The Federal Reserve's Impact on the US M&A Market: An Empirical Examination

Sebastian v. Boetticher

Spring 2015

1. Introduction

Mergers and acquisitions (M&A) have become an ever popular way for firms and investors to seek an operational, economical, or financial advantage. The increasing popularity of M&A is underscored by the over $2 trillion in aggregated deal volume in the US in 2014, comprised of 12 thousand transactions (IMAA 2015). M&A transactions, akin to other capital markets, facilitate the reallocation of capital to its most efficient user. While M&A are ubiquitous in virtually all industries, on an aggregate-level, M&A activity, measured both in relative and absolute terms, booms and busts in cycles. These cycles, namely M&A waves, are often characterized by irrational valuations and expectations followed by a downturn and loss of appetite. Similar to other asset bubbles, M&A cycles are welfare-destructive in that they misallocate capital, decrease market confidence, and can have a spillover effect on corollary asset markets and the real economy. M&A deals that are predicated on unrealistic expectations of growth and synergies are doomed to fail. Moreover, dynamic macroeconomic forces can dictate the ex post success of a transaction. Thereby, the single most economically influential institution in the US, the Federal Reserve, may have a hand in accelerating and stymieing M&A growth. Further, the Fed may proactively steer M&A activity to smooth the M&A cycle, and, thus, should consider this asset market in its determination of appropriate monetary policy.

Although the Federal Reserve's influence on macroeconomic conditions and market behavior has been thoroughly studied, little research has examined M&A dynamics in the context of monetary conditions. Researchers have found a significant relationship between M&A activity and the Fed's principal monetary policy tool, the federal funds rate; however, the findings are purely empirical. Other findings provide a theoretical framework, corroborated by empirical evidence, contending that public financial markets, which the Fed has at least some

come control over, drive M&A waves (Choi and Jeon 2011). While researchers have examined the federal funds rate as a determinant of M&A activity, I am expanding the scope of the Fed's effect on the M&A market by including qualitative, more subtle factors. Qualitative factors—such as the Federal Open Market Committee's (FOMC) statements on forward guidance of monetary policy; economic projections on expected future unemployment, inflation, and GDP; and dissent within the FOMC—have already been found to predictably move public financial markets (Hayo et al. 2012).

In this paper, I examine whether the Fed's manipulation of the money supply and implicit "signaling" of future monetary policy dynamics are determinants of M&A frequency and dollar volume. First, I outline literature pertaining to found factors of M&A waves and the Fed's influence on said factors. Then, in Section 3, I explain how the Fed could theoretically manipulate M&A frequency and dollar volume. In Section 4, I describe my data set. Section 5 outlines my econometric methodology and presents the findings of my regression analysis. Finally, Section 6 covers the conclusion of this paper.

2. Literature Review

The research of the determinants of aggregate-level M&A activity in the context of monetary policy entails the intersection of the fields of finance and economics. Since the Fed is under Congress' imposed dual mandate to maintain low and stable inflation[1] and maximum employment, M&A activity is not explicitly under the Fed's radar, per se; however, the Fed does closely monitor multiple asset markets to determine whether a welfare-destructive bubble is forming and an appropriate intervention is warranted. Aggregate-level M&A activity has been studied extensively since the 1950s, when M&A became a prominent form of business

[1] The Fed's annualized inflation target is 2%, as measured by the personal consumption expenditures (PCE) index ("Board of Governors" 2015).

transactions in the US (Choi and Jeon 2011). Researchers test theories explaining M&A dynamics through econometric methods to determine whether empirical data support or reject their assertions on drivers of M&A growth. In most papers, M&A activity has been quantified by frequency and aggregated value of deals in a given time period. Nelson (1959) has been credited with first identifying aggregate-level M&A waves (Choi and Jeon 2011). DePamphilis (2011) has identified six M&A waves since the late 1890s with the most recent wave reaching its peak at the burst of the subprime mortgage bubble in 2007.

The correlation between M&A waves and financial market dynamics have prompted researchers to focus on the stock and bond markets in rationalizing the acute ebbs and flows in M&A activity over time. Gort (1969), Guerard (1989), and Choi and Jeon (2011) report a positive empirical relationship between the stock market and M&A activity. Schleifer and Vishny (2003) and Rhodes-Kropf and Viswanathan (2004) provide a theoretical model from the behavioral finance school claiming that stock market mispricing incentivizes managers of relatively overvalued firms to acquire relatively undervalued firms through equity-financed acquisitions. Verter's (2002) finding that equity market volatility significantly correlates with M&A waves supports the behavioral finance theory. The behavioral finance theory assumes that managers know their firm's shares are overpriced, and can facilitate an acquisition without relaying this information to the market.

The neoclassical argument fundamentally differs from the behavioral finance theory in that markets always price assets efficiently. Mitchell and Mulherin (1996) present a leading neoclassical theory for industry-level M&A waves—claiming economic, technological, and regulatory shocks drive intra-industry M&A waves. Andrade et al. (2001) and Mulherin and Boone (2000) support Mitchell and Mulherin's theory with empirical evidence that industry-

wide shocks drive M&A waves. Harford (2005) finds that capital liquidity plays a crucial role in fostering M&A waves, and that in times of sufficient macro-level liquidity intra-industry M&A waves can cluster to form aggregate-level M&A waves across industries. An important assumption underpinning the neoclassical theory is that M&A transactions generate wealth through synergies.

On a macroeconomic level, researchers have focused on the dynamics of common factors in driving M&A waves. Becketti (1986), Guerard (1989), and Choi and Jeon (2011) examine various forms of national income metrics and interest rates in driving aggregate-level M&A waves. Choi and Jeon (2011) find that the effective federal funds rate and 10 year Treasury yield are correlated with M&A deal value; although, the direction of correlation for the federal funds rate reverses with lagged conditions. On a microeconomic level, Jensen (1986, 2003) and Harford (1999) find that highly liquid firms are more inclined to engage in M&A transactions; thereby, claiming a positive correlation between a firm's free cash flow and its management's propensity to engage in M&A.

