance of the #MeToo movement by including year indicators as explanatory variables. Results from our empirical models indicated that female sexual harassment charges were statistically significantly higher in 2018 than in 2017, although male charges were not. Many professionals in the employment industry have stated that they do not believe there was an increase in the number of sexual harassment *occurrences* between 2017 and 2018, but rather that employees felt more strongly that their claim would be taken more seriously as a result of the "MeToo" movement, and thus were more likely to speak out. EEOC Commissioner Charlotte A. Burrows said in February 2019, "I do not think the fact that Harvey Weinstein was front page news for over a year made more harassment occur. It made people realize they can talk about it and report it and that something would change." (Diaz 2019). Since females' annual sexual harassment charges had decreased every year since 2009, the sizable and statistically significant increase in charges in 2018 indicates that the #MeToo movement motivated more victims to file charges against their harassers. Media reports have indicated that this motivation stems from an increased recognition that harassment is far more prevalent than victims believed prior to #MeToo. Representatives of the EEOC have stated that the increased motivation to file claims stems from a changed perception of how the allegations will be handled by employers and government institutions, such that victims now believe that allegations will be taken more seriously (Gurchiek 2019).

One hopes that after the "#MeToo" movement, which began in October 2017, businesses would focus on creating a positive workplace environment where sexual harassment is eliminated. Motivated by the #MeToo movement, many businesses are now focused on discussions of cultural views on gender and power in the workplace, changing policies and procedures in ways that will reduce victims' fear of reporting harassment, and eliminating negative consequences of reporting harassment such as retaliation and job loss. As businesses and government leaders within a state identify and learn more about the factors that are related to sexual harassment and victims' willingness to report it, they can develop proactive and effective mechanisms for ending a practice that has high costs for both employees and businesses.

There are several avenues to extend the findings from this study. One is to develop theoretical and empirical models to better understand differences in the causes and consequences of sexual harassment for male and female victims. Our empirical model for male charges is not based on strong theoretical assumptions, as these have not been developed in the literature. Yet over time male sexual harassment charges have represented an increasingly larger percentage of total sexual harassment charges, and male charges were 22.2 percent of total charges across states in 2018. Given this reality, future research could explore causes for sexual harassment and other forms of harassment against males using data on harassment from the EEOC.

Another avenue for future research is to continue to evaluate how external social events, such as “MeToo,” impact employee decisions regarding sexual harassment litigation. These models could potentially be predictive in nature as data becomes available after significant events. The hypotheses and model we have developed here could also be applied to other forms of employee discrimination for which federal and state government collects claim information. However, there will always be the possibility that unmeasured variables significantly influence variation in data on claims. This limitation would be remediated as more data becomes available and models developed to explore the important relationship between external variables and employee decisions to litigate.

References

Arellano, M. (1987) “Computing robust standard errors for within-groups estimators” *Oxford Bulletin of Economics and Statistics* 49(4) 431–434.

Avendaño, Ana. (2019) “#MeToo Inside the Labor Movement.” *New Labor Forum* https://newlaborforum.cuny.edu/2019/01/24/metoo-inside-the-labor-movement/

Bureau of Labor Statistics. (2019a) Local Area Unemployment Statistics. Expanded State Employment Status Demographic Data. https://www.bls.gov/lau/ex14tables.htm

Bureau of Labor Statistics. (2019b) Union affiliation data from the Current Population Survey. https://www.bls.gov/webapps/legacy/cpslutab5.htm

Bureau of Labor Statistics. (2019c) Annual Report: Highlights of Women’s Earnings. https://www.bls.gov/cps/earnings.htm

Cassino, Dan. (2017) “When Male Unemployment Rates Rise, So Do Sexual Harassment Claims.” *Harvard Business Review.* August 14, 2017.

CBS News (2017) “More than 12M “Me Too” Facebook posts, comments, reactions in 24 hours.” October 17, 2017. https://www.cbsnews.com/news/metoo-more-than-12-million-facebook-posts-comments-reactions-24-hours/

Chamberlain, Lindsey Joyce, Crowley, Martha, Tope, Daniel, Hodson, Randy. (2008) “Sexual Harassment in Organizational Context” *Work and Occupations* 35(3) 262–95.

Cooper, Michael. (2019) “Caught in the Middle of #MeToo: Unions That Represent Accusers and Accused.” *The New York Times,* May

27, 2019. https://www.nytimes.com/2019/05/17/arts/metoo-unions-ballet-ramasar.html

Dastagir, Alia. "It's been two years since the Me Too movement exploded. Now What?" *USA Today,* Sept. 30, 2019.

De Coster, Stacy, Estes, Sarah Beth, and Charles W. Mueller. (1999) "Routine Activities and Sexual Harassment in the Workplace." *Work and Occupations* 26(1) 32–49.

Diaz, Jaclyn. (2019) "Rise in Sexual Harassment Claims Has EEOC Looking for Answers." Bloomberg Law, Daily Labor Report. Posted February 21, 2019. https://news.bloomberglaw.com/daily-labor-report/rise-in-sexual-harassment-claims-has-eeoc-looking-for-answers

Equal Employment Opportunity Commission (EEOC). (2016) Select Task Force on the Study of Harassment in the Workplace: Report of Co-Chairs Chai R. Feldblum & Victoria A. Lipnic. https://www.eeoc.gov/eeoc/task_force/harassment/report.cfm

EEOC. (2018) EEOC Releases Preliminary FY 2018 Sexual Harassment Data. Press Release 10-4-2018. https://www.eeoc.gov/eeoc/newsroom/release/10-4-18.cfm

EEOC. (2019a) EEOC & FEPA Charges Filed Alleging Sexual Harassment, by State & Gender FY 1997 – FY 2018. https://www.eeoc.gov/eeoc/statistics/enforcement/sexual_harassment_fepas_by_state.cfm

EEOC. (2019b) Race-Based Charges (Charges filed with EEOC) FY 1997 – FY 2018. https://www.eeoc.gov/eeoc/statistics/enforcement/race.cfm

EEOC. (2019c) Sex-Based Charges (Charges filed with EEOC) FY 1997 – FY 2018. https://www.eeoc.gov/eeoc/statistics/enforcement/sex.cfm

EEOC. (2019d) Charges Alleging Sexual Harassment FY 2010 – FY 2018. https://www.eeoc.gov/eeoc/statistics/enforcement/sexual_harassment_new.cfm

Fitzgerald, Louise F., Fritz Drasgow, Charles L. Hulin, Michele J. Gelfand, and Vicki J. Magley. (1997) "Antecedents and Consequences of Sexual Harassment in Organizations: A Test of an Integrated Model" *Journal of Applied Psychology,* 82(4) 578 – 589.

Gibson, Caitlin, and Guskin, Emily. (2017) "A majority of Americans now say that sexual harassment is a 'serious problem'." *The Washington Post.* October 17, 2017. https://www.washingtonpost.com/lifestyle/style/a-majority-of-americans-now-say-that-sexual-harassment-is-a-serious-problem/2017/10/16/707e6b74-b290-11e7-9e58-e6288544af98_story.html

Gurchiek, Kathy. (2019) "#MeToo Has 'Significant Impact' on Harassment Filings." *SHRM Online.* April 12, 2019. https://www.shrm.org/resourcesandtools/hr-topics/behavioral-competencies/global-and-cultural-effectiveness/pages/discrimination-charges-eeoc-fy-2018.aspx

Gutek, Barbara A. (1985) *Sex and the Workplace: The Impact of Sexual Behavior and Harassment on Women, Men, and Organizations.* San Francisco, CA: Jossey-Bass.

Harvard Graduate School of Education. (2018) "For Families: 6 Tips for Reducing and Preventing Misogyny and Sexual Harassment Among Teens and Young Adults." Making Caring Common Project. https://mcc.gse.harvard.edu/resources-for-families/6-tips-parents-reducing-preventing-misogyny-sexual-harassment

Knapp, Deborah, Erdos Faley, Robert H. Ekeberg, Steven E. Dubois, and Cathy L. Z. (1997) "Determinants of target responses to sexual harassment: A conceptual framework." *The Academy of Management Review,* 22(3) 687-729.

Kullgren, Ian. (2017) "Why didn't unions stop sexual harassment?" *Politico.* November 14, 2017. https://www.politico.com/story/2017/11/14/why-didnt-unions-stop-sexual-harassment-244883

MacKinnon, Catharine A. (1979) *Sexual Harassment of Working Women: A Case of Sex Discrimination.* Yale University Press.

McLaughlin, Heather, Christopher Uggen, and Amy Blackstone. (2009) "A Longitudinal Analysis of Gender, Power, and Sexual Harassment in Young Adulthood." 2009 Annual American Sociological Association. San Francisco, CA.

McLaughlin, Heather, Christopher Uggen, and Amy Blackstone. (2012) "Sexual Harassment, Workplace Authority, and the Paradox of Power." *American Sociological Review*, 77(4) 625–647.

McLaughlin, Heather, Christopher Uggen, and Amy Blackstone. (2017) "The Economic and Career Effects of Sexual Harassment on Working Women." *Gender & Society,* 31(3) 333–358.

National Academies of Sciences, Engineering, and Medicine. (2018) Sexual Harassment of Women: Climate, Culture, and Consequences in Academic Sciences, Engineering, and Medicine. Washington, DC: The National Academies Press. https://doi.org/10.17226/24994.

Rospenda, Kathleen M., Richman, Judith A., Nawyn, Stephanie J. (1998) "Doing Power: The Confluence of Gender, Race, and Class in Contrapower Sexual Harassment." *Gender & Society* , 12(1) 40–60.

Siegelman, Peter and John J. Donohue III. (1995) "The Selection of Employment Discrimination Disputes for Litigation: Using Business Cycle Effects to Test the Priest-Klein Hypothesis." *The Journal of Legal Studies,* 24(2) 427–462.

Sugerman, Lauren. (2018) "#MeToo in Traditionally Male-Dominated Occupations: Preventing and Addressing Sexual Harassment." Chicago: Chicago Women in Trades. http://womensequitycenter.org/wp-content/uploads/2017/10/CWIT-MeToo-in-Male-Dominated-Jobs-003.pdf

Taylor, Richard, Tew, Phillip, Crawford, Jerry, and Kern, David. 2013. "A Note on the U.S. Unemployment Rate and Unionization." *Southern Business & Economic Journal,* 36(1) 27–33.

Theil, H. (1971) *Principles of Econometrics.* John Wiley & Sons, Inc. New York, NY.

Uggen, Christopher, Amy Blackstone. (2004) "Sexual Harassment as a Gendered Expression of Power." *American Sociological Review,* 69(1) 64-92.

United States Census Bureau. (2019a) American Community Survey. Table B24010: Sex by Occupation for the Civilian Employed Population 16 years and Over. https://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t

United States Census Bureau. (2019b) American Community Survey. Table B24030: Sex by Industry for the Civilian Employed Population 16 Years and Over. https://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t

Willer, Robb. (2005) "Overdoing Gender: A Test of the Masculine Overcompensation Thesis." Presented at the American Sociological Association Annual Meeting, Philadelphia, PA.

Figure 1a: Female Sexual Harassment Charges in the U.S.

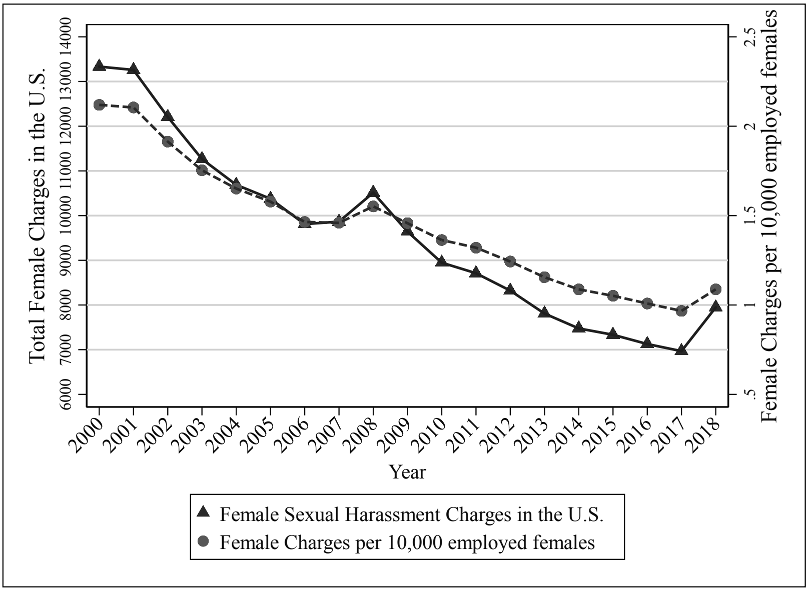

Figure 1b: Male Sexual Harassment Charges in the U.S.

