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The Real Estate and Stock Market During the Great Depression: Construction Permit Growth as a Leading Economic Indicator for Stock Returns

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SUBMITTED TO

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Abstract

The 1929 stock market crash on Black Thursday, followed by the subsequent four-year period of extreme economic downturn, signifies an extremely profound piece of U.S. history. During this time, global economic productivity – measured by GDP – decreased while the U.S. unemployment rate increased staggeringly. Leveraging construction permits as a forward-looking measure of economic activity, I empirically evaluate the effect of construction permits – specifically, the lagged growth rate of monthly construction permits – and lagged monthly stock returns on monthly Standard & Poor's 500 (S&P 500) stock returns. Lagged construction permit returns and lagged stock returns provide early indications (i.e., stock returns) of the following Great Depression.

Key Words: Great Depression, Stock Market Crash of 1929, Wall Street Crash of 1929, Housing Price, Real Estate Investment, Construction Permits, Housing Bubble, Leading Economic Indicator

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Background

For my final senior thesis capstone project, a huge milestone – arguably the most significant in my life thus far – I research stock returns and construction permits during the Great Depression[1] (October 29, 1929-1939). After taking Professor Burdekin's upper-level economics course, *Money and Banking*, I was intrigued by the sudden 1929 stock market boom and crash and all the associated factors at play. Moreover, my genuine interest in the U.S. stock market prompted me to read former Vanguard CEO and founder John C. Bogle's *Little Book of Common Sense Investing: The Only Way to Guarantee Your Fair Share of Stock Market Returns*, igniting my interest in the S&P 500 Index's historical returns. Lastly, this past summer, when I worked in Avon, Colorado at Aspen Grove Capital, LLC., I researched and wrote a whitepaper providing a general market outlook regarding the U.S. real estate market (Cresap, 2016). Ultimately, this unique combination of my past experiences led me to research this topic – in conjunction with Professor Weidenmier – for my senior thesis paper in Economics at Claremont McKenna College.

[1] According to Library of Congress in Washington, D.C., the Great Depression commenced on October 29, 1929 and ended in 1939.