The economic consequences of the FOMC's discretionary monetary policy, as opposed to a rules-based policy, have been debated among scholars, especially in the context of the recent housing crisis. Kahn (2010) examines various parameterizations of the Taylor rule[2] and finds that "virtually all of them—to varying degrees—characterize monetary policy as too accommodative from 2003 to 2006." Adrian and Shin (2008) find that when the federal funds rate is lower than a Taylor rule prescribed rate, firms are more inclined to issue debt. Miller et al. (2002) coined the

[2] The Taylor rule is as follows: $FF = RR^* + \pi + \beta(\pi - \pi^*) + \gamma(y - y^*)$, where FF is the recommended benchmark short-term interest rate; RR^* represents the equilibrium interest rate (takes the value of 2% in this paper (Taylor 1993)); π represents the current inflation rate (measured by the personal consumption expenditures price index in this paper (Bernanke 2015)); π^* represents the targeted inflation rate (takes the value of 2% in this paper (Taylor 1993)); $y - y^*$ represents the output gap; β and γ represent parameters capturing the recommended policy rate reaction to an inflation gap and output gap, respectively (per Taylor (1993), both parameters take the value of 0.5 in this paper).

term “Greenspan put,” which claims that one-sided monetary policy intervention, specifically during precipitous downward asset price movements, can cause investor risk premia to fall dramatically and foster asset bubbles.

While the FOMC’s control of the federal funds rate has been thoroughly studied, market reaction to statements and speeches from FOMC meetings and members is a relatively novel subject in academia. Blinder (1998) emphasizes the importance of transparent and unambiguous central bank communication in enhancing market confidence and helping central bankers achieve their goals. In a survey of literature on central bank communication, Blinder et al. (2008) report that empirical evidence supports that “communication can be an important and powerful part of the central bank’s toolkit since it has the ability to move financial markets, to enhance the predictability of monetary policy decisions, and potentially to help achieve central banks’ macroeconomic objectives.” Hayo et al. (2012) find that Federal Reserve communication moves equity and debt markets in the intended direction, and short-term securities are more elastic in response to communication than long-term securities. Thereby, the FOMC’s strategic communication to the public has the potential to be as much of a monetary tool as actual open market operations. As of the writing of this paper, the relationship between M&A activity and Fed communication has not been studied with econometric methods.

3. Theory

Next, I outline the economic and financial theories connecting my model’s independent variables with M&A activity. The variables used in this paper along with respective descriptions are listed in Table 1 in the Appendix. M&A transactions, depending on the acquirer’s intention, can take on various forms. Generally speaking, an acquirer is either strategically or financially motivated; the former is pursuing external growth through expanding its market share, vertical

integration, or business lines, while the latter is seeking to maximize its return on investment (ROI) by collecting dividends and/or selling its equity stake in the future. Strategic acquisitions vary in the share of equity and debt financing, while financially motivated acquirers, especially private equity funds, primarily finance acquisitions with debt to boost the expected ROI from its relatively small equity investment. Thereby, equity and bond market conditions can have uniquely different effects on driving strategic and financial investors to acquire a target firm.

Through managing the supply of money, or credibly signaling future monetary policy, the Fed can affect M&A activity. Although the Fed's main monetary policy tool, the federal funds rate, does not directly influence M&A financing or valuation, it does have a profound indirect effect. Per Harford's (2005) findings, the most important determinant of aggregate-level M&A waves is sufficient macro liquidity, "The increase in capital liquidity and reduction in financing constraints that is correlated with high asset values must be present." While the federal funds rate has a direct influence on the short-term side of the yield curve, long-term rates are determined by market forces. Since long-term rates are a function of expected future inflation and expected future short-term rates, the FOMC can influence long-term rates by communicating credible forward guidance with stable inflation in regard to its monetary policy plans. Moreover, in response to the Great Recession, the Fed has adopted a new monetary policy tool that has directly influenced long-term rates; per Gagnon et al.'s (2010) findings, the Fed's large scale asset purchase programs, or quantitative easing, has an "economically meaningful and long-lasting reductions in longer-term interest rates on a range of securities, including securities that were not included in the purchase programs" by a reduction in risk premia. Although, presumably, quantitative easing will be reserved as a monetary tool of last resort, it can be used to manage macro liquidity conditions when warranted.

A corollary question is how the Fed influences aggregated M&A value. To understand this I first delve into business valuation methods. The determination of the compensation paid for a target firm usually involves considering multiple valuation approaches. These can be dichotomized by the market approach (historical comparable transaction metrics and comparable company market capitalization) and the income approach (discounting expected future income). The market approach is highly dependent on current and historical stock market conditions, as a bullish market would inflate the value of comparable companies and, hence, the total compensation paid for a target company. The forward looking nature of the income approach, which involves forecasting pro forma income and discounting these to the present value, causes it to be a more assumption-sensitive valuation—depending on the expected earnings growth rate and appropriate discount rate. The following equation gives the income approach valuation:

$$V_i = \sum_{t=1}^{\infty} \frac{\pi_{i,t}}{(1 + r_i)^t}$$

where V is the present value of firm i; π is firm i's net income at time t; and r is firm i's weighted average cost of capital (WACC) (Gugler et al. 2012). The WACC is determined by the firm's capital structure, cost of equity, cost of debt, and size. Interest expenses are determined by the risk free rate, usually the 10 year Treasury yield, and a firm-specific risk premium (Bodie et al. 2005).

Based on the market valuation approach, ceteris paribus, the Fed can inflate (deflate) comparable valuation metrics through monetary easing (tightening)—or credibly signaling its intention to in the future—and thereby lowering (raising) interest rates, and causing capital to flow into (out of) the equities market, where returns are relatively higher (lower). Likewise to the market approach, the Fed can inflate (deflate) the present value of a firm's future earnings through monetary easing (tightening), lowering (raising) the risk free rate, and thereby lowering

(raising) the firm's discount rate, or WACC. Moreover, interest rates determine the firm's expected future net income, assuming the firm is not purely equity-financed. Finally, determining the growth rate of the firm's future income has a significant impact on its present value, and the Fed's stewardship of the economy, or market confidence in the Fed's competency, may also have an impact on expected drivers of earnings growth.