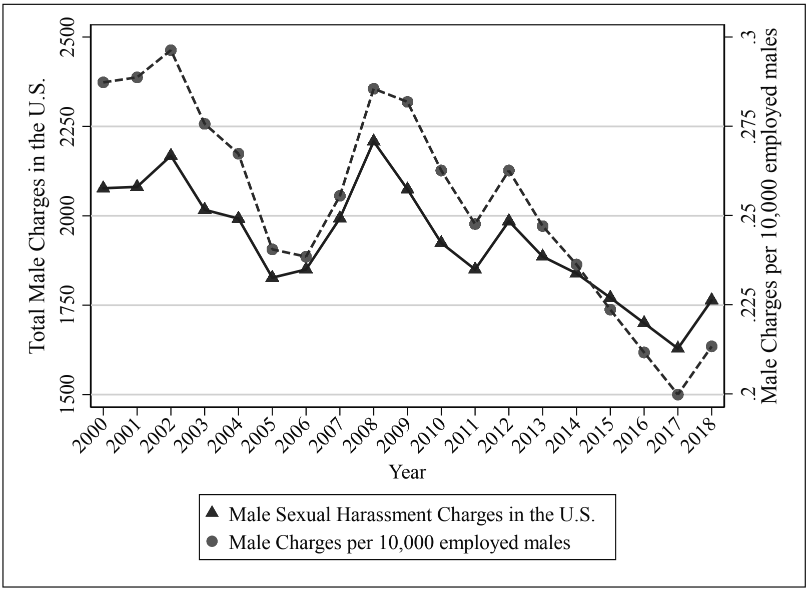

Figure 2: Percent Change in female Sexual Harassment Charges Across the U.S. States, 2017 to 2018

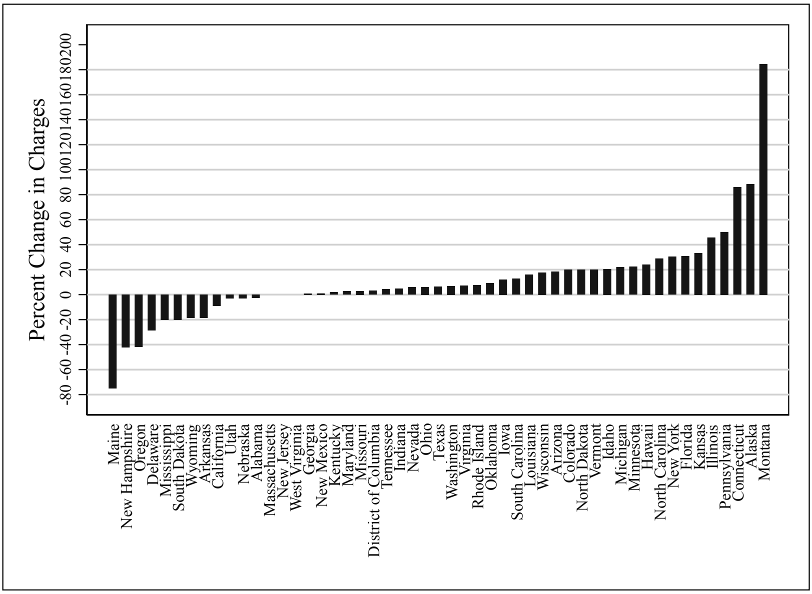

Table 1: Summary Statistics for States' Annual Charges and Characteristics.

	Sample 1. Fifty States and D.C. over 2000–2018 N = 969		Sample 2.[b] Fifty States over 2005–2018 N = 699	
Dependent Variables[a]	Mean	Standard Deviation	Mean	Standard Deviation
Total Female Sexual Harassment Charges	187.42	192.9	171.91	172.56
Female Sexual Harassment Charges per 10,000 females employed	1.63	0.905	1.4	0.716
Total Male Sexual Harassment Charges	37.81	37.18	37.38	36.31
Male Sexual Harassment Charges per 10,000 males employed	0.3	0.188	0.278	0.156
State-Specific Time-Varying Characteristics				
Female state unemployment rate (lag)	5.35	1.81	5.52	1.94
Male state unemployment rate (lag)	5.92	2.25	6.19	2.45
Percent Union Members in state	10.98	5.4	10.67	5.39
Female to Male Earnings Ratio in state (lag)	79.02	4.99	79.78	4.5
Percent of Female employees under age 35	34.22	4.17	33.31	3.87
Percent of Male employees under age 35	34.21	3.78	33.4	3.51
Percent of Female employees working in male-dominated industries			65.89	6.55
Percent of Supervisors who are Females			46.28	1.26

[a] Each observation is a specific state and year combination.

[b] Data on the number of males and females in each industry is currently unavailable for the year 2018 in the state of Wyoming.

Table 2: Estimates for States' Sexual harassment Charges per 10,000 employed

	Sample 1. Fifty States and D.C. over 2000–2018		Sample 2.[1] Fifty States over 2005–2018	
State-Specific Time-Varying Characteristics[a,b]	*Females*	*Males*	*Females*	*Males*
Female state unemployment rate (lag)	-0.0297** (0.0149)		-0.0296** (0.0136)	
Male state unemployment rate (lag)		-0.0076** (0.0040)		-0.0077** (0.0036)
Percent Union Members	0.0171 (0.0111)	-0.0013 (0.0036)	-0.0090 (0.0108)	-0.0067** (0.0030)
Female to Male Earnings Ratio (lag)	-0.0006 (0.0034)	0.0012 (0.0016)	-0.0072** (0.0033)	-0.0025** (0.0013)
Percent of Female employees under age 35	0.0060+ (0.0037)		0.0074** (0.0039)	
Percent of Male employees under age 35		-0.0031 (0.0019)		-0.0009 (0.0016)
Percent of Female employees working in male-dominated industries			0.0021 (0.0034)	0.0007 (0.0012)
Percent of Supervisors who are Females			-0.0721*** (0.0249)	-0.0276*** (0.0086)
Constant	2.031*** (0.353)	0.363*** (0.133)	5.815*** (1.186)	1.885*** (0.401)
Year - *reference year is 2017*[c]				
2014	0.1292*** (0.0413)	0.0790*** (0.0119)	0.1709*** (0.0341)	0.0605*** (0.0109)
2015	0.0801*** (0.0269)	0.0498*** (0.0070)	0.1004*** (0.0212)	0.0333*** (0.0074)
2016	0.0095 (0.0155)	0.0279*** (0.0049)	0.0295** (0.0120)	0.0109** (0.0057)
2018	0.0677*** (0.0132)	-0.0032 (0.0042)	0.0963*** 0.0127)	-0.0087 (0.0071)
Pairwise correlation coefficient between predicted & actual sexual harassment charges	0.920***	0.833***	0.932***	0.843***
N	969		699	

[a] *Not Shown:* State indicators are included in all four models. Wald tests *rejected the null* that the coefficients for all states are jointly equal to zero for all four models.

[b] Models are specified to control for a) first-order autocorrelation within panels, where the coefficient of the AR(1) process is specific to each panel; and b) disturbances that are heteroskedastic and contemporaneously correlated across the panels.

[c] *Not Shown:* Coefficients for all time indicators. In Sample 1. the coefficients are positive and statistically significant at the 1 percent level for each year from 2000 to 2013 for both females and males. In Sample 2. for females, the coefficients are positive and statistically significant at the 1 percent level for each year from 2005 to 2013. For males the coefficients are not statistically significant for years 2005 to 2007 but are positive and statistically significant for each year from 2008 to 2013. Wald tests rejected the null that the coefficients for all years are jointly equal to zero for all four models.

[d] *** $p < 0.01$, ** $p < 0.05$, + $p < 0.1$

Table 3a: Sources of Variation in States' Sexual Harassment Charges, Females

	Females	*Females*	*Females*	*Females*
Panel A.				
Sample 1.: 2000-2018: Overall R^2	0.851	0.249	0.006	0.204
Sample 2.: 2005-2018: Overall R^2	0.861	0.154	0.022	0.107
Observed State-Specific Characteristics	No	Yes	Yes	No
State Fixed Effects	Yes	No	No	No
Year Fixed Effects	Yes	Yes	No	Yes
N	969	969	969	969
Panel B.				
Sample 1.				
Incremental R^2				
State Fixed Effects (1) - (2)		0.602		
Year Fixed Effects (2) - (3)			0.243	
Observed State-Specific Characteristics (2) - (4)				0.045
Sample 2.				
Incremental R^2				
State Fixed Effects (1) - (2)		0.707		
Year Fixed Effects (2) - (3)			0.132	
Observed State-Specific Characteristics (2) - (4)				0.047

[a] All four models are estimated using panel OLS regressions, fitted using the generalized least square estimator, and the standard errors allow for intragroup correlation by state.

Table 3b: Sources of Variation in States' Sexual Harassment Charges, Males

	Females	*Females*	*Females*	*Females*
Panel A.				
Sample 1.: 2000-2018: Overall R^2	0.693	0.050	0.002	0.039
Sample 2.: 2005-2018: Overall R^2	0.692	0.054	0.032	0.037
Observed State-Specific Characteristics	No	Yes	Yes	No
State Fixed Effects	Yes	No	No	No
Year Fixed Effects	Yes	Yes	No	Yes
N	969	969	969	969
Panel B.				
Sample 1.				
Incremental R^2				
State Fixed Effects (1) - (2)		0.644		
Year Fixed Effects (2) - (3)			0.048	
Observed State-Specific Characteristics (2) - (4)				0.010
Sample 2.				
Incremental R^2				
State Fixed Effects (1) - (2)		0.638		
Year Fixed Effects (2) - (3)			0.023	
Observed State-Specific Characteristics (2) - (4)				0.017

[a] All four models are estimated using panel OLS regressions, fitted using the generalized least square estimator, and the standard errors allow for intragroup correlation by state.

Value Stocks Trump Growth Stocks in a Recent 20-Year Study

Ladd Kochman
Kennesaw State University
David Bray
Kennesaw State University
Ken Gilliam
Kennesaw State University

Abstract

A review of Russell indices reveals that value stocks have provided higher returns, lower standard deviations and lower betas than those from growth stocks for both large- and small-cap stocks over the 1999-2018 period. The findings challenge the positive relationship between risk and return and suggest that value stocks can be an alternative to bonds for those seeking to reduce market exposure.

Background

The distinction between growth and value stocks is largely made by their respective price-to-earnings and price-to-book-value ratios. Low P/E and P/B ratios relative to an industry or sector average are characteristic of value stocks whereas growth stocks attract relatively high ratios. Simply put, undervalued and fast-growing companies are considered value stocks and growth stocks, respectively. Dividend yields are also a determining factor: higher for value stocks and lower for growth stocks. Shi and Seller (2002) tracked the performance of growth and value stocks by focusing on mutual funds with relevant objectives. Kochman et al. (2012) also compared growth and value stocks but used stock indices as surrogates. They reasoned that indices would ensure that stocks remain growth- or value-oriented for the balance of the study vis-à-vis funds which may stray from their original objectives in the pursuit of greater returns.

Shi and Seller reported that the average return for large-cap growth funds was 1.54 percent higher than the average return for large-cap value funds and that the average return for small-cap growth funds was 0.59 percent greater than the mean for small-cap value funds during the 1989-1999 period. Using Morningstar's downside deviation to measure risk, the authors also noted that large-cap growth funds were seven percent more risky than large-cap value funds and that small-cap growth funds were 34 percent more risky than small-cap value funds. Kochman et al. found that the large-cap Russell 1000 growth index annually returned 0.45 percent more than the Russell 1000 value index and that the small-cap Russell 2000 growth index annually returned 1.43 percent more than the Russell 2000 value index from 2002 through 2011. Concerning risk, the Russell 1000 growth index (1000 value index) had a standard deviation of 20.77 percent (17.84 percent) while the Russell 2000 growth index (2000 value index) had a standard deviation of 25.41 percent (21.18 percent). Ibbotson and Riepe (1997) also used the Russell indices to compare growth and value stocks. Over 19 years ending in February 1997, they learned that the Russell 1000 value index (16.9 percent) and the Russell 2000 value index (17.9 percent) had higher average returns than the Russell 1000 growth index (15.9 percent) and Russell 2000 growth index (13.1 percent), respectively, and lower standard deviations—specifically, 16.0 percent and 19.6 percent for the 1000 and 2000 value indices versus 19.1 percent and 25.1 percent for the 1000 and 2000 growth indices.

The curious result that higher returns for Ibbotson and Riepe were obtained with lower standard deviations was repeated by Israelsen (2013). He found that large-cap and small-cap value stocks earned greater returns than large-cap and small-cap growth stocks from 1990 through 2012. Large-cap (small-cap) value stocks averaged 8.55 percent (10.34 percent) while large-cap (smallcap) growth stocks averaged 7.60 percent (7.68 percent). But like Ibbotson and Riepe, Israelsen derived lower standard deviations for the Russell 1000 value and 2000 value indices (16.83 percent and 19.22 percent, respectively) as opposed to those for the Russell 1000 and 2000 growth indices (22.22 percent and 23.86 percent, respectively). The inconsistent relationship between risk and return exposed by papers cited in this study would seem to invite another investigation into the comparative performances of growth and value stocks.

The question of why value stocks generally outperform their growth counterparts was tackled by Chan and Lakonishok (2004) and again by Athanassakos (2007). The two studies focused on risk and investor behavior as possible explanations of value stocks' higher returns. Chan and Lakonishok concluded that investors inadvertently push value stocks below their true worth by extrapolating from the past and becoming excessively excited about the promising new technologies inherent in growth stocks. Athanassakos also pointed to investor behavior. He cited errors in expectations as the primary cause of value's superior returns; specifically, an inverse relationship between P/E ratios and returns along with the tendency to award higher P/E ratios to growth stocks combine to make growth stocks the weaker choice.