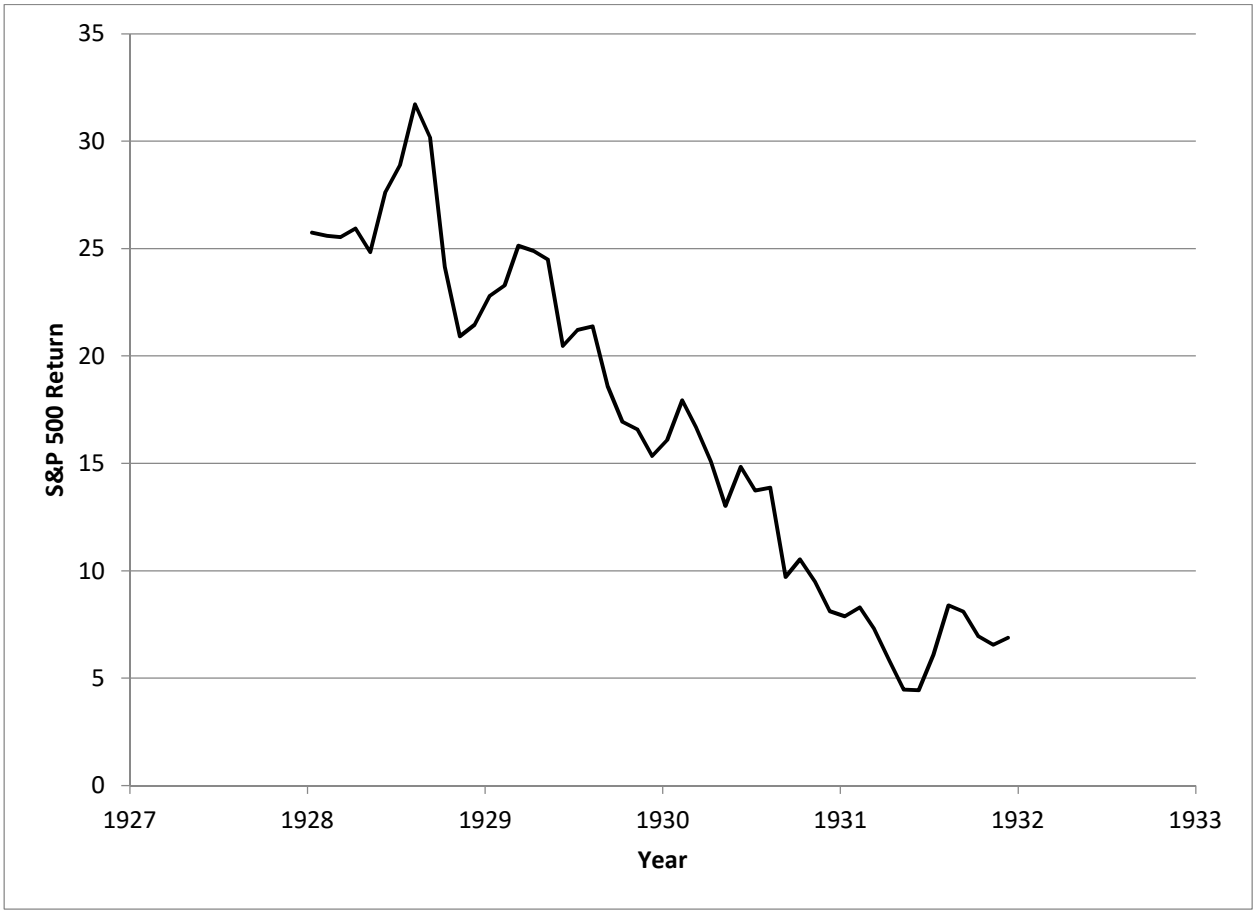
Introduction

My mother lived through the Great Depression. Her Family of 11 children pulled themselves up by their bootstraps and moved to wherever there was work at the time. And in rural Oklahoma, that wasn't easy to find.

– Chuck Norris

Widely known as the "Wall Street Crash of 1929", the most catastrophic U.S. stock market crash transpired on "Black Tuesday" (October 29, 1929), when stock prices plummeted. Equities continued falling the following week, when on "Black Thursday" (October 24, 1929), vertical price drops resulted as irrational investors, driven by panic, liquidated their stocks, underpinning the downward pressure on prices and marking the start of the Great Depression (White 1990, 68). Throughout this period, stock volatility was over two times any other level in U.S. history (Weidenmier and Cortes, 2017, 1). To set the tone for my analysis: **Figure 1** portrays the crisis' magnitude on the U.S. stock market, depicting the S&P 500 returns descending during the years immediately following the crash.