4. Data and Methodology

The data set used in this paper covers the 21-year period from 1994 to 2014. As Figure 1 in the Appendix illustrates, this period contains two M&A cycles. In congruence with the eight scheduled FOMC meetings per year, eight data points are assigned per year. The two dependent variables measuring aggregate-level M&A activity—dollar value (in billions of US Dollars) and number of transactions—are collected from the Institute of Mergers, Acquisitions and Alliances (IMAA). The rationale for including two M&A metrics is to capture a broader measure of M&A activity and examine how the explanatory variables drive M&A cycles. Explanatory variables are collected through various online databases: data pertaining to public perception are collected through analyses of The New York Times articles reporting on FOMC meeting statements; the effective federal funds rate, long-term debt held by the Fed, 10 year Treasury rate, corporate net free cash flow, and real GDP are collected from Federal Reserve Economic Data (FRED) published by the Federal Reserve Bank of St. Louis; FOMC dissenting voting data are retrieved from Thornton and Wheelock (2014); the Taylor rule prescribed interest rates are retrieved from Bernanke (2015); Russell 3000 Index prices are exported from Yahoo! Finance.

I evaluate public sentiment towards Fed communication by examining 168 The New York Times articles covering the FOMC's release of statements immediately following its semi-quarterly scheduled meetings. The FOMC began issuing statements summarizing its current view

on the economy and monetary policy outlook in 1994 (Wynne 2013). I follow Ehrmann and Fratzscher's (2007) use of "content analysis" in assigning numerical values for monetary policy (MP) and economic outlook (EO) insinuations. I define monetary policy guidance as the FOMC's opined view on the direction the federal funds rate target, or in recent times other asset purchase programs, will take. I construct four variables to capture FOMC statement effect by assigning MP+ (MP-) with a value of 1 (-1) for a dovish (hawkish) monetary policy guidance; EO+ (EO-) are assigned a value of 1 (-1) based on a positive (negative) economic outlook by the FOMC. In cases where the FOMC's statement is abjectly ambiguous or neutral, I assign a value of 0 to the MP+/MP- and/or EO+/EO- variables. To capture whether dissenting members of the FOMC cause uncertainty over future monetary policy and thereby discourage managers to engage in M&A, I have included the number of dissenting votes per FOMC meeting. Since 2002, dissenting votes have been made public immediately after each meeting, prior to then voting information was released after the subsequent meeting (Wynne 2013).

In addition to qualitative variables capturing the Fed's effect on markets, I include open market operation variables such as the effective federal funds rate, the difference between the federal funds rate and a Taylor rule prescribed interest rate, and the Fed's holding of long-term debt. Deviations from a Taylor rule recommended federal funds rate are intended to investigate whether discretionary monetary policy decisions contribute to driving M&A waves. Long-term debt—categorized by maturity at the respective reporting date (1 to 5 years; 5 to 10 years; and over 10 years)—comprises of US Treasury securities, federal agency securities, and mortgage-backed securities. Since reaching the zero-bound of the federal funds rate at the onset of the subprime mortgage crisis, the FOMC has decided to engage in large scale purchases of long-term debt to further ease credit conditions. Data points for long-term debt are only available beginning

in the year 2003. Figures 2 and 3, both shown in the Appendix, illustrate all Fed-related variables used.

To control for financial market variables Gort (1969), Guerard (1989), and Choi and Jeon (2011) find significantly correlated with M&A activity, I include the 10 year Treasury yield and Russell 3000 Index[3] as proxies for the bond and stock market, respectively. To control for macroeconomic variables Becketti (1986), Guerard (1989), and Choi and Jeon (2011) find significantly correlated with M&A activity, I include corporate net cash flow and real GDP as proxies for corporate liquidity and national income, respectively. For graphs depicting financial and macroeconomic control variables, see Figures 4 and 5, respectively, in the Appendix.

5. Results

I begin my analysis with two correlation matrices, one where the two dependent variables are lagged by one year and one without a lag—shown with Tables 3 and 2, respectively, in the Appendix. Since data pertaining to the Fed's holding of long-term debt are only available beginning in the year 2003, and all three of the variables representing the Fed's holding of various maturing securities are highly correlated with proxies capturing the stock market (RUSS), bond market (10_YR), corporate liquidity (CNCF), and national income (GDP), I have eliminated long-term debt from the OLS analysis. I then conduct four OLS regression analyses with the dependent M&A variables, as follows:

$$y_t = \hat{\beta}_0 + \hat{\beta}_{FF} x_{FF,t} + \hat{\beta}_{FF-T} x_{FF-T,t} + \hat{\beta}_{EO+} x_{EO+,t} + \hat{\beta}_{EO-} x_{EO-,t} + \hat{\beta}_{MP+} x_{MP+,t} + \hat{\beta}_{MP-} x_{MP-,t} + \hat{\beta}_{DIS} x_{DIS,t} + \hat{\beta}_{RUSS} x_{RUSS,t} + \hat{\beta}_{10\_YR} x_{10\_YR,t} + \hat{\beta}_{CNCF} x_{CNCF,t} + \hat{\beta}_{GDP} x_{GDP,t} + \varepsilon_t,$$

where y represents the observed M&A activity metric at time t; $\hat{\beta}_0$ represents the estimated slope intercept; $\hat{\beta}_{FF,FF-T,\ldots,CNCF,GDP}$ represent the estimated slope coefficients for the explanatory

[3] The Russell 3000 Index measures the performance of the 3,000 largest publicly traded US firms by market capitalization, covering 98% of the total US stock market capitalization ("Russell" 2015).

variables; $x_{FF,FF-T,\ldots,CNCF,GDP}$ represent the observed values for the explanatory variables at time *t*; and ε represents the residual error at time *t* (Hansen 2015, 87).