Our motivation for this study was to learn whether the premium attached to value stocks persisted beyond the observation periods in foregoing studies. Additionally, we highlighted the style of investing—value or growth—which can be overlooked as investors focus on more monetary criteria such as expense ratio and minimum investment.

Methodology

Using an observation period that subsumed the 10 years in Kochman et al., we understandably hypothesized that growth stocks would produce higher returns than value stocks for both large and small cap sizes during the 20 consecutive years ending with 2018. Like Kochman et al., we compared the returns from large- and small-cap growth stocks using the Russell 1000 and Russell 2000 growth indices, respectively; to represent large- and small-cap value stocks, we chose the Russell 1000 and Russell 2000 value indices, respectively. The Russell 1000 indices consist of 1000 large U.S. companies as determined by market capitalization while the Russell 2000 indices track 2000 companies with small market caps. To evaluate our indices, we calculated average returns, standard deviations, coefficients-of-variation and betas. The source of historical returns was Lazard Asset Management's annual returns of key indices, or www.lazardassetmanagement.com. Calculations were performed by the Excel spreadsheet program published in Fonda Money's Excel Financial Planning Guide.

Results

For the 20 consecutive years ending in December 2018, large- and small-cap value stocks as represented by the Russell 1000 and Russell 2000 indices, respectively, posted higher average returns than large- and small-cap growth stocks.. The Russell 2000 value index had a mean return of 9.87 percent versus the Russell 2000 growth index mark of 8.85 percent. Similarly, the Russell 1000 value index beat the Russell 1000 growth index: 7.50 percent to 7.30 percent. See Table 2. Curiously, the greater average returns were achieved with lower standard deviations. The Russell 2000 value index generated a standard deviation of 19.06 percent as opposed to the Russell 2000 growth index's 24.01 percent. For the Russell 1000 indices, value beat growth 16.34 percent to 21.24 percent. For a better comparison, we also calculated a standard-deviation-to-average-return value (or coefficient-of-variation) for each index. Not surprisingly, the Russell 2000 value index boasted the lowest CV (1.93) while the Russell 1000 growth had the highest (2.91).

Our results support the earlier findings from Chan and Lakonishok, who also tracked the Russell 1000 large-cap growth and value indices as well as the Russell 2000 small-cap growth and value indices. Over the 1979-2002 period, they found that the large-cap value index beat the large-cap growth index by a margin of 2.09 percent (13.93 percent vs. 11.84 percent) and that the small-cap value index returned 5.80 percent more than the small-cap growth index (14.74 percent vs. 8.94 percent). Standard deviations for the two value indices were lower than those for the corresponding growth indices. For the Russell 1000 indices, risk was less for value by 6.68 percent (14.16 percent vs. 20.84 percent); for the Russell 2000 indices, risk for value was lower by 6.43 percent (17.40 percent vs. 23.83 percent).

The betas for our four indices agree with the results previously reported by Patel and Swensen (2007). Betas for the two growth indices were greater than those for the value indices. The highest beta belonged to the Russell 2000 growth index—1.34; the Russell 1000 growth index was next with 1.20. Betas for the value indices were 0.89 (Russell 1000) and 0.77 (Russell 2000).

Conclusions

For the 20-year period ending in December 2018, value stocks generated higher average returns than growth stocks irrespective of cap size. The Russell 2000 value index averaged 1.02 percent more than the Russell 2000 growth index while the Russell 1000 value index beat the Russell 1000 growth index by 0.20 percent. That they did so at lower levels of risk challenges the conventional thinking that return is a positive function of risk. The Russell 2000 and 1000 value indices had standard deviations nearly five percent less than those for the Russell 2000 and 1000 growth indices. Value indices' coefficients-of-variation were more than 0.70 lower than those for the growth indices. Betas were lower for value indices than for their growth counterparts by at least 0.30.

Israelsen observed that the "value premium" created by the value stocks' greater returns is more pronounced among small-cap stocks.

His value premium for small-cap value stocks (2.66 percent) produced an extra $8291 after 23 years for a portfolio with a beginning balance of $10,000. For large-cap value stocks, the premium of 0.95 percent translated into an extra $2429. We likewise found that a value premium for small caps was larger than that for large caps. In our study, the value premium for the Russell 2000 value index of 1.02 percent (or 9.87 percent *minus* 8.85 percent) provided an extra $2250 from a portfolio with a $10,000 beginning balance after 20 years[1]. The 20-basis-point value premium produced by the Russell 1000 value index added an extra $408[2]. The imperfect decision-making that underlies the persistence of the value premium is evidence of the behavioral nature of finance.

Future researchers may want to choose observation periods that connect bull and bear markets with superior returns for growth or value stocks. Our 20-year period was impacted by the bearish market of the 2000-2009 decade: an annual average return of -0.61 percent for the Standard & Poor's 500 index. Overall, the mean for 1999-2018 was 5.13 percent. Exchange-traded funds represent another avenue for comparing growth and value stocks. Data for Russell's growth and value ETFs could provide new insights into the growth-versus-value debate if the flexible trading ability of ETFs serves to alter strategies and returns.

Table 1
Annual returns from the Russell indices (1999-2018)

Year	Russell 1000 Growth	Russell 1000 Value	Russell 2000 Growth	Russell 2000 Value
2018	- 1.51%	- 8.27%	- 9.31%	-12.86%
2017	30.21%	13.66%	22.17%	7.84%
2016	7.08%	17.34%	11.32%	31.74%
2015	5.67%	- 3.83%	- 1.38%	- 7.47%
2014	13.05%	13.45%	5.60%	4.22%
2013	33.48%	32.53%	43.30%	34.52%
2012	15.26%	17.51%	14.59%	18.05%
2011	2.64%	0.39%	- 2.91%	- 5.50%
2010	16.71%	15.51%	29.09%	24.50%
2009	37.21%	19.69%	34.47%	20.58%
2008	-38.44%	-36.85%	-38.54%	-28.92%
2007	11.81%	- 0.17%	7.05%	- 9.78%
2006	9.07%	22.25%	13.35%	23.48%
2005	5.26%	7.05%	4.15%	4.71%
2004	6.30%	16.49%	14.31%	22.25%
2003	29.75%	30.03%	48.54%	46.03%
2002	-27.88%	-15.52%	-30.26%	-11.43%
2001	-20.42%	- 5.59%	- 9.23%	14.02%
2000	-22.42%	7.01%	-22.43%	22.83%
1999	33.16%	7.36%	43.09%	- 1.49%

Table 2
Statistics for the Russell indices (1999-2018)

Statistic	Russell 1000 Growth	Russell 1000 Value	Russell 2000 Growth	Russell 2000 Value
Average	7.30%	7.50%	8.85%	9.87%
Std. dev.	21.24%	16.34%	24.01%	19.06%
CV	2.91	2.18	2.71	1.93
Beta	1.20	0.89	1.34	0.77

Endnotes

1. [$10,000(1.0102)^{20} = $12,250] – $10,000 = $2250
2. [$10,000(1.0020)^{20} = $10,408] – $10,000 = $408

References

Athanassakos, George. "Value vs. Glamour Stock Returns and the Value Premium: Errors in Expectations or Risk Differences?" SSRN Electronic Journal, May 2007. Available at SSRN: http://ssrn.com/abstract=996705.

Chan, L., and J. Lakonishok. "Value and Growth Investing: Review and Update." Financial Analysts Journal, January/February 2004, 60(1) 71-86.

Israelsen, C. "Tale of the Tape: Value Vs. Growth." Financial Planning, April 2013, 43(4) 81-83.

Ibbotson, R., and M. Riepe. "Growth Vs. Value Investing: And the Winner is …" Journal of Financial Planning, June 1997, 10(3) 64-71.

Kochman, L., R. Badarinathi and K. Gilliam. "Size Matters: A Comparison of Growth and Value Stocks." Working Paper, 2012.

Patel, J., and R. Swensen. "Comparative Performance of Value and Growth Stock Indexes." Journal of Wealth Management, Spring 2007, 9(4) 51-61.

Shi, S., and M. Seller. "Growth and Value Style Comparison of U.S. Mutual Funds." American Business Review, January 2002, 20(1) 25-32.

________________. Fonda Money's Excel Financial Planning Guide. Kendall Hunt Publishing Co., 2018.

A Simple Augmented-Friedman Money Growth Rule

Peter V. Bias, Florida Southern College

Abstract

This paper proposes a Friedman-like monetary growth rule as a complement to interest rate rules seen in New Keynesian 3-equation models that are commonly used as a guide for monetary policy authorities. An augmented-Friedman rule is culled from the dynamic equation of exchange and is calibrated to fit US quarterly M2 data from 1992 to the present. The monetary growth rule is shown to be complementary to the standard interest rate targeting Taylor rule during normal times and to provide a valuable guide when interest rates are constrained at the zero lower bound. Simulations are performed in which the augmented-Friedman rule is melded to the standard Taylor rule to show how Taylor rule interest rate targets are altered, especially under severe aggregate demand- or aggregate supply-shock conditions. Monetary policy guidance is thus shown to be improved by observing both interest rates and monetary growth rates in tandem.

Keywords: monetary growth rate, Taylor rule, monetarism, Friedman's *k*-percent rule

JEL classifications: E31, E43, E52, E58

Introduction

With the exception of a brief 'monetarist experiment' with money growth rates in the 1980s, US monetary policy has been framed in interest rate targeting. The popular New Keynesian model, with notable exceptions, contains no monetary aggregates or growth rates at all. There have been a few who have continued to advocate for money in monetary policy, for example Gerlach, & Svensson (2003), Kilponen & Leitemo (2008), Thornton (2014), Raffinot (2017), Neumann & Meyer, (2016), or Le et al (2016, 2018), but interest rate policy has remained by far the dominant paradigm. Sole interest rate targeting is imperfect, however, and is known to have various shortcomings: 1) interest rate targeting is thwarted at the zero lower bound; 2) in non-linear models interest rate rules have been shown, in theory (Benhabib, Schmitt-Grohé, Uribe, 2001), to contain multiple equilibria, one of which might be a classical liquidity trap; 3) some New Keynesian models promote Neo-Fisherism, the idea that interest rates causally and positively correlate with inflation, while standard interest rate rules promote the reverse; and 4) the uncertainty of r (sometimes called r^*, the natural real rate of interest), which is usually inferred from interest rate trends (Williams, 2017) can lead to improper targeting.

Often these shortcomings lead authorities to argue for higher inflation objectives in order to avoid the downsides of interest rate targeting. But inflation, even expected inflation, is not without its costs as well (Lucas, 1994; Dotsey & Ireland, 1996) even though some models suggest those costs might be small (Burstein & Hellwig, 2008).

Inflation has long been considered a monetary, not an interest rate, phenomenon and has continued to demonstrate long-run, positive, close correlations with monetary aggregates. This is important to the question of Neo-Fisherism and to the advocacy of the augmented-Friedman rule here. Monetary theory and practice say that changes in money supply unmatched by similar sized changes in money demand should result in a change in the interest rate (Ihrig et al, 2015). By the liquidity effect, interest rates should decline as a result of imperfectly anticipated monetary expansion. In contrast, the Neo-Fisherist hypothesis maintains that inflation is directly and causally affected by interest rates, with no mention of money. Thus, the validity of the Neo-Fisherist argument requires that these two seemingly conflicting criteria are simultaneously met: there is a causal and negative relationship between money and short-term interest rates; and inflation is causally and positively related to both interest rates and money growth. Given this conundrum, there is a lack of theoretical support for Neo-Fisherism, and adds some question as to the overall efficacy of interest rate targeting. This question then opens an opportunity for monetary growth rates to offer assistance.

Recently Le et al (2016, 2018) have performed interesting studies that have pushed for money supply rules, somewhat like advocated here. They found that their money growth rule, which largely mimics the Taylor (1993) gap-closing approach, actually performs better in their simulations than interest rules. Their approach is quite different from the one here, in how it is derived and by the lack of the velocity rate of growth as part of their model; however, it is encouraging sign that money growth rates are used and perform well in their analysis.

This paper breaks new ground in two ways. Whereas the money-focused studies cited above have advocated for a return to a monetary aggregate approach for monetary policy, none propose the two-pronged approach advocated here: the use of an interest rate rule in tandem with a new A-F rule as complementary guides to monetary policy. Moreover, no nominal GDP rules proposed to date include the crucial movements of the velocity rates of growth.

The objective here is to provide evidential support for and to introduce and promote an augmented-Friedman monetary growth rule (hereafter the A-F rule). The proposed rule follows in the footsteps of Friedman's (Friedman, 1960; Kilponen & Leitemo, 2008) *k*-percent rule both by its simplicity and its clarity. As shown below, it is found by fashioning a very simple monetary 'rule' from the dynamic equation of exchange, using all of that equation's components, including velocity, and then by empirically determining optimal response coefficients that best mimics historical Fed behavior, much like is often done with the Taylor rule.