Figure 1: S&P 500 Monthly Returns, 1929-1932



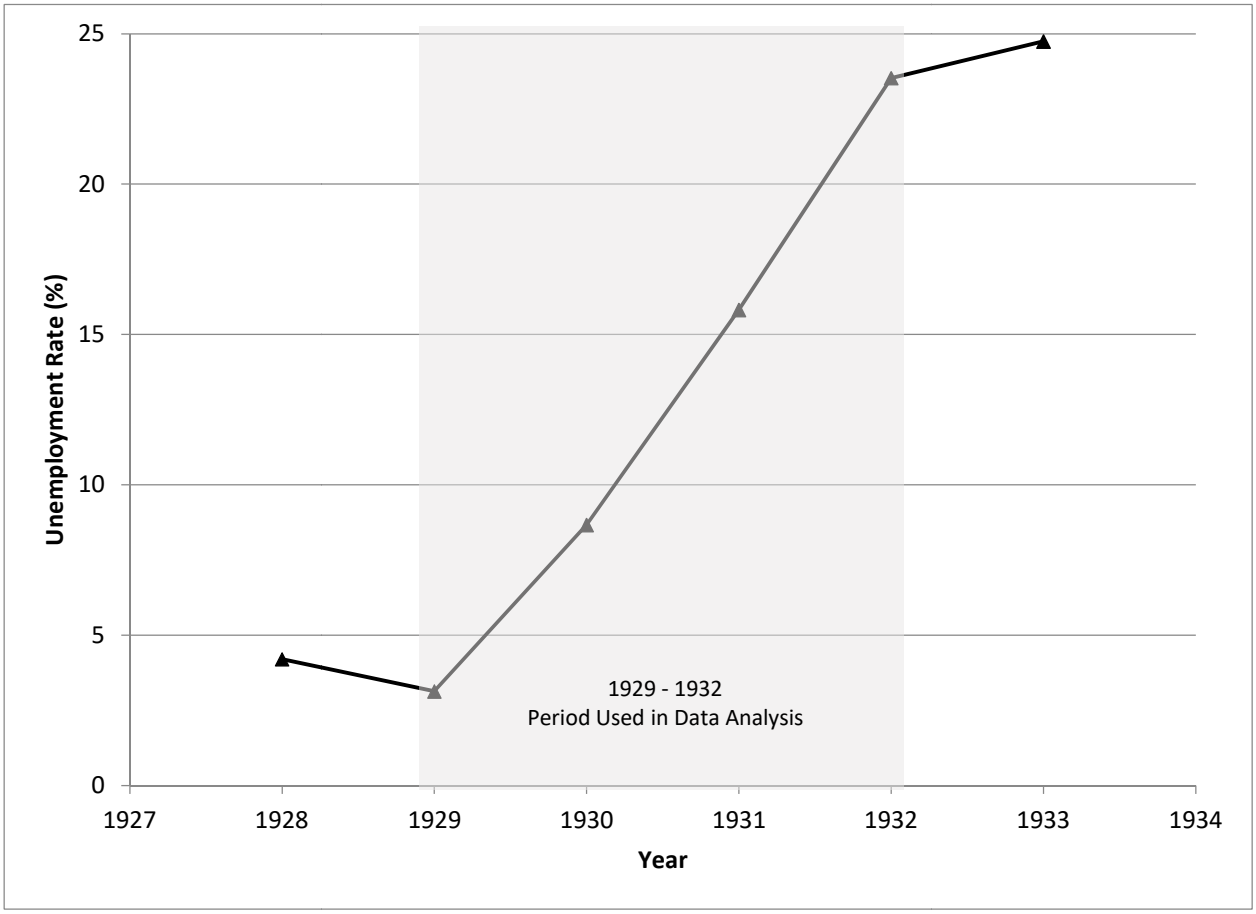
Before October 1929, larger and more efficient industrial production ramped up as commercialization and technological innovation intersected (i.e., vertical integration expanded economies of scale) (Chandler, 1977). Fueled by this technological revolution (also known as the "Second Industrial Revolution"), domestic equities had been experiencing favorable and optimistic growth before crashing. The market seemed frothy pending the crash. Some people, such as Galbraith (1954) along with Frederick Lewis Allen (1931), believe the bubble begins in early March 1928 when GM and RCA stock rose 7% and 14%, respectively (White, 1990). Utilities boomed, outpacing industrials, as the bull market charged on, swiftly headed for late October 1929.

Many economic factors pointed to a time of great prosperity in the U.S before the crash. For example, U.S. unemployment remained at just over 3.5%, and gross national product (GNP)[2] grew at just above 4.5%[3] per year. During the ensuing four-year period, from 1929 to 1932, total global gross domestic product (GDP), a fundamental economic indicator, declined approximately 15%. Diverging dramatically from this negative growth pattern – and also aiding to establish perspective – during the more recent global financial crisis (known as the "Great Recession"), from 2008 to 2009, global GDP only dropped approximately 1%. Many other major economic indicators (i.e., total tax revenue, income per capita, and trade) fell throughout the 1930s in various countries; shockingly, in some, the unemployment rate skyrocketed, surpassing 30%, while domestically the U.S. unemployment rate soared to nearly 25%, as shown below in **Figure 2**.

[2] A useful measure often used to assess a country's economy through size and growth; generally calculated by summing GDP, net income inflow from abroad, and net income outflow to foreign countries.

[3] According to the U.S. Department of Commerce. For further information, see U.S. Department of Commerce, 1975, Volume I, pages 135 and 226. GDP generally calculated by summing consumption, investment, government spending, and net exports (exports-imports).

Figure 2: United States Unemployment Rate, 1928-1933



The unemployment rate, trending around 3.5% before to the crash, abruptly jumps as the Great Depression begins. Below, **Table 1** shows a slowly and steadily increasing labor force from 1929 to 1941 – highlighted, from 1929 to 1932, unemployment drastically rises.