Table 4, shown in the Appendix, depicts the results of the four OLS models. Of the Fed-related explanatory variables, the federal funds rate, the deviation from a Taylor rule recommended federal funds rate, and monetary policy signaling are significant in at least one of the four models. The federal funds rate is the most significant variable endogenous to the Fed. Choi and Jeon (2011) also report a positive relationship between the federal funds rate and M&A activity. Although interest rates are presumed to be negatively correlated with investment activities, such as M&A transactions, this positive relationship may highlight the Fed's attempt to smooth the business cycle by proactively countering swings in asset markets. When contrasting the Fed's discretionary targeting of the federal funds rate to a Taylor rule recommended short-term rate, negative deviations (where the federal funds rate is lower than recommended by a Tylor rule) appear to spur M&A activity with a lagged adjustment. This relationship can be seen in the recent M&A cycle, which was characterized, especially in its ascension, by negative deviations from a Taylor rule (Kahn 2010). Economic outlook statements seem to have no effect on M&A activity. Monetary policy signaling, however, does appear to be correlated with M&A activity. Without lag, signaling of an expansion of the money supply appears to coincide with a decrease in M&A frequency. With a one year lag, this relationship reverses as dovish statements appears to correlate with an increase in M&A frequency and value. The reversed relationship may also be explained by the Fed's proactive steering of the economy, as dovish monetary policy guidance are more likely to coincide with dismal outlooks on financial or economic conditions. Similarly, hawkish monetary policy statements are positively correlated with M&A value, as a signaling of contractionary monetary policy coincides with a booming

economy and, in turn, favorable conditions for M&A activity. The number of dissenting FOMC members does not appear to have an influence on M&A activity.

Next I analyze the four financial and macroeconomic control variables. In congruence with the empirical findings of Gort (1969), Guerard (1989), and Choi and Jeon (2011), and the theoretical framework by Schleifer and Vishny (2003) and Rhodes-Kropf and Viswanathan (2004), the stock market proxy variable is positively correlated with all four M&A metrics at the 0.01 significance level. Similarly, in support of Becketti's (1986) findings, long-term interest rates, captured by the 10 year Treasury yield, are negatively correlated with M&A frequency. This supports the negative relationship between investments and interest rates, as firms and investors are more inclined to engage in debt-financed M&A activities when interest rates are low. Aggregated corporate liquidity appears to have a positive relationship with M&A frequency, as per Harford (2005) and Choi and Jeon's (2011) findings. When regressed with M&A frequency and value lagged by one year, corporate liquidity is statistically insignificant or becomes negative, respectively; alternative free cash flow allocation options such as investment in internal growth, share repurchase programs, or dividend distributions may explain the temporal effect on the relationship between liquidity and M&A activity. Contrary to previous findings, my results indicate GDP to be negatively correlated with M&A frequency; however, M&A value lagged by one year is positively associated with GDP.

6. Conclusion

This paper examined the Fed's influence on US M&A activity, measured both in frequency and dollar volume, in the timespan from 1994 to 2014. The Fed's ability to move markets and dampen the business cycle has been researched extensively; how monetary policy drives M&A dynamics, however, has received less attention. Welfare-destructive M&A cycles

pose a threat to the real economy, especially with M&A transactions summing to over $2 trillion in 2014. Existing literature on M&A activity in the context of monetary policy has focused on the federal funds rate as the sole proxy variable for monetary policy. Since reaching the zero-bound of the federal funds rate, the Fed has implemented new and unorthodox monetary policy tools which may influence M&A dynamics. To capture more subtle, Fed-related effects on the M&A market, some of which have already been found to move other financial markets, I include the Fed's forward guidance on monetary policy, economic signaling, dissent within, quantitative easing programs, and deviations from a Taylor rule recommended federal funds rate in my model. Also, I include four macroeconomic and financial control variables found significantly correlated with M&A activity by previous authors.

The chief results of my OLS analysis are summarized as follows. The federal funds rate is positively correlated with both M&A frequency and volume. Although the direction of the relationship is unintuitive at first, it corresponds with the Fed's lean against the wind policy; when M&A activity is overheating, the Fed increases the federal funds rate, and vice versa. With the M&A metrics lagged by one year, a negative deviation from a Taylor rule recommended federal funds rate (when the federal funds rate is below the Taylor rate) increases both M&A frequency and dollar volume; this relationship is most prominent in the low interest rate period of 2003 to 2007. Dovish communication signaling future easing, issued through FOMC statements, is negatively correlated with M&A activity, and positively correlated with a one year lag. This, too, is in congruence with the Fed's lean against the wind policy. Among the control variables, I found GDP, and the stock and bond markets most significantly correlated with M&A frequency. For M&A dollar volume, GDP, the stock market, and corporate net cash flow are most significant. Due to high multicollinearity and limited availability of data, I did not include

the Fed's holding of long-term debt, designed to capture the quantitative easing programs, in the regression analysis.

Further expanding the examination of central banks' effect on M&A activity would build upon my findings. Endogenizing quantitative easing in a model explaining M&A activity would shed light on a relatively uncharted monetary tool. Including cross-border transactions, which are becoming more popular, and non-US deals in the analysis would produce more expansive and applicable findings. Also, accounting for the intricate harmony in monetary policy across major central banks in modeling M&A waves would explain the dynamics driving cross-border deals. Finally, the development of a more refined theoretical framework, one that central bankers could include in monetary policy calculations, would further benefit the understanding of M&A waves and appropriate monetary policy response.

Appendix

Table 1. Variable Description

Variable	Description
NUM_D	Aggregated number of M&A transactions announced
VAL_D	Aggregated value of M&A transaction announced (in billions of 2009 USD)
NUM_D_L1	Aggregated number of M&A transactions announced with one year lag
VAL_D_L1	Aggregated value of M&A transaction announced with one year lag (in billions of 2009 USD)
FF	Effective federal funds rate
FF-T	Effective federal funds rate minus the Taylor rule prescribed interest rate
EO+	Dummy variable indicating a positive economic outlook by the FOMC
EO-	Dummy variable indicating a negative economic outlook by the FOMC
MP+	Dummy variable indicating a future loosening of monetary conditions by the FOMC
MP-	Dummy variable indicating a future tightening of monetary conditions by the FOMC
DIS	Number of FOMC voting members voting against the FOMC's policy action
RUSS	Closing price of the Russell 3000 Index
10_YR	10 year Treasury yield
CNCF	Corporate net cash flow (in billions of 2009 USD)
GDP	Real GDP (in billions of 2009 USD)
1-5	Federal Reserve holdings of Treasury securities, agency debt, and mortgage-backed securities with remaining maturitiy between 1 and 5 years
5-10	Federal Reserve holdings of Treasury securities, agency debt, and mortgage-backed securities with remaining maturitiy between 5 and 10 years
>10	Federal Reserve holdings of Treasury securities, agency debt, and mortgage-backed securities with remaining maturitiy in excess of 10 years