This new device provides the Federal Reserve with another policy guide to complement interest rate rules. In fact if it does not, it puts to question all monetary guidance rules; that is to say, if this rule is not complementary, perhaps it is trivial to find a model that coincidentally mimics Fed behavior and the Taylor and A-F rules are only reflections of that ease. The position taken here, however, is that the A-F rule is a complement to interest rate rules because both types of rules are based on sound macroeconomic underpinnings. But it is not a certainty. Recent work has questioned the ability of the paradigmatic dynamic, stochastic, general equilibrium (DSGE) models to predict inflation. At the May 2018 Nobel Symposium on Money and Banking, Uhlig (2018) and Cochrane (2018) both claimed and presented evidence that monetary shocks (as measured by interest rates) have little impact on inflation or output. The results here suggest that it is not the DSGE models or theory at fault, but it can instead be explained by the fact that attenuated interest rate policies currently used are possibly too gradual for their influences to be strongly felt. Rarely are there targeted interest rate movements that shock the macroeconomy the way a strong recession would, for instance.

The remainder of the paper contains three main parts. First, there is a brief introduction to the monetary policy rules used. This rules section includes the famous Taylor rule for a comparison purposes, recalls Friedman's equally famous *k*-percent monetary growth rule, introduces the posited augmented-Friedman (A-F) monetary growth rule, and adds a hybrid Taylor/A-F interest rate rule. Because the A-F rule monetary growth rate recommendations cannot be directly compared to Taylor interest rate rule prescriptions, the A-F monetary growth rule is melded with a Taylor interest rate rule to form a hybrid interest rate/money growth rate rule. This new Taylor/A-F rule hybrid incorporates money and velocity growth rates into the real interest rate, but is not intended to take the place of the A-F rule. The Taylor/A-F rule introduced as is a proxy means to compare rule behaviors that are not targeting the same variable.

The second part of the paper compares the rules' recommended interest and monetary growth rates to actual values over the recent two percent inflation targeting era (considered here from 1992 – 2018). Facing the same real-world data for the full time period, the Taylor/A-F rule interest rate prescriptions are contrasted with the Taylor rule prescriptions and actual interest rates. The augmented-Friedman monetary growth rate rule is also contrasted with actual money growth rates. Within that era, particular interesting shorter time segments are viewed and similarly contrasted for differences in policy targeting. Those periods are the pre-Great Recession era (2002 – 2007) and the early recovery from the Great Recession era (2007 – 2012).

The third part of the paper introduces a simulation model, which is posited to test the Taylor, A-F, and Taylor/A-F rules to see how they perform under known, controlled conditions when subjected to rather severe aggregate supply and demand shocks. That model is based on the New Keynesian three equation model, but necessarily adds some monetary elements for comparison purposes.

Lastly, a summary and conclusions is given where arguments are made in favor of the new monetary aggregate growth rate approach, along with a list of possible caveats.

Monetary Policy Rules

Monetary policy rules provide central banks with prescriptive mathematical formulas that can be used to guide their policy behaviors, i.e. what to do, under various macroeconomic conditions. Consequently, rules-based policies have been advocated for over seventy years. Policy rules supporters argue that giving monetary authorities discretionary powers makes it difficult for the public to know what policies the authorities will pursue. Instead, discretionary policies are perceived much like an unforeseen aggregate demand shock, making it difficult for the private sector to make optimal economic decisions.

While there have been many versions of monetary rules, using either money or interest rates, two rules stand out for their historical significance as well as their simplicity and profound insight: Taylor's interest rate rule and Friedman's monetary growth rule. These classic rules are briefly surveyed below as a background for the augmented-Friedman rule introduced in this paper.

The Taylor Rule

The Taylor rule as originally designed (Taylor, 1993) has a simple but profound mechanism. Taylor starts with a dynamically stable macroeconomic equilibrium condition, the long-run Fisherian equilibrium, as the rule's foundation and then introduces additional components such that the rule automatically recommends counter-cyclical policy interest rates. These rule-recommended target rates are meant to lead to dynamic macroeconomic equilibrium.

It has been known for over a century that the economy should settle, in theory, at a Fisherian (Fisher, 1907, 1930) equilibrium in the long run,

$$i = r + \dot{P} \tag{1}$$

where the long-run nominal interest rate i completely reflects the real interest rate r plus actual inflation $\dot{P}$ for a given level of risk and contract length. Nominal interest rates are contractual interest rates, reflecting not only real interest rates and inflation but also risk and contract length, thus there are a multitude of nominal interest rates at any point in time. In this study the federal funds interest rate is used as a general proxy for the nominal interest rate. Using the federal funds rate as a proxy serves several purposes: it largely eliminates the impacts of risk and contract length because the risks of default and inflation are very small for overnight lending between banks; it is readily manipulated by Federal Reserve open market operations; and, lastly, the federal funds rate has ideal long-range target feedback value, that theoretically stabilizes via market mechanisms when the objectives are achieved. This makes Fisher's equation (1) a seemingly ideal monetary policy foundation because it directly contains, in one simple equation, a manageable instrument variable, the nominal federal funds rate, and a very important macroeconomic objective variable, inflation. The equation implies, under some assumed causalities, that by manipulating the nominal federal funds rate the central bank can theoretically influence macroeconomic objectives. Throughout the remainder of the paper the federal funds interest rate is used as the proxy for the nominal interest rate.

It was Taylor's genius to tack on additional mathematical arguments and objectives to that foundational Fisher equation such that central bankers could be precisely guided in performing reasonably proper and sound counter-cyclical macroeconomic policy simply by following the rule. Taylor's rule even allows for varying response strengths based on the central bankers' subjective or empirically optimized values of their objectives. His justly famous rule is seen in equation (2) below.

$$i_t^* = r + \dot{P}_t + \gamma_1\left(\dot{P}_t - \dot{P}_t^*\right) + \gamma_2\left(\dot{Y}_t - \dot{Y}_t^*\right) \tag{2}$$

where i_t^* is the targeted federal funds nominal interest rate, r is the real interest rate, $\dot{P}_t$ is the inflation rate, $\dot{P}_t^*$ is the targeted inflation rate, $\dot{Y}_t$ is the rate of growth of real gross domestic product (hereafter, GDP), $\dot{Y}_t^*$ is the targeted rate of growth of real GDP, and the gamma coefficients represent the central bank's subjective response strengths to the inflation and output gaps, i.e. the difference between the actual values and the targeted values, in parentheses respectively. The subscript t represents the time period. The beauty of the Taylor interest rate rule is that, by setting the federal funds rate as ascribed by the rule, microeconomic incentives are introduced that tend to push the actual macroeconomic variables toward their targeted values, i.e. to close the gaps.

As one would expect, this type of rule was well-received by bankers and economists and spawned the development of other interest rate policy rules such as the Mankiw rule (2001), rules that included unemployment rates, inflation-only rules, nominal GDP rules, etc. Still, these new rules have almost all continued to be interest rate rules, with all of the corresponding problems and caveats outlined in the introduction. This paper argues that these interest rate problems can be mitigated by the successful re-introduction of monetary aggregates.

Friedman's Monetary Growth Rule

Despite the common use of interest rate targeting rules today, money targeting rules have a long history. Henry Simons (1936) was advocating money supply rules during the Great Depression. And Milton Friedman (Friedman, 1953; Friedman, 1960; Friedman & Schwartz, 1963) later sought and advocated a monetary growth rule that would minimize the impact that policy-makers could have on business cycle variance. Because poorly timed policy could worsen the economy, and timing is difficult, Friedman's solution was to create a no-policy-variance monetary policy rule, thereby leaving only the natural business cycle variance to remain. The rule is Friedman's simple constant monetary growth rule, sometimes called the k-percent rule. Friedman's k-percent rule ostensibly assumes that velocity, V, is constant. It also assumes that nominal GDP will grow at a constant rate although it does not limit prices or real GDP to any particular independent rates of growth. In that sense Friedman's k-percent rule could be characterized as a simple nominal GDP growth rate rule as seen in equation (3) below.

$$\bar{\dot{M}}_t^* = \left(\dot{P}_t + \dot{Y}_t\right) = \theta_t^* \tag{3}$$

In equation (3) above, all values are at time t as listed; $\dot{M}_t^*$ is the targeted percentage rate of growth of the money stock, in this case held fixed as a nominal GDP growth rule; $\dot{P}_t$ is price level inflation, $\dot{Y}_t$ is the rate of growth of real GDP, and θ_t^* is the targeted growth rate of nominal GDP, which is the simple summation of price level and GDP growth rates.

The rule in equation (3) has long been criticized because it requires the velocity rate of growth, $\dot{V}$, to be zero for the rule to be viable, counter to historical evidence. Old causality tests have shown, however, that money growth to some extent Granger-causes velocity growth rates (Hall & Noble, 1987), but that line of investigation largely stalled as monetary policy concentrated solely on interest rates. Responding to the problem of velocity volatility, a slightly augmented form of the k-percent rule will perform Friedman's original task. The augmentation method is described below.

An Augmented-Friedman Monetary Growth Rate Rule

Like Friedman's k-percent rule the dynamic equation of exchange, equation (4), is the foundation of the augmented-Friedman rule,

$$\dot{M} + \dot{V} = \dot{P} + \dot{Y} \tag{4}$$

As noted above, together $\dot{P} + \dot{Y}$ represent the rate of growth of nominal GDP. Using the equation a very simple monetary growth rate rule can be posited that stabilizes nominal GDP growth.

$$\dot{M}_t^* = \theta_t^* - \dot{V}_t \tag{5}$$

The monetary growth rate rule above only implicitly includes the target inflation and economic growth rates, being a nominal GDP growth rate rule. Thus any inflationary and output gaps seen in other rules are subsumed in the velocity and/or targeted money growth variables. The rule guides monetary authorities to alter the money growth rate either in response to velocity growth rate changes or by creating them (or both), all while maintaining full monetary support for a constant nominal GDP growth rate. The exact growth rates of prices or GDP do not matter.

The rule is extremely simple: adjust the rate of growth of money in response to changes in growth rate of velocity in order to maintain a targeted nominal GDP growth rate. In practice, however, the rule might be more difficult to use. For instance, velocity might simultaneously adjust to money as authorities are altering money to respond to velocity, or contemporaneous velocity growth data might be unavailable. Both of these concerns can be solved by using the previous period's velocity and finding a proper response coefficient, δ, that accounts for the problems of simultaneity and uncertainty. This is done in equation (6) below,

$$\dot{M}_t^* = \theta_t^* - \delta \dot{V}_{t-1} \tag{6}$$

which is a lagged velocity form of equation (5). Equations (5) or (6) represent the proposed augmented-Friedman, A-F, rule, depending upon the real-time data availability.

A Taylor/A-F rule; Using the A-F and Taylor Rules in Tandem

To be used as complementary guides as advocated here, monetary authorities need to know if the A-F and Taylor rules consistently offer the same general responses, i.e. stimulus and braking, given the same macroeconomic gap conditions.

First, under long-run equilibrium conditions both rules simultaneously settle to and maintain a mutually consistent steady state. Because the Taylor rule is built on the long-run Fisher equation, when economic gaps are eliminated, the targeted and actual fed funds rates are equal. Likewise, because the A-F rule is built on the dynamic equation of exchange, when the economic gaps of choice are eliminated, the targeted and actual rates of growth of the money supply are the same. These two rules are consistent, such that when the long-run equilibrium fed funds rate has been reached, the long-run equilibrium money growth rates is reached as well. That is, in long-run equilibrium the Taylor rule settles to $\dot{P}_t = \dot{P}_t^*$, $\dot{Y}_t = \dot{Y}_t^*$, and $i_t^* = r + \dot{P}_t^*$, which is consistent with monetary growth rate equilibrium, $\dot{M}_t = \dot{M}_t^*$, by the following. Given the rules in equilibrium,

$$\dot{M}_t^* = \left(\dot{P}_t^* + \dot{Y}_t^*\right) - \dot{V}_t \tag{7}$$

$$i_t^* = r + \dot{P}_t^* \tag{8}$$

and using the long-run equilibrium condition for interest rates (equation 1) along with the dynamic equation of exchange (equation 4), solves to equation (9) below.

$$\dot{M}_t^* - \dot{M}_t = \dot{P}_t^* + r - i_t \tag{9}$$

Since the right-hand side of (9) is zero in long-run equilibrium, the actual money growth rate is also equal to the targeted growth rate in the long run, i.e. $\dot{M}_t^* = \dot{M}_t$. It will also be true that, $i_t^* = i_t$ because, from the Fisher equation (equation 1) and the Taylor rule (equation 2) solves to

$$i_t^* - i_t = \gamma_1\left(\dot{P}_t - \dot{P}_t^*\right) + \gamma_2\left(\dot{Y}_t - \dot{Y}_t^*\right) \tag{10}$$

In equation (10), the left-hand side of the equation goes to zero precisely when the gaps are closed, i.e. $i_t^* = i_t$. The larger concern of disequilibrium can addressed by merging the rules themselves. Using equations (7) and (8) and subbing for $\dot{Y}_t$ using the dynamic equation of exchange to solve for i_t^* obtains equation (11) below.

$$i_t^* = r + (1 + \gamma_1)\dot{P}_t + (\gamma_2 - \gamma_1)\dot{P}_t^* + \gamma_2\dot{Y}_t - \gamma_2\left[\dot{M}_t^* + \dot{V}_t\right] \tag{11}$$

Equation (11) is essentially a modified Taylor rule, hereafter called the Taylor/A-F interest rate rule. The Taylor/A-F rule uses the targeted monetary rate of growth from the A-F rule developed earlier and contains a variable real interest rate, *r*. The value to use for *r* is problematic. Bauer & Rudebusch (2019) provides a thorough history and examination of interest rate and macroeconomic gap methodologies to predict *r* but generally leaves out monetary aggregate methods. This is the problem faced here. There needs to be an approach that intertwines the two. In an effort to show how a monetary aggregate approach compares to an interest rate approach beyond the ability to show that the two methods can on occasion deliver different signals, the A-F rule is melded in equation (11) through the real interest rate. The method is to use money and velocity rates of growth to be impacted partially by the A-F rule currently and back another two periods, i.e. $r = f(\dot{M}_t^*, \dot{M}_{t-1}^*, \dot{M}_{t-2}^*, \dot{V}_t, \dot{V}_{t-1}, \dot{V}_{t-2})$. $\dot{M}_t^*$ rises contemporaneously as the targeted interest rate falls, so the rules offer mutually consistent monetary responses to macroeconomic gaps. This is necessarily true, however, only under conditions where the remaining variables in the expression are known. In practice, there is uncertainty in (at least) r, $\dot{P}_t$, $\dot{V}_t$, and $\dot{M}_t$, which allows for the possibility of some disconnect; either or both rules offering countering, inconsistent signals to optimal monetary policy. It is these possible inconsistencies that give value to the A-F rule and the corresponding Taylor/A-F rule as a complementary guide to the standard Taylor rule. The A-F rule is not hampered by the uncertainty of r, while the Taylor rule is not impacted by the uncertainties of velocity growth rates. And both rules are independently able to alter response coefficients and targets. Mehrotra & Sanchez-Fung (2011) advocated for a similar type of rule, combining McCallum (1987) and Taylor rules, but their model uses monetary base rather than monetary aggregates and does not consider velocity. Because monetary base is now commonly controlled with interest payments on reserves, which has drastically changed the correlations, their results would have to be modified to take that into account.

Of course, the most important addition to monetary authorities is to have some monetary policy guidance when interest rates are at the zero lower bound. The A-F rule continues to provide guidance on the strength of monetary policy response to economic conditions.

Comparison of Eras

To show how this simple monetary growth rule works and how it compares to the Taylor rule and actual data, several time series graphics are provided below. The several charts and visual comparisons are shown for advocacy only. Interest rate targeting was actually occurring during these periods, while money growth rates were almost assuredly not targeted and, in some periods, likely not monitored at all. That the augmented-Friedman monetary growth rates rule performs as well as it does, reflects, at least in part, the complex, strong interconnection between money and velocity growth rates and interest rates.

For the following empirics the standard Taylor rule (equation 2) employs gap response coefficients both set at Taylor's (1993) original levels of 0.5. The gap coefficients represent both the strength of response to the gaps as well as how the central bank views the relative weights or importance of meeting their targets. Response coefficients set at 0.5 reflect a central bank applying equal weights to the problems of inflation and economic growth. Of course a central bank could certainly view one or the other problem as more important by having larger response coefficients for one gap than the other and studies have used other coefficients than those here. For instance, Carlstrom & Fuerst (2008) used coefficients of 1.44 and 0.15 for the inflation and output gaps respectively. However, 0.5 gap coefficients are used here because coefficients are ultimately subjective and possibly variable over time, and because textbooks commonly (e.g. Mankiw, 2016) tend to use Taylor's classical 0.5 settings. Also following Mankiw (2016), the real interest rate is set at 2%, the targeted inflation rate is set at 2%, and the targeted GDP growth rate is set at 3%. These values are near the averages for the past thirty years. The augmented-Friedman monetary growth rule (equation 6) used for the graphics also assumed a targeted inflation rate set at 2% and a targeted GDP growth rate set at 3%. The velocity rate of growth response coefficient, δ, is set at 0.5, which was found by asymptotic trial and error minimizing of the root mean squared error (RMSE), i.e. by minimizing the average of the squared deviations between the actual velocity and modeled velocity values as different values were tried for δ covering the full period between 1992 and 2018. Inflation and GDP growth rate targets set at different values would alter δ and would necessitate a similar process for its new determination.

The time periods below were selected for a visual appraisal of the relative efficacy of interest rate targeting versus the behavior and potential for targeting of monetary growth rates. The full time period (1992 – 2018) is chosen to roughly correspond to the two percent inflation targeting era in the US and was decided upon only by sight. This full period is broken into smaller periods that are meant to represent time periods of particular interest, both of which show large deviations between targeted rule values and actual: the lead-up to the Great recession era (2002 – 2007), chosen by sight to highlight the slow rise in interest rates and targeted rates that came before the downturn; and the early recovery period from the Great Recession era (2007 – 2012), chosen to highlight monetary behaviors during and just after a severe downturn. Each time period shows how the standard Taylor rule, the Taylor/A-F rule (recall that this rule is an interest rate rule that also includes money and velocity rates of growth), and the augmented-Friedman monetary growth rate rule perform against what actually occurred.

The quarterly data used for these analyses in the figures and relevant regressions were retrieved from FRED https://fred.stlouisfed.org/series/ : M2 (M2NS_PC1 M2 Money Stock, Percent Change from Year Ago, Quarterly, Not Seasonally Adjusted); M2 velocity (M2V_PC1 Velocity of M2 Money Stock, Percent Change from Year Ago, Quarterly, Not Seasonally Adjusted); fed funds interest rate (FEDFUNDS Effective Federal Funds Rate, Percent, Quarterly, Not Seasonally Adjusted); real GDP (GDPC1_PC1 Real Gross Domestic Product, Percent Change from Year Ago, Quarterly, Not Seasonally Adjusted); and price level using PCE index (PCEPI Personal Consumption Expenditures: Chain-type Price Index, Index 2012=100, Monthly, seasonally adjusted). All rates of growth are shown by FRED's percent change from a year ago data adjustment. The particular monetary variables, M2 and M2 velocity, were chosen based on Friedman's (1960) historical use in advocating for the *k*-percent rule.

Figures 1, 2 and 7 show the entire period in which inflation targeting has been held at roughly 2% in the US. This encompasses 104 quarterly observations. Figures 3 and 4 show comparisons for the lead-up to the Great Recession. Finally, Figures 5 and 6 show comparisons for the Fed's response to the Great Recession.

The 2% Inflation Targeting Era (1992 – 2018)

The full period, 1992 – 2018, was chosen to compare the two rules for the inflation targeting being held at roughly 2%. Just as Taylor's rule was being developed, the Fed appears to have made a determined effort to keep inflation low, at roughly 2%. In Figures 1 and 2 below it is discerned that the Fed has not followed Taylor's rule particularly well, nor has it followed the augmented-Friedman rule proposed in this paper. There are several gaps of interest rates higher or lower than the rule by more than 2% (Figure 1). The augmented-Friedman rule has similar gaps as well (Figure 2).

In Figure 1 it is apparent that both interest rate rules promote larger interest rate volatility than the smoother, attenuated, changes that actually occurred over the years. It is also striking that there are three periods where the rules-targeted interest rates are quite different from the actual rates for sustained time periods: between 1997 and 2000; between 2002 and 2006; and between 2009 and 2015. Below the focus is centered on the time periods leading up to and during the

Great Recession. Those time periods largely coincide with the last two periods noted above.

Figure 2 also shows sustained periods where the monetary growth rule does not match the actual money growth rates; however, they do not completely correspond to the periods observed for interest rates. This lack of connection is evidence that the augmented-Friedman growth rate rule provides a different and useful perspective for monetary policy authorities.

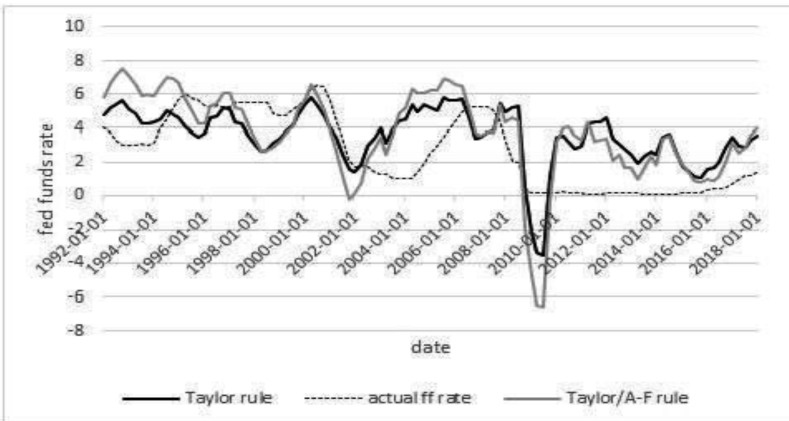

Figure 1. Taylor and Taylor/A-F federal funds rate target predictions vs. actual federal funds (ff) interest rates in the 2% inflation target era, 1992 – 2018

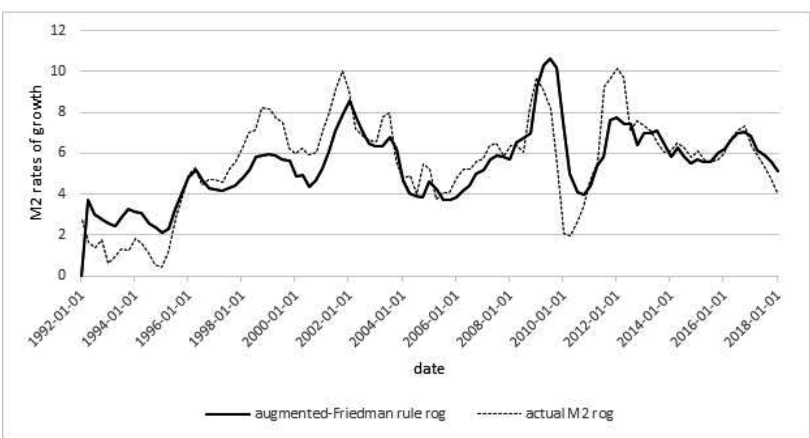

Figure 2. Augmented-Friedman M2 monetary growth rate (rog) rule target predictions vs. actual M2 monetary growth rates (rog) in the 2% inflation target era, 1992 – 2018

Lead-up to the Great Recession (2002 – 2007)

Some have argued that the Federal Reserve's policies before the Great Recession were in part to blame for the severe downturn. To investigate this, the first and crucial sub-period viewed is the lead-up to the Great Recession, which is defined here as the period 2002 – 2007. Those years were chosen to highlight the divergence between the Taylor rule and the actual interest rates (see Figure 3 below). While causality is not shown, it is certainly true that the actual fed funds interest rates leading up to the recession were well below those advocated by the simple Taylor rule. Figure 3 also includes the interest rate targets advocated by the hybrid Taylor/A-F rule, which was developed earlier in the paper (see equation 11). The Taylor/A-F interest rate rule also incorporates M2 rates of growth rates into a Taylor interest rate rule. As can be seen in Figure 3, the hybrid rule advocates for relatively similar interest rates as the Taylor rule over the period, with some slight but consistent modifications.

The proposed augmented-Friedman rule targets are seen in Figure 4. That rule advocates for a lower monetary growth rate, which is consistent with the higher interest rates advocated by the interest rate rules seen in Figure 3. However, whereas the divergences in the interest rate rules vs. actual are quite large, over 400 basis points at times, the monetary growth rate divergences are comparatively small. Throughout the period the monetary growth rates advocated by the A-F rule are within one percent of the actual M2 growth rates (see Figure 4).

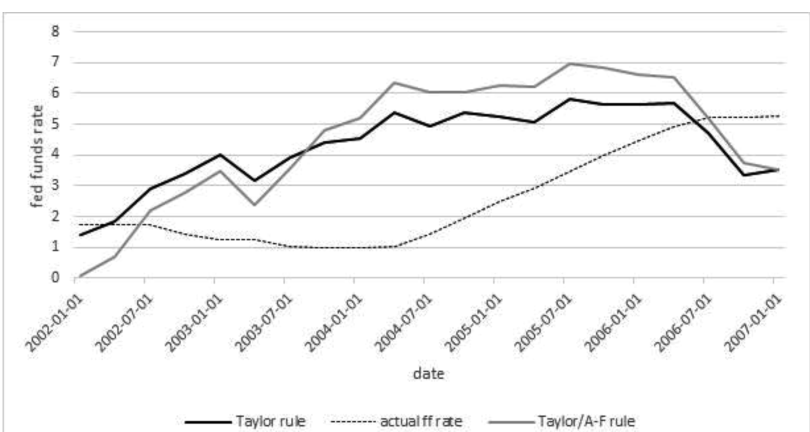

Figure 3. Taylor and Taylor/A-F federal funds rate target predictions vs. actual federal funds (ff) interest rates leading up to the Great Recession, 2002 – 2007

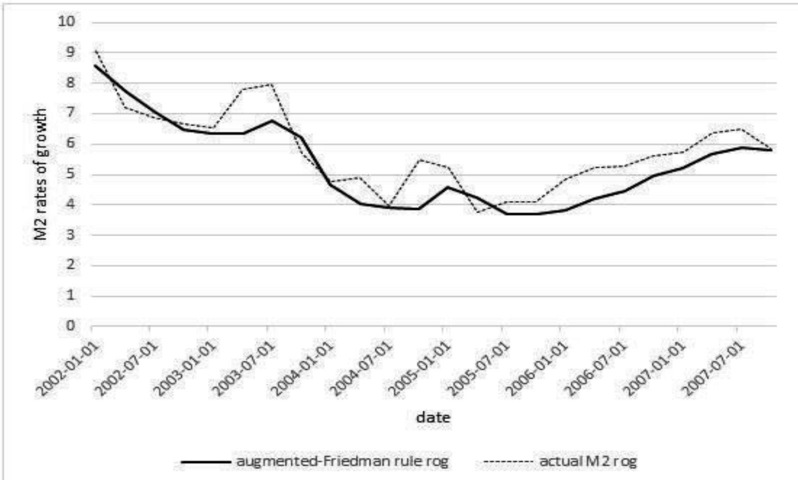

Figure 4. Augmented-Friedman M2 monetary growth rate (rog) rule target predictions vs. actual M2 monetary growth rates (rog) leading up to the Great Recession, 2002 – 2007

By either policy instrument, interest rate or money growth rate, it is apparent that actual Federal Reserve policies (or results) were not in line with the rules during the lead-up to the Great Recession. It appears that the criticisms of the Fed are warranted.