Table 2. Correlation Matrix w/o Lag

	NUM_D	VAL_D	FF	FF-T	EO+	EO-	MP+	MP-	DIS	RUSS	10_YR	CNCF	GDP	1-5	5-10	>10
NUM_D	1.00															
VAL_D	0.77	1.00														
FF	0.52	0.24	1.00													
FF-T	0.41	0.16	0.46	1.00												
EO+	0.02	0.00	0.10	0.07	1.00											
EO-	-0.13	-0.09	-0.19	-0.17	-0.53	1.00										
MP+	-0.29	-0.11	-0.20	-0.24	-0.29	0.49	1.00									
MP-	0.13	0.14	0.07	-0.08	0.34	-0.39	-0.38	1.00								
DIS	-0.01	0.03	-0.22	-0.10	-0.11	0.22	0.10	-0.19	1.00							
RUSS	0.17	0.62	-0.40	-0.22	-0.13	0.06	0.07	0.06	0.21	1.00						
10_YR	0.24	-0.10	0.85	0.40	0.22	-0.26	-0.26	0.12	-0.30	-0.67	1.00					
CNCF	-0.18	0.11	-0.82	-0.30	-0.15	0.19	0.15	-0.06	0.26	0.62	-0.90	1.00				
GDP	-0.12	0.32	-0.71	-0.44	-0.18	0.21	0.22	-0.01	0.23	0.83	-0.89	0.89	1.00			
1-5	0.13	0.35	-0.54	0.15	0.02	-0.04	-0.06	-0.04	0.37	0.78	-0.74	0.69	0.81	1.00		
5-10	0.04	0.20	-0.60	0.17	0.04	-0.06	-0.06	-0.14	0.42	0.70	-0.86	0.70	0.81	0.85	1.00	
>10	0.05	0.26	-0.63	0.23	0.02	-0.07	-0.06	-0.08	0.36	0.75	-0.79	0.75	0.82	0.94	0.90	1.00

Table 3. Correlation Matrix with Lag

	NUM_D_L1	VAL_D_L1	FF	FF-T	EO+	EO-	MP+	MP-	DIS	RUSS	10_YR	CNCF	GDP	1-5	5-10	>10
NUM_D_L1	1.00															
VAL_D_L1	0.78	1.00														
FF	0.52	0.22	1.00													
FF-T	0.11	-0.14	0.45	1.00												
EO+	0.01	-0.01	0.08	0.05	1.00											
EO-	-0.07	0.01	-0.17	-0.15	-0.52	1.00										
MP+	0.07	0.24	-0.19	-0.24	-0.28	0.47	1.00									
MP-	0.06	0.07	0.05	-0.09	0.31	-0.37	-0.37	1.00								
DIS	0.04	0.00	-0.24	-0.11	-0.10	0.24	0.11	-0.21	1.00							
RUSS	0.25	0.52	-0.38	-0.20	-0.05	-0.03	0.02	0.16	0.26	1.00						
10_YR	0.27	-0.03	0.87	0.39	0.15	-0.20	-0.23	0.06	-0.35	-0.62	1.00					
CNCF	-0.35	-0.08	-0.84	-0.29	-0.08	0.12	0.10	0.01	0.31	0.56	-0.90	1.00				
GDP	-0.12	0.25	-0.73	-0.45	-0.11	0.13	0.17	0.08	0.28	0.80	-0.88	0.88	1.00			
1-5	0.04	0.15	-0.54	0.15	0.02	-0.04	-0.06	-0.04	0.37	0.78	-0.74	0.69	0.81	1.00		
5-10	0.02	0.05	-0.60	0.17	0.04	-0.06	-0.06	-0.14	0.42	0.70	-0.86	0.70	0.81	0.85	1.00	
>10	-0.05	0.05	-0.63	0.23	0.02	-0.07	-0.06	-0.08	0.36	0.75	-0.79	0.75	0.82	0.94	0.90	1.00