Initial Response to the Great Recession (2007 – 2012)

The other sub-period of particular interest is the period during and after the Great Recession, while the economy was struggling and unemployment rates were high. This period, between 2007 and 2012, is chosen to visually highlight the Federal Reserve's response to the severe downturn (See Figures 5 and 6). During that period Taylor's rule and the Taylor/A-F rule are generally promoting a much higher interest rate than what actually occurred, except during the negative GDP growth period (Figure 5). That is, both rules argue that monetary policy was too stimulative both before and after the recession, while not stimulative enough during its depths. Through much of the period there is an interest rate advocacy gap of more than 2%, both positive and negative.

It is in this sub-period that the two instrument variable rules seemingly diverge. Whereas the Taylor and Taylor/A-F rules are advocating higher interest rates, the A-F monetary growth rule is pushing for a higher rate of money growth than actually occurred, i.e. for some portions of this important response period the Taylor rule reads that the Fed was too stimulative, while the A-F rule reads that the Fed did not stimulate the economy enough. (Figure 6). Of course, all else equal, higher monetary growth rates are expected to lower interest rates, thus the contrast is stark. It would appear that the rules are contradicting each other.

How can this apparent contradiction be reconciled? First, note that during almost the entire period the actual interest rates were effectively at the zero lower bound. Moreover, the M2 velocity rate of growth fell dramatically as money demand increased (see Figure 7).

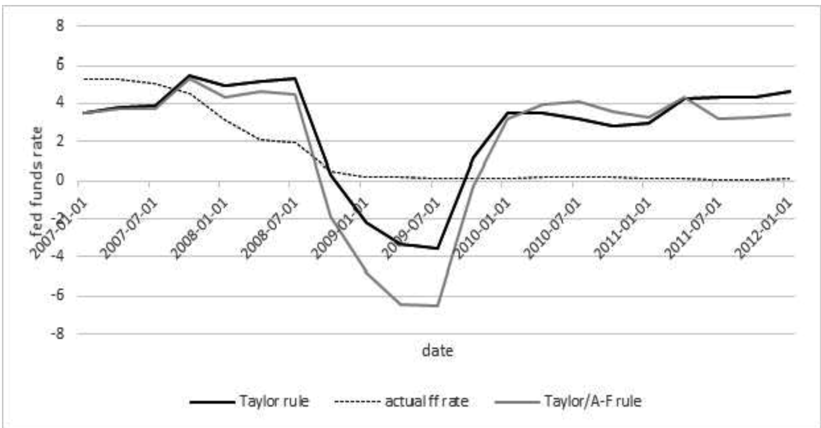

Figure 5. Taylor and Taylor/A-F federal funds rate target predictions vs. actual federal funds (ff) interest rates during the Great Recession, 2007 – 2012

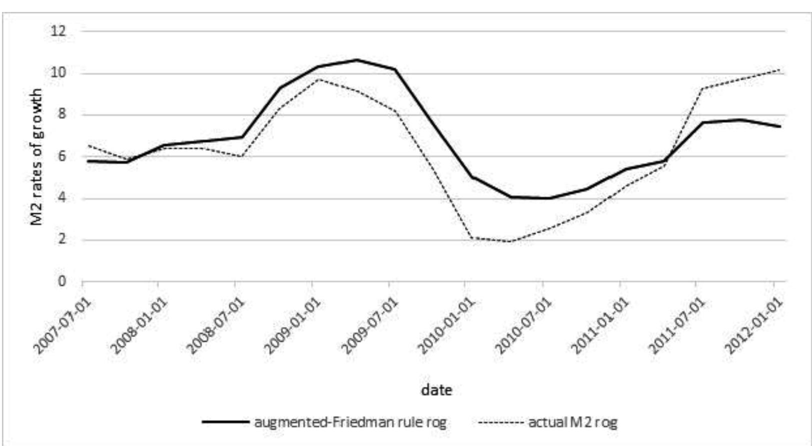

Figure 6. Augmented-Friedman M2 monetary growth rate (rog) rule target predictions vs. actual M2 monetary growth rates (rog) during the Great Recession, 2007 – 2012

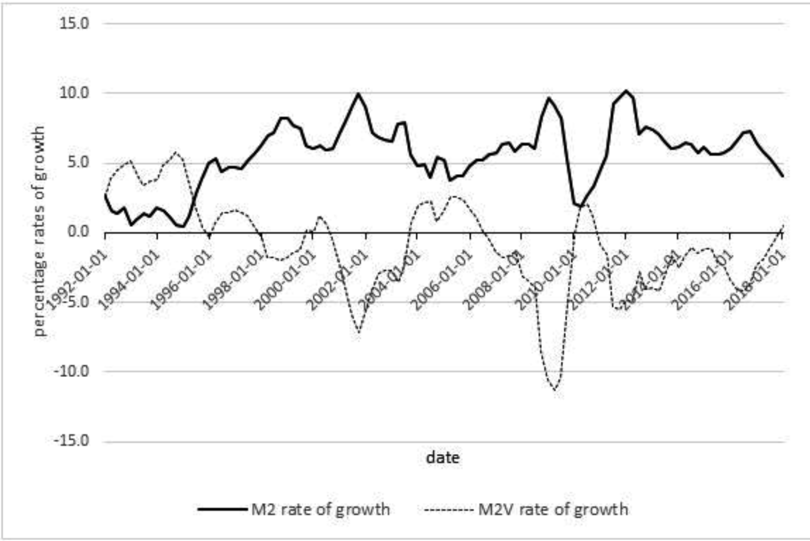

Figure 7. Actual M2 and M2 velocity growth rates during the 2% inflation target era, 1992 – 2018

Once again, by either policy instrument, interest rate or money growth rate, it is apparent that actual Federal Reserve policies (or results) were not in line with the rules during the Great Recession itself. The Fed's attenuated approach to changing interest rates is apparent during this crucial period, but not warranted by the Taylor or Taylor/A-F rules. Moreover, the M2 rates of growth during the period were consistently too low to maintain a constant nominal GDP rate of growth. Given the stated concerns about the possibilities of deflation, the information provided in Figure 6 could have been quite beneficial.

New Keynesian Macroeconomic Model Simulations

The New Keynesian model used for the simulations here is a version of Lavoie and Saccareccia (2004) as modified in Bias (2015). The familiar equations include the intertemporal IS function (12), the New Keynesian Phillips curve (13), and the Taylor rule (14):

$$\dot{Y}_t = A_0 - \theta i_{t-1} + \varepsilon_t \tag{12}$$

$$\dot{P}_t = \dot{P}_{t-1} + \delta\left(\dot{Y}_{t-1} - \dot{Y}^*_{t-1}\right) + \varepsilon_t \tag{13}$$

$$i^*_t = \bar{r} + \dot{P}_t + \gamma_1\left(\dot{P}_t - \dot{P}^*_t\right) + \gamma_2\left(\dot{Y}_t - \dot{Y}^*_t\right) \tag{14}$$

Simulations are only as good as the models used. The tricky aspect of the modelling for the simulations here is the interrelationships and interplay between nominal interest rates, money supply rates of growth, and velocity rates of growth. For instance, over forty years ago Hall and Noble (1987) found that there is a relationship between money growth rate volatility and velocity, and Cagan (1972) even earlier identified the temporal effects on interest rates from monetary shocks; however, the triumvirate is not well investigated from a full market and modeling approach. Instead, generally either money supply or money demand models are put forward separately.

To resolve this problem, i.e. how to reasonably calibrate the simulation model used here, simple OLS regressions were run in order to get semi-realistic coefficients for the various equations. The calibrations used here stem from those regressions along with the imposed requirement that the model always revert back to the idealized/targeted 2% inflation and 3% real GDP growth rate. This second requirement necessitated some adjustments to make the simulations work. While the simulation model is not a true DSGE-backed model, the model is still composed much like a standard 3-equation New Keynesian model.

Because the simulation model is anchored by the New Keynesian model, which does not include money or velocity variables, to get a sense of how the A-F rule would complement the Taylor rule, the simulation model incorporates the A-F rule into the Taylor rule as seen in equations (11) and (18). The A-F impact in those equations comes in two parts: the strict -2.5 constant seen in equation (18) and the indirect and ongoing influence on the real interest rate, r, generated in equation (20). In equation (18), the real interest rate is not held constant as it often is in the Taylor rule, but is instead influenced by changes in the rate of growth of both money and velocity over several periods. The equation for r, equation (20) was modeled after the OLS results of money and velocity growth on r, where r itself was originally calculated from the difference between the nominal federal funds rate and PCE inflation in each period. Shock coefficients were introduced to both equations (15) and (16) to mimic the simultaneous impacts to inflation and real GDP growth.

The simulation model developed here is based on the model discussed above, but it is calibrated and supplemented with three additional equations (19 – 21) in order to bring in money, velocity rates of growth, and real interest rates. The three equations are then used to build a fourth new equation, the Taylor/A-F rule for interest rates, which is equation (11) seen earlier but in calibrated form to generate equation (18) below. This new equation attempts to show how the Taylor rule would be modified to include money and velocity growth rates normally left out of the rule. The simulation model tests the zero lower bound for interest rates by shocking the model sufficiently to generate negative interest rates in the Taylor rule. In particular, these response function re-assessments are meant to mimic the behaviors for the lead-up to and the initial response to the Great Recession. Equations (15) and (16), the New Keynesian portion, were modelled based on coefficients found from simple ordinary least squares regressions (OLS) coupled with some artificial shock coefficients that are meant to mimic exogenous aggregate demand or supply changes. The Taylor/A-F rule (equation 18) incorporates a real interest rate that is again based on OLS results from running $r = f(\dot{M}_t^*, \dot{M}_{t-1}^*, \dot{M}_{t-2}^*, \dot{V}_t, \dot{V}_{t-1}, \dot{V}_{t-2})$, the results of which is equation (20) below. Equation (21), the velocity equation, is based on the surprisingly simple results of an OLS regression as well.

The simulations are run in Excel for 25 periods, meant to mimic quarterly data, with various shocks being introduced in the 6th period. The corresponding response functions and comparative root mean squared errors (RMSEs) are given for four different shocks: negative and positive aggregate demand shocks, and negative and positive aggregate supply shocks. The calibrated model and all four results are shown and compared below.

$$\dot{Y}_t = 0.54 + 0.9\dot{Y}_{t-1} - 0.06i_{t-1} + \varepsilon_{AD_t} + 0.5\varepsilon_{AS_t} \qquad (15)$$

(intertemporal IS function)

$$\dot{P}_t = 1.0 + 0.5\dot{P}_{t-1} + 0.8\left(\dot{Y}_{t-1} - 3\right) + \varepsilon_{AS_t} + 0.25\varepsilon_{AD_t} \qquad (16)$$

(New Keynesian Phillips curve)

$$i_t^* = 2 + \dot{P}_t + 0.5\left(\dot{P}_t - \dot{P}_t^*\right) + 0.5\left(\dot{Y}_t - \dot{Y}_t^*\right),\ i_t^* \geq 0 \qquad (17)$$

(Taylor rule)

$$i_t^* = r + 1.5\dot{P}_t + 0.5\dot{Y}_t - 2.5,\ i_t^* \geq 0 \qquad (18)$$

(Taylor/A-F rule)

$$\dot{M}_t^* = 5 - 0.5\dot{V}_{t-1} \qquad (19)$$

(augmented-Friedman rule)

$$r = 0.2 - 0.3\dot{M}_t^* + 0.44\dot{M}_{t-1}^* + 0.3\dot{M}_{t-2}^* + 0.15\dot{V}_t + 0.15\dot{V}_{t-1} + 0.25\dot{V}_{t-2} \quad (20)$$

(real interest rate equation)

$$\dot{V}_t = \dot{Y}_t - 3 \quad (21)$$

(velocity equation)

$\varepsilon_{AD_t} = aggregate\ demand\ shock$

$\varepsilon_{AS_t} = aggregate\ supply\ shock$

As is seen in the simulation graphical results below, and as measured by lower root mean squared error, the Taylor/A-F rule performs better under all conditions, i.e. positive or negative aggregate demand or supply shocks, than the Taylor rule. However, there are important caveats to consider. First, the RMSE comparisons assume that deviations from ideal values of both inflation and real GDP growth rate are equally important. Being subjective, they may not be. Second, the RMSE values assume equal weight to being too high or too low, when it is possible that they would not be equally weighted by direction. This is of particular interest in a few cases where the economic conditions that result from the comparisons are rather different. Last, in some cases the Taylor rule has achieved equilibrium within the 20 periods whereas the Taylor/A-F rule has not.

Simulation Results

The results from four simulations are shown below, which include all four aggregate economy shocks. Case 1 shows the resulting response functions for a negative aggregate demand shock, Case 2 shows the results for a positive aggregate demand shock, Case 3 shows the results for a negative aggregate supply shock, and Case 4 shows the results for a positive aggregate supply shock. All shocks are severe by design, to ensure that differential behaviors will be captured. In each case the response functions for inflation and GDP growth are compared when using a Taylor rule (equation 17) or the Taylor/A-F rule (equation 18), and the behavior of the targeted interest fed funds interest rate is compared as well.

A negative aggregate demand shock

The first shock analyzed is a negative aggregate demand shock. Inflation and GDP growth rate response functions are seen in Figure

8 below. The RMSEs for the -4% annual rate of change aggregate demand shocks, reflecting the divergence from targeted inflation and GDP growth rates, are: Taylor rule, 75.42; Taylor/A-F rule, 19.63. Thus, the Taylor/A-F rule is seen to perform better than the Taylor rule alone as measured by the RMSEs; however, the performances are quite different. The Taylor rule generates steeper declines in both inflation and real GDP growth, but recovers to the targeted values within 15 periods, whereas the Taylor/A-F rule generates shallower responses, but overshoots the targeted values and never falls back to the targets within the remaining 20 periods.

A comparison of the changes to the targeted interest rates is shown in Figure 9. As can be seen, in general the targeted interest rates appear fairly similar; however, the Taylor/A-F rule requires a targeted zero interest rate a period earlier than the Taylor rule and holds target rates slightly lower for several periods, both before and after the Taylor rule is advocating for interest rates at the zero lower bound.

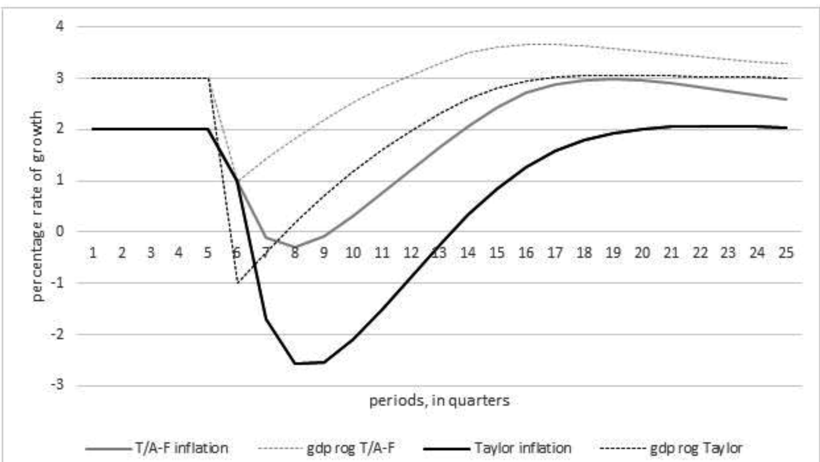

Figure 8. Simulated inflation and GDP rate of growth (rog) response functions for Taylor and Taylor/A-F interest rate rules given a -4% annual rate of change aggregate demand shock

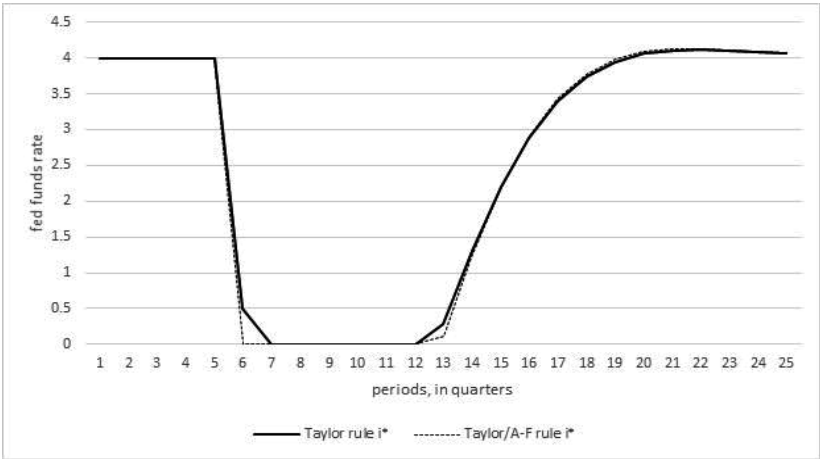

Figure 9. Simulated interest rate response functions for Taylor and Taylor/A-F interest rate rule targets (i*) given a -4% annual rate of change aggregate demand shock

A positive aggregate demand shock

The second analyzed shock is a positive aggregate demand shock. The response functions to inflation and GDP growth rates are shown in Figure 10 below. The RMSEs for the +4% annual rate of change aggregate demand shocks, reflecting the divergence from targeted inflation and GDP growth rates, are: Taylor rule, 61.40; Taylor/A-F rule, 24.04. Once again the Taylor/A-F rule is seen to perform better than the Taylor rule as measured by the lower RMSEs, and again, the response function performances are markedly different. The Taylor rule includes steeper responses in both inflation and real GDP growth, while coming back to the targeted values within roughly 10 periods, whereas the Taylor/A-F rule generates shallower responses, but undershoots the targeted values for the entire analyzed period, never attaining the targeted values within the remaining 20 periods. The Taylor/A-F rule responds very harshly to inflation and drives inflation down below the target rate for over 12 periods, i.e. three years, after the initial kick above four percent.

Similar to the negative aggregate demand shock, the Taylor/A-F rule responds aggressively to the shock as shown by holding interest rates higher than the targeted Taylor rule for about eight periods before advocating for more or less the same rates, as seen in Figure 11.

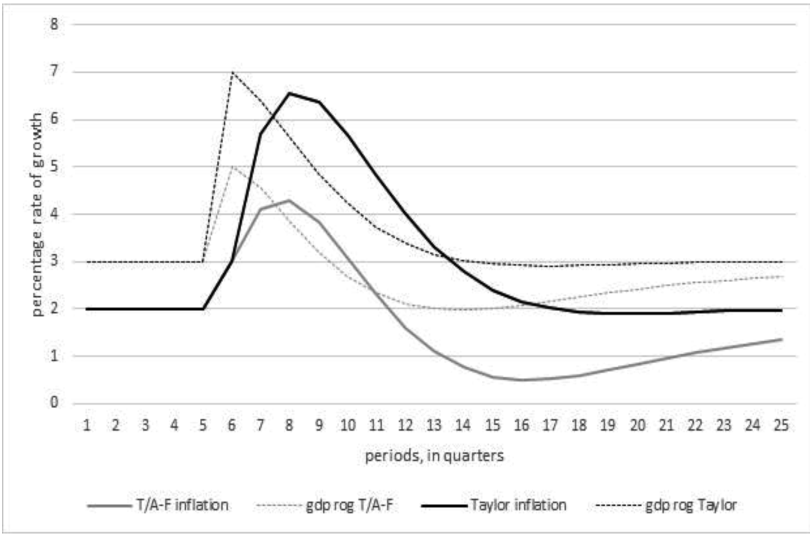

Figure 10. Simulated inflation and GDP rate of growth (rog) response functions for Taylor and Taylor/A-F interest rate rules given a +4% annual rate of change aggregate demand shock

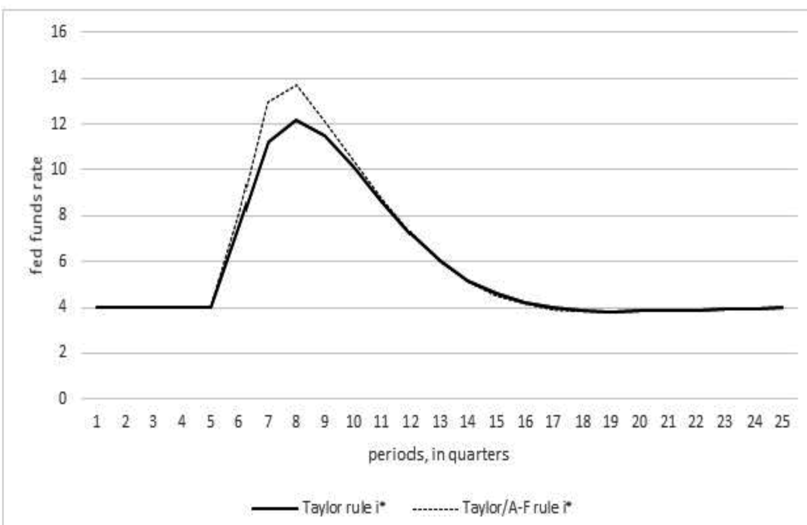

Figure 11. Simulated interest rate response functions for Taylor and Taylor/A-F interest rate rule targets (i*) given a +4% annual rate of change aggregate demand shock

A negative aggregate supply shock

The third analyzed shock is a negative aggregate supply shock. Inflation and GDP growth rate response functions are seen in Figure 12 below. The RMSEs for -4 annual rate of change aggregate supply shocks, reflecting the divergence from targeted inflation and GDP growth rates, are: Taylor rule, 21.87; Taylor/A-F rule, 20.28. Responding to the negative aggregate supply shock the Taylor/A-F rule is quite similar to the Taylor rule in their advocated targeted interest rate response functions. This is, however, not unexpected as aggregate demand management tools are known to perform comparatively well when both targeted variables are moving in the same direction, and do not perform nearly as well when the targets are moving in opposite directions (Bias, 2010). Still, the Taylor/A-F rule is slightly more aggressive than the Taylor rule in its response to the negative aggregate supply shock, again tending to hold interest rate targets a little lower for a little longer to stimulate the economy.

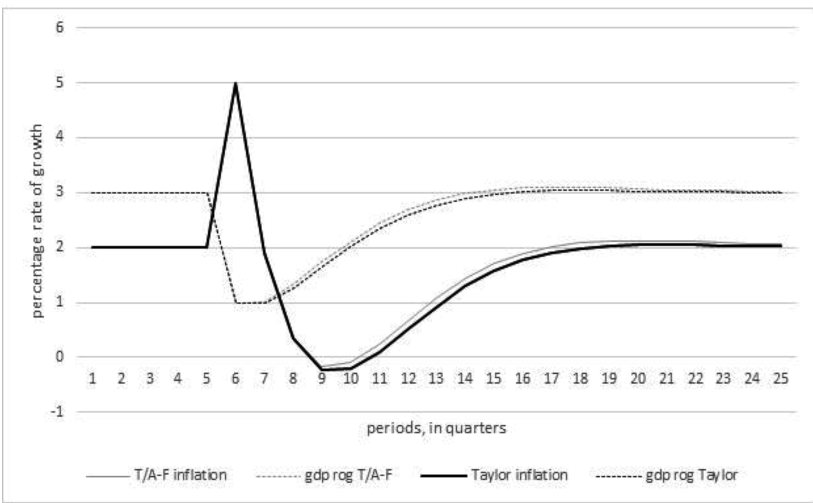

Figure 12. Simulated inflation and GDP rate of growth (rog) response functions for Taylor and Taylor/A-F interest rate rules given a -4% annual rate of change aggregate supply shock

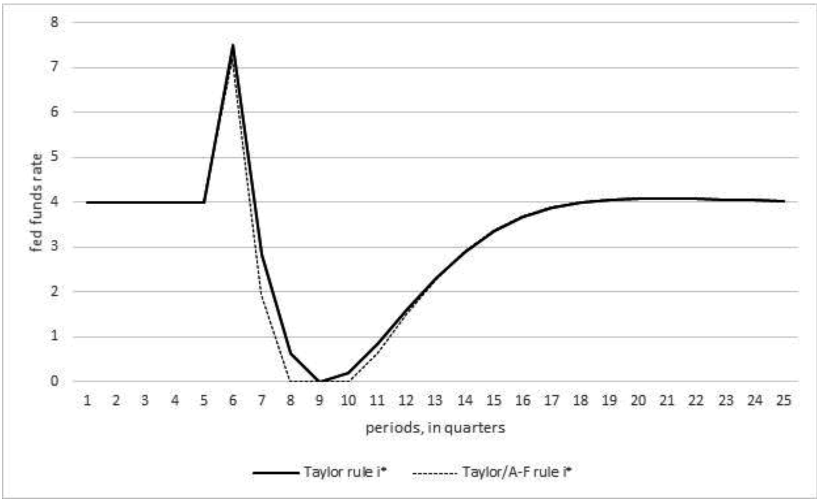

Figure 13. Simulated interest rate response functions for Taylor and Taylor/A-F interest rate rule targets (i*) given a -4% annual rate of change aggregate supply shock

A positive aggregate supply shock

The final comparison, shown in Figures 14 and 15 below, is for a positive aggregate supply shock. Once again the Taylor/A-F rule is slightly more aggressive than the Taylor rule, but they more or less promote the same responses and advocate for similar interest rates, with the Taylor/A-F tending to hold target rates higher a little longer. The RMSEs for the +4% annual rate of change aggregate supply shocks, reflecting the divergences from targeted inflation and GDP growth rates, are again fairly similar with a slight edge to the Taylor/A-F rule: Taylor rule: 21.87; Taylor/A-F rule 19.94. Again, the Taylor/A-F interest rates are slightly but consistently more aggressively targeted than the Taylor interest rates to combat a large, positive aggregate supply shock.