Table 4. OLS Regression Results

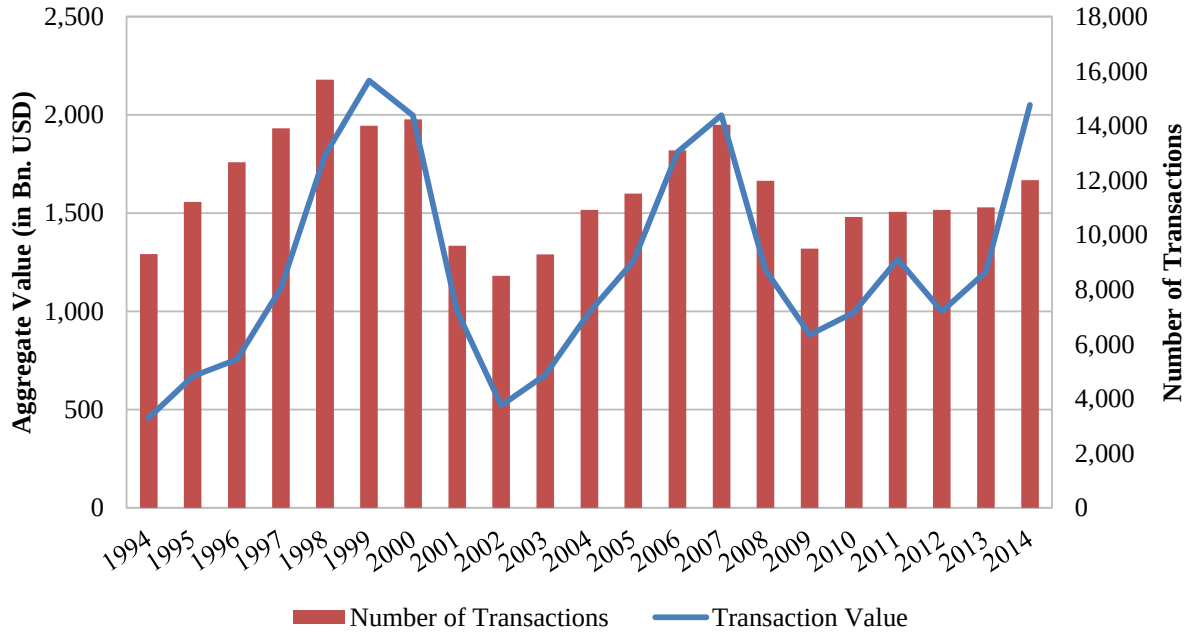
	M&A quantity				M&A value			
	No lag		1 year lag		No lag		1 year lag	
	Coefficient	Standard Error	Coefficients	Standard Error	Coefficient	Standard Error	Coefficients	Standard Error
Intercept	1,405.15	377.71	1,801.69	402.06	-59.01	75.47	-134.45	84.95
FF	12,973.59 ***	1,489.57 ***	11,185.99 ***	1,624.80 ***	2,105.04 ***	297.64 ***	1,616.80 ***	343.29 ***
FF-T	1,271.08	1,233.44	-3,409.99 ***	1,267.94 ***	229.91	246.46	-461.07 *	267.89 *
EO+	-5.78	41.78	18.22	44.35	4.51	8.35	14.82	9.37
EO-	37.56	37.99	-2.91	39.57	3.71	7.59	-1.01	8.36
MP+	-95.02 **	37.97 **	120.15 ***	38.72 ***	-3.69	7.59	40.52 ***	8.18 ***
MP-	57.16	39.69	15.69	42.60	13.34 *	7.93 *	-6.96	9.00
DIS	-0.23	23.94	5.87	26.50	-5.65	4.78	-5.17	5.60
RUSS	0.57 ***	0.17 ***	1.03 ***	0.18 ***	0.26 ***	0.03 ***	0.16 ***	0.04 ***
10_YR	-7,598.41 **	3,084.33 **	-7,217.84 **	3,351.91 **	-593.45	616.30	-158.76	708.19
CNCF	0.53 ***	0.16 ***	0.15	0.16	0.05 *	0.03 *	-0.07 **	0.03 **
GDP	-0.09 **	0.04 **	-0.10 ***	0.04 ***	-0.01	0.01	0.02 **	0.01 **
R^2	0.58		0.59		0.71		0.64	
Adjusted R^2	0.55		0.56		0.69		0.61	