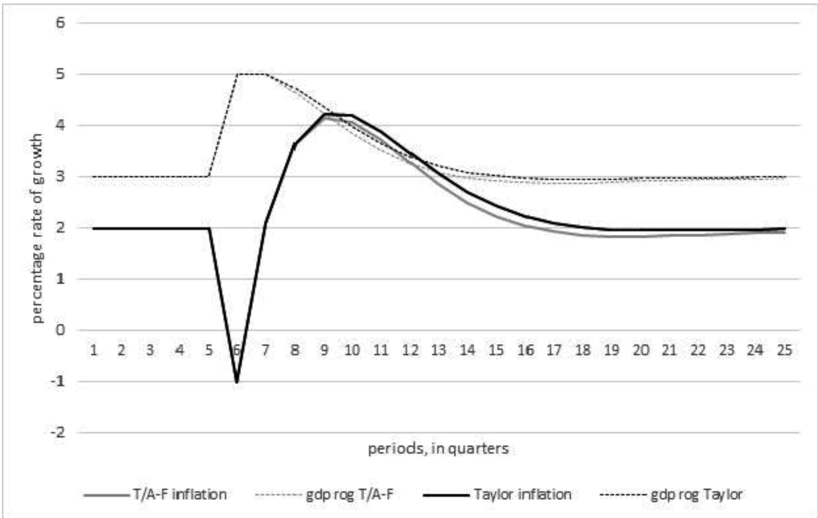

Figure 14. Simulated inflation and GDP rate of growth response functions for Taylor and Taylor/A-F interest rate rules given a +4% annual rate of change aggregate supply shock

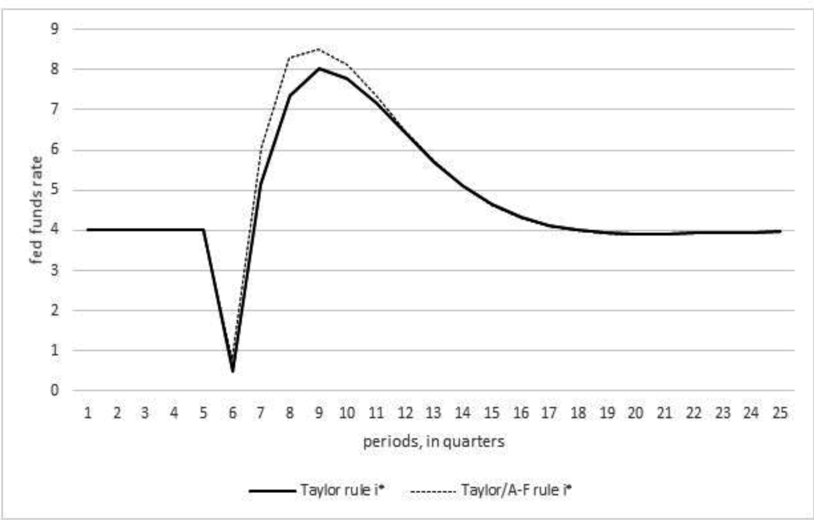

Figure 15. Simulated interest rate response functions for Taylor and Taylor/A-F interest rate rules given a +4% annual rate of change aggregate supply shock

Summary and Conclusions

The Friedman's monetary growth rule (*k*-percent rule) can be augmented such that it fits the current financial environment, using a standard M2 aggregate. The simple augmented-Friedman rule advanced in this paper works well enough, in fact, to be used in current Federal Reserve optimal policy discussions. By using both a Taylor-like interest rate rule, which works via a long-run equilibrium mechanism, and the augmented-Friedman rule advocated here, which works via a wholly different dynamic constraint mechanism, the Federal Reserve has two complementary, robust guideposts for policy-making. This paper breaks new ground in two ways. While other studies have advocated for a return to a monetary aggregate approach for monetary policy, none propose the two-pronged approach advocated here: the use of an interest rate rule in tandem with a new A-F rule as complementary guides to monetary policy. Moreover, no nominal GDP rules proposed to date include the crucial movements of the velocity rates of growth.

Several temporal insights have been demonstrated, and as such, point to the rule's use as a complementary indicator for policy-making. The augmented-Friedman rule results indicate that the Fed helped feed the lead-in to the Great Recession by pumping money into the economy too fast. Conversely, when the Great Recession was underway, the Fed did not push hard enough for the first several years of the recession. While interest rates at the zero lower bound were unable to provide enough information or stimulus, the augmented-Friedman M2 growth rate rule, containing its corresponding velocity growth rate, was still able to provide nuanced information as to how much and when to apply monetary stimulus.

Powerfully, this A-F rule also does not utilize or recognize expectations or institutions. Evidently, these intricacies, which are extremely topical, are simply absorbed into the mix of money and velocity growth rates. And advantages over other strict monetary rules, are that the rule is simpler, not requiring any forecasting (Raffinot, 2017) but also utilizes velocity rates of growth, while some alternative money rules (Kilponen & Leitemo, 2008; Le et al, 2018) do not.

There are limitations. The rule developed here is a guide only. There is certainly potential for more complicated approaches, even in US data, to be found along this same avenue of research. Reasons have been given for why the eras have been established as they are, but it is possible that the eras as defined are not representative of the true nature of the macroeconomic behavior. It is also possible that the data used for the rule are not contemporaneously available to central bankers, particularly the velocity rate of growth; therefore, there may be inherent problems in using a lagged velocity growth rate that have not shown up in the data set used, or may enter in the future.

An obvious caveat is that the study has assumed a nominal GDP growth rate of 5% for the empirical checks in Figures 1 - 7, although many textbook approaches make the same assumptions as used here. Other values could have been chosen and might even work better. For instance, US averages since 1980 have been a real GDP rate of growth of 2.6%, while inflation has averaged 2.8%. This would suggest a nominal GDP rule targeting of 5.4%, and possibly explains why the rule above does not center exactly on the targeted 5%. Still, the formula is easily adaptable to a different inflation and/or nominal GDP growth rate targets.

The clearest caveat is that the simulations here were forced to work indirectly through interest rate channels for the monetary growth rule to show how it might behave, and these simulations are then bound by the Taylor/A-F rule formulation that only proxies the true A-F rule. Still, any model that would be put together without interest rates, especially to make direct comparisons to interest rate models, would be equally governed by the simulation's calibrations and assumptions. This problem is ubiquitous.

A final caveat is that the rule developed here covers only the US financial system and does not necessarily represent central banking behavior elsewhere. It is possible that there will be similar relationships in other countries, perhaps with different coefficients or targets. These are not looked at here.

To summarize, the proposed A-F rule champions the return of an augmented form of monetarism, at least as a concurrent, robust, complementary, monetary policy indicator. Friedman's *k*-percent rule was on the right track but needed a twist to make it work. This nominal GDP rule can be used right away as a Federal Reserve policy guide and puts M2 back into monetary policy. The rule can provide a quick assessment of policy, too tight or loose, which under constrained conditions, are more difficult to assess with interest rate rules.

The augmented–Friedman M2 monetary growth rate rule brings another very simple but robust indicator of monetary policy strength and accuracy. Coupled with interest rate rules such as Taylor's, the augmented-Friedman rule adds another degree of precision to monetary policy in the United States.

References

Bauer, M. D. & G. D. Rudebusch. (2019). Interest rates under falling stars. *Federal Reserve Bank of San Francisco*, Working Paper 2017-16. https://doi.org/10.24148/wp2017-16

Benhabib, J., Schmitt-Grohé, S., & Uribe, M. (2001). The perils of Taylor rules. *Journal of Economic Theory*, 96(1-2) 40-69.

Bias, P. V. (2010). Examining monetary rules by spreadsheet simulations. *Journal of Business, Industry, and Economics*, 14(1) 49-59.

Bias, P. V. (2011). Monetary policy rule welfare comparisons. *Academy of Business Disciplines Journal*, 3(1) 31-46.

Burstein, A., & Hellwig, C. (2008). Welfare costs of inflation in a menu cost model. *American Economic Review*, 98(2) 438-43.

Cagan, P. (1972). *The channels of monetary effects on interest rates* (Vol. 97). New York: National Bureau of Economic Research.

Carlstrom, Charles T. and Fuerst, Timothy S. (2008). Inertial Taylor Rules: The Benefit of Signaling Future Policy. *Federal Reserve Bank of St. Louis Review*, 90(3, Part 2) 193-203.

Cochrane, J. H. (2018). "Lessons of the long quiet ELB" Comments on "Monetary policy: Conventional and unconventional" Nobel Symposium on Money and Banking

Dotsey, M., & Ireland, P. (1996). The welfare cost of inflation in general equilibrium. *Journal of Monetary Economics*, *37*(1) 29-47.

Federal Reserve Bank of St. Louis, Economic Research, FRED Economic Data (2019), http://research.stlouisfed.org/series/...

Fisher, I., & Barber, W. J. (1907). *The rate of interest*. Garland Pub.

Fisher, I. (1930). *Theory of interest: as determined by impatience to spend income and opportunity to invest it*. Augustusm Kelly Publishers, Clifton.

Friedman, M. (1960). *A program for monetary stability* (Vol. 541). New York: Fordham University Press.

Friedman, M. (1953). The effects of a full-employment policy on economic stability: A formal analysis. *Essays in positive economics*, 117-132.

Friedman, M., & Schwartz, A. J. (1963). *A monetary history of the United States, 1867-1960*. Princeton University Press, for the National Bureau of Economic Research, Inc.

Gerlach, S., & Svensson, L. E. (2003). Money and inflation in the euro area: a case for monetary indicators? *Journal of Monetary Economics*, 50(8) 1649-1672.

Hall, T. E., & Noble, N. R. (1987). Velocity and the variability of money growth: Evidence from Granger-Causality tests: note. *Journal of Money, Credit and Banking*, 19(1) 112-116.

Ihrig, J. E., Meade, E. E., & Weinbach, G. C. (2015). "Monetary policy 101: A Primer on the Fed's changing approach to policy implementation," Finance and Economics, Discussion Series 2015-047. Washington: Board of Governors of the Federal Reserve System, http://dx.doi.org/10.17016/FEDS.2015.047.

Kilponen, J., & Leitemo, K. (2008). Model Uncertainty and Delegation: A Case for Friedman's k-Percent Money Growth Rule?. *Journal of Money, Credit and Banking*, 40(2-3) 547-556.

Lavoie, M., & Seccareccia, M. (Eds.). (2004). *Central banking in the modern world: alternative perspectives*. Edward Elgar Publishing.

Le, V. P. M., Meenagh, D., & Minford, P. (2016). Monetarism rides again? US monetary policy in a world of Quantitative Easing. *Journal of International Financial Markets, Institutions and Money*, 44(1) 85-102.

Le, V. P. M., Meenagh, D., & Minford, P. (2018). *Oil and Commodities Drive the World Business Cycle: A Long-Commodity-Cycle Model of the World Economy Over a Century and a Half* (No. E2018/16). Cardiff University, Cardiff Business School, Economics Section.

Lucas, R. E. (1994). *On the welfare cost of inflation* (No. 394). Center for Economic Policy Research, Stanford University.

Mankiw, N. G. (2001). *US monetary policy during the 1990s* (No. w8471). National Bureau of Economic Research.

Mankiw, G. (2016). Macroeconomics. Worth Publishers, New York, NY. 9th Edition.

McCallum, B. T. (1987). The case for rules in the conduct of monetary policy: a concrete example. *Review of World Economics*, 123(3) 415-429.

Mehrotra, A., & Sánchez-Fung, J. R. (2011). Assessing McCallum and Taylor rules in a cross-section of emerging market economies. *Journal of International Financial Markets, Institutions and Money*, 21(2) 207-228.

Neumann, H. Jr. & J. Meyer, (2016). Monetary mystery: why has the post great recession recovery been so disappointing? *Research in*

Business and Economics Journal, AABRI, the Academic and Business Research Institute, Vol. 11

Raffinot, T. (2017). Interest-rates-free monetary policy rule. Mercatus Working Paper, Mercatus Center, George Mason University

Simons, H. C. (1936). Rules versus authorities in monetary policy. *Journal of political economy*, 44(1) 1-30.

Taylor, J. B. (1993, December). Discretion versus policy rules in practice. In *Carnegie-Rochester conference series on public policy* North-Holland, 39(1) 195-214.

Thornton, D. L. (2014). Monetary policy: Why money matters (and interest rates don't). *Journal of Macroeconomics*, 40(1) 202-213.

Uhlig, H. (2018). "Money and Banking: Some DSGE Challenges" Nobel Symposium on "Money and Banking" conference presentation

Williams, J. C. (2017). Three questions on R-star. *Federal Reserve Bank of San Francisco Economic Letter*, 5(1) 1-5.