* Significant at the 0.10 alpha level

** Significant at the 0.05 alpha level

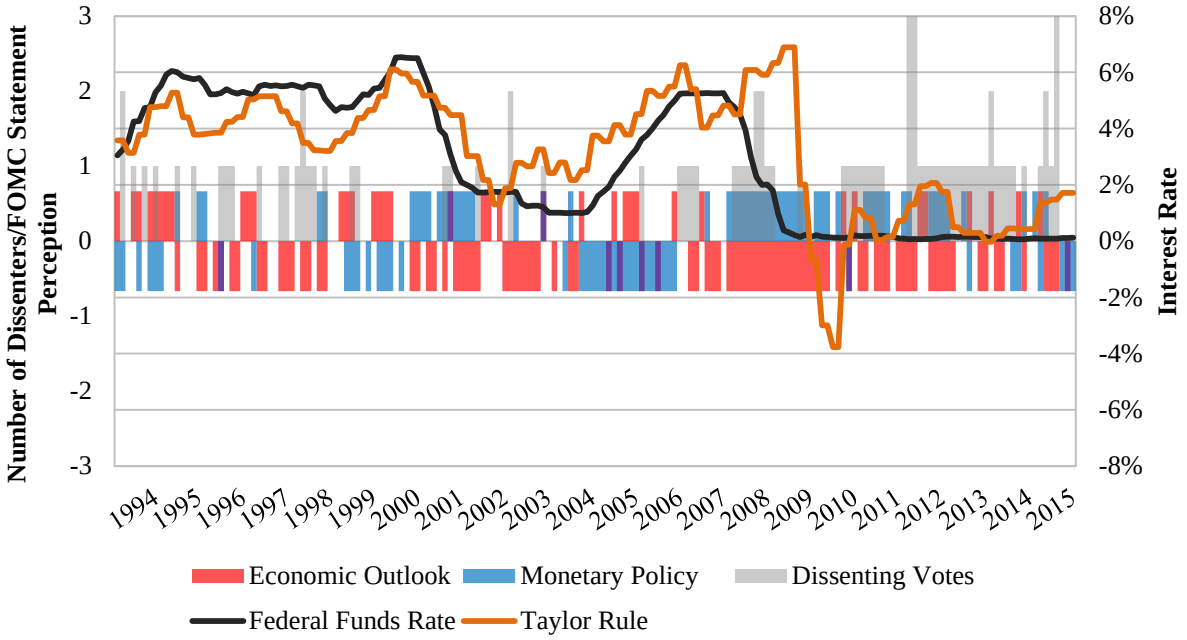
*** Significant at the 0.01 alpha level

Figure 1. US M&A Activity



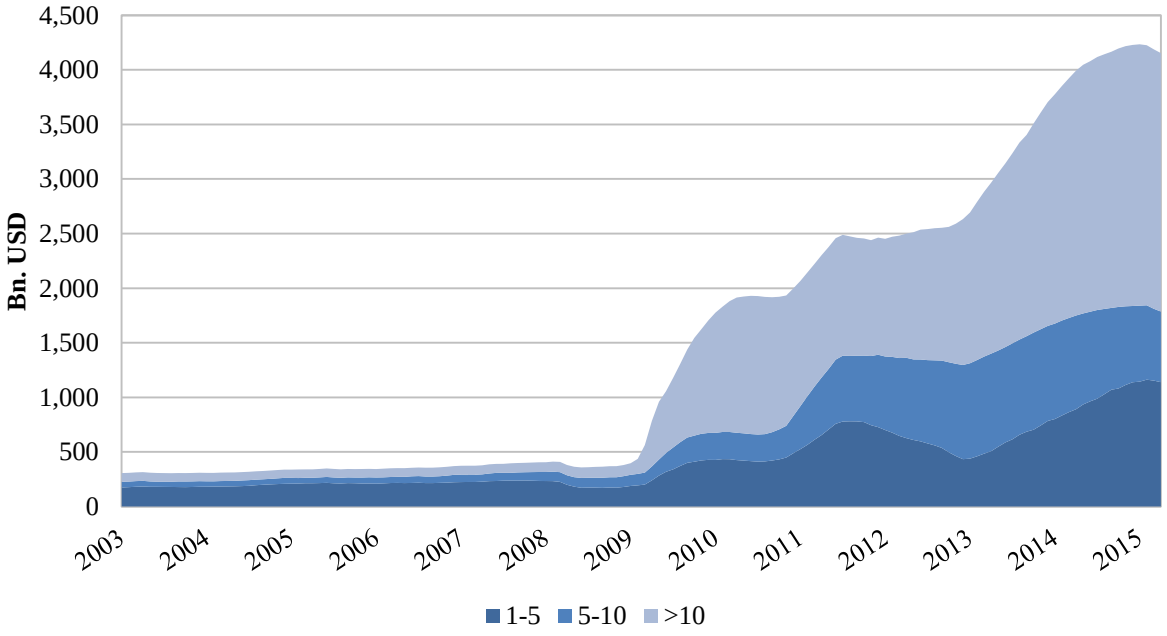
Source: IMAA

Figure 2. Federal Reserve Communication and Federal Funds Rate



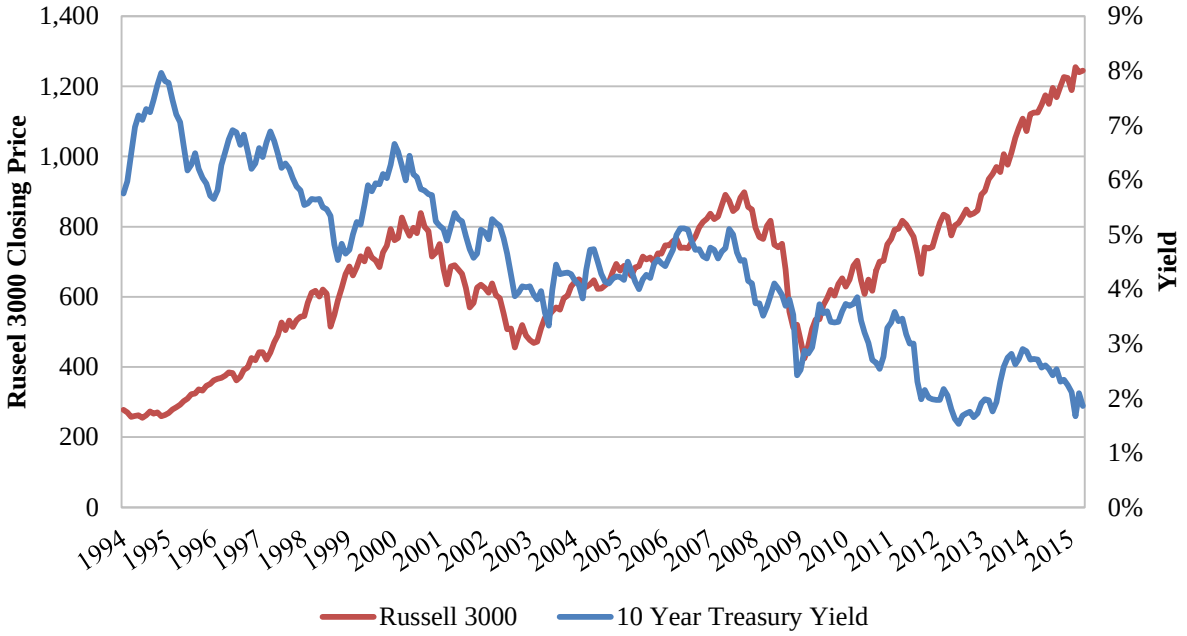
Source: Thornton and Wheelock (2014), Bernanke (2015), The New York Times, FRED

Figure 3. Long-Term Debt Held by Federal Reserve (by Maturity)



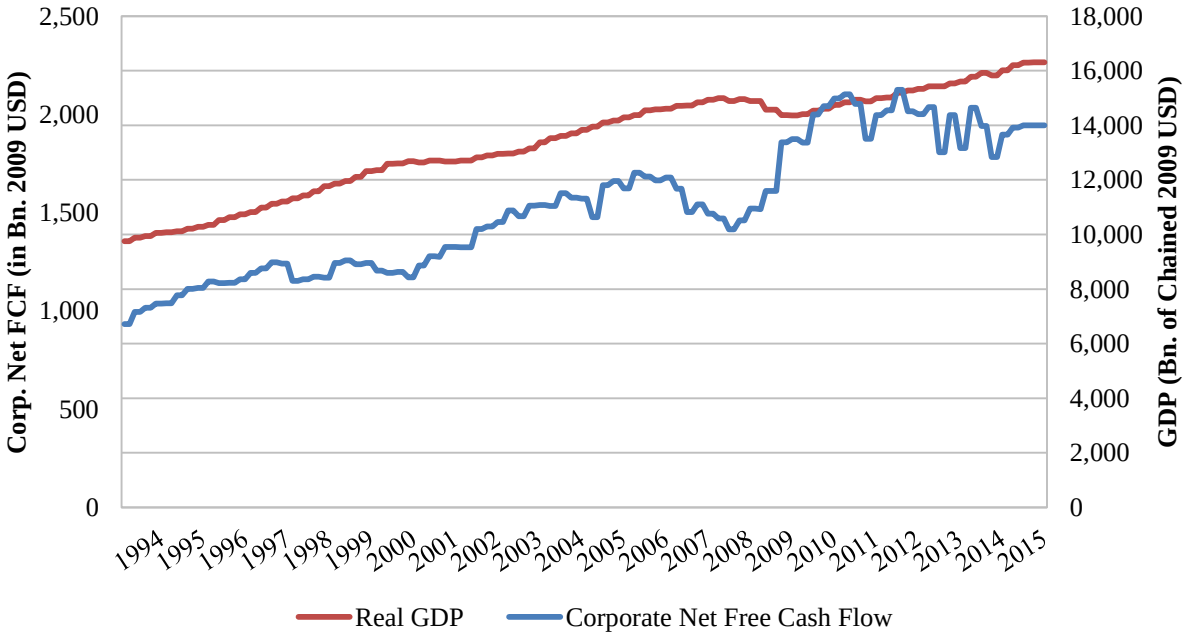
Source: FRED

Figure 4. Financial Market Control Variables



Source: FRED, Yahoo! Finance

Figure 5. Macroeconomic Control Variables



Source: FRED

References

Adrian, Tobias, and Hyun Song Shin. "Liquidity, Monetary Policy, and Financial Cycles." *Current Issues in Economics and Finance, Federal Reserve Bank of New York* 14, no. 1 (2008): 1-7.

Andrade, Gregor, Mark Mitchell, and Erik Stafford. "New Evidence and Perspectives on Mergers." *Journal of Economic Perspectives* 15, no. 2 (2001): 103-20. Accessed May 10, 2015.

Becketti, Sean. "Corporate Mergers and the Business Cycle." *Economic Review, Federal Reserve Bank of Kansas City*, 1986, 13-26. Accessed May 9, 2015.

Bernanke, Ben S. "The Taylor Rule: A Benchmark for Monetary Policy?" The Brookings Institution. April 28, 2015. Accessed May 10, 2015.

Blinder, Alan S., Michael Ehrmann, Marcel Fratzscher, Jakob De Haan, and David-Jan Jansen. "Central Bank Communication and Monetary Policy: A Survey of Theory and Evidence." *Journal of Economic Literature* 46, no. 4 (2008): 910-45.

Blinder, Alan S. *Central Banking in Theory and Practice*. Cambridge, MA: MIT Press, 1998.

Bodie, Zvi, Alex Kane, and Alan Marcus. *Investments*. 6th ed. Boston, Mass.: McGraw-Hill Irwin, 2005.

Choi, Seung Hee, and Bang Nam Jeon. "The Impact of the Macroeconomic Environment on Merger Activity: Evidence from US Time-series Data." *Applied Financial Economics* 21, no. 4 (2010): 233-49. Accessed May 10, 2015.

DePamphilis, Donald M. *Mergers and Acquisitions Basics*. Burlington, MA: Academic Press, 2011.

Gugler, Klaus, Dennis C. Mueller, and Michael Weichselbaumer. "The Determinants of Merger Waves: An International Perspective." *International Journal of Industrial Organization* 30, no. 1 (2012): 1-15.

Ehrmann, Michael, and Marcel Fratzscher. "Communication by Central Bank Committee Members: Different Strategies, Same Effectiveness?" *Journal of Money, Credit & Banking* 39, no. 2-3 (2007): 509-41.

Gagnon, Joseph, Matthew Raskin, Julie Remache, and Brian Sack. "Large-Scale Asset Purchases by the Federal Reserve: Did They Work?" *Economic Policy Review, Federal Reserve Bank of New York* 17, no. 1 (2010): 41-59.

Gort, Michael. "An Economic Disturbance Theory of Mergers." *The Quarterly Journal of Economics* 83, no. 4 (1969): 624-42. Accessed May 10, 2015.

Guerard, John. "Mergers, Stock Prices, and Industrial Production." *Economics Letters* 30, no. 2 (1989): 161-64. Accessed May 10, 2015.

Hansen, Bruce E. "Least Squares Regression." In *Econometrics*, 87. University of Wisconsin, 2015.

Harford, Jarrad. "Corporate Cash Reserves and Acquisitions." *The Journal of Finance* 54, no. 6 (1999): 1969-997.

Harford, Jarrad. "What Drives Merger Waves?" *Journal of Financial Economics* 77, no. 3 (2005): 529-60.

Hayo, Bernd, Ali M. Kutan, and Matthias Neuenkirch. "Financial Market Reaction to Federal Reserve Communications: Does the Crisis Make a Difference?" 2012. Accessed May 10, 2015.

Jensen, Michael C. "Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers." *The American Economic Review*, 1986, 323-29.

Jensen, Michael C. "Agency Costs of Overvalued Equity." *Financial Management* 34, no. 1 (2005): 5-19. Accessed May 10, 2015.

Kahn, George A. "Taylor Rule Deviations and Financial Imbalances." *Economic Review, Federal Reserve Bank of Kansas City* 95, no. 2 (2010): 63-99.

Miller, Marcus, Paul Weller, and Lei Zhang. "Moral Hazard and the US Stock Market: Analysing the 'Greenspan Put'" *The Economic Journal* 112 (2002): C171-186.

Mitchell, Mark L., and J. Harold Mulherin. "The Impact of Industry Shocks on Takeover and Restructuring Activity." *Journal of Financial Economics* 41, no. 2 (1996): 193-229. Accessed May 10, 2015.

Mulherin, J. Harold, and Audra L Boone. "Comparing Acquisitions and Divestitures." *Journal of Corporate Finance* 6, no. 2 (2000): 117-39.

Nelson, Ralph L. *Merger Movements in American Industry, 1895-1956*. Princeton, NJ: Princeton University Press, 1959.

Rhodes-Kropf, Matthew, and S. Viswanathan. "Market Valuation and Merger Waves." *The Journal of Finance* 59, no. 6 (2004): 2685-718. Accessed May 10, 2015.

"Russell 3000® Index: Fact Sheet." Russell Investments. March 31, 2015. Accessed May 10, 2015.

Shleifer, Andrei, and Robert W. Vishny. "Stock Market Driven Acquisitions." *Journal of Financial Economics* 70, no. 3 (2003): 295-311. Accessed May 10, 2015.

"Statistics on Mergers & Acquisitions." Institute of Mergers, Acquisitions and Alliances (IMAA). Accessed May 1, 2015.

Taylor, John B. "Discretion versus Policy Rules in Practice." *Carnegie-Rochester Conference Series on Public Policy* 39 (1993): 195-214.

Thornton, Daniel L., and David C. Wheelock. "Making Sense of Dissents: A History of FOMC Dissents." *Federal Reserve Bank of St. Louis Review* 93, no. 3 (2014): 213-27. Accessed May 10, 2015.

Wynne, Mark A. "A Short History of FOMC Communication." *Economic Letter*, *Federal Reserve Bank of Dallas* 8, no. 8 (2013). Accessed May 10, 2015.

Verter, Geoffrey. “Timing merger waves.” Working Paper (2002). Harvard University, Boston, MA.