Table 1: United States Unemployment Statistics, 1929-1941[4]

Year	Population	Labor Force	Unemployed	Unemployment Rate
1929	88,010,000	49,440,000	1,550,000	3.14
1930	89,550,000	50,080,000	4,340,000	8.67
1931	90,710,000	50,680,000	8,020,000	15.82
1932	91,810,000	51,250,000	12,060,000	23.53
1933	92,950,000	51,840,000	12,830,000	24.75
1934	94,190,000	52,490,000	11,340,000	21.6
1935	95,460,000	53,140,000	10,610,000	19.97
1936	96,700,000	53,740,000	9,030,000	16.8
1937	97,870,000	54,320,000	7,700,000	14.18
1938	99,120,000	54,950,000	10,390,000	18.91
1939	100,360,000	55,600,000	9,480,000	17.05
1940	101,560,000	56,180,000	8,120,000	14.45
1941	102,700,000	57,530,000	5,560,000	9.66

However, year to year, there are acute increases and decreases in the unemployment rate with high variation. For example, from 1929 to 1930, while the labor force only increased from approximately 49,440,000 to 50,080,000 (a 1.3% increase), the number of unemployed people dramatically – and disproportionately – rose from 1,550,000 to 4,340,000 (a 180% increase), resulting in a noteworthy 5.53% spike in the unemployment rate from 3.14% to 8.67%. During the decade, the U.S. unemployment rate peaked in 1932 and 1933 at approximately 23.53% and 24.75%, respectively.

Figure 3: Monthly S&P 500 Returns, 1920-1939

Undoubtedly, S&P 500 returns fell sharply as the economic downturn began during this brief, four-year period. To put this steep drop in context, **Figure 3** displays the S&P 500 returns from January 1920 to December 1939. This period of steady growth, followed by a boom, then a bust, then a slow and steady recovery, shows the drastic stock market impact the Great Depression generated. As the S&P 500's returns contracted, so did markets worldwide. Moreover, throughout many other countries, negative ramifications lasted until World War II commenced in 1945. Evidently, the Great Depression not only drastically disrupted economic stability, shaking productivity in both

rich and developing countries, but it also shook society as a whole, diminishing everyone's quality of life everywhere.

Literature Review

Extensive research on the vast amount of literature on this topic, suggests that today, many decades after 1929, scholars continue studying what specifically caused the crash. As time continues, understanding the causes and implications of past economic downturns at least equips people with some awareness, and thus ability, to respond to – or even prevent – another severe economic downturn.

The most widely-accepted justification for the 1929 crash stems from John Galbraith's *The Great Crash 1929*, which highlights the rampant and blind speculation exhibited by overzealous investors. At the time, many investors had access to brokers' loans (a form of credit), consequently permitting them to trade on the margin and engage in riskier behavior. Galbraith described this irrational mania as "the vested interest in euphoria [that] leads men and women, individuals and institutions to believe that all will be better, that they are meant to be richer and to dismiss as intellectually deficient what is in conflict that conviction" (Galbraith, 1954). At the time, "it would have been difficult to design a more contractionary policy." (Hamilton, 1987) Hence, although readily available to investors, cheap credit causing the crash seems peculiar.

Other authors, such as Charles Kindleberger, use basic intuition, citing excessive greed as the general cause for such an abrupt liquidation event, postulating that many things could have initiated the irrational forced-selling. (Kindleberger, 1978). But they often stop there, failing to address any real, fundamental economic factors at play during this volatile time. (White, 1990). Many skeptics remain unconvinced. For example, Irving Fisher, a market fundamentalist from Yale University, doubts this notion of irrational

mania, stating that his opinion, "the market went up principally because of sound, justified expectations of earnings, and only partly because of unreasoning and unintelligent mania for buying" (Fisher, 1930). The expanding stock market incentivized companies to issue new shares to raise capital, causing excessive issuance of new stock. The supply of shares rose quickly; in 1927, approximately $1.47 billion of new shares were issued, two years later, in 1929, approximately $5.93 billion of new shares were issued (White, 1990). Though, these newly issued stocks fail to significantly contribute to the crash, since the new issues were trivial relative to the overall market supply. Sirkin (1975), proposed that these observed inflated price to earnings ratios and equity prices during the 1920s were justifiable when considering expected earnings, concluding that it was not a "speculative orgy." (Sirkin, 1975)

Empirical arguments pointing to economic fundamentals driving the market to boom then bust persist throughout prevalent literature – and many make convincing cases. For instance, historically, construction, typically a cyclical industry, tends to ramp up near the onset of the business cycle (Cresap, 2016). Further, in general, housing, can help to provide insight into the economy's direction, since many related businesses directly thrive as home buying increases.[4] Many people assume the Great Depression was related to both real estate and stock market shocks (White, 1990). Often, many forward-looking economists utilize housing permits, widely-known LEIs, to forecast where the U.S. economy is headed. Intuitively, this makes sense, to build new a new house, one

[4] New home owners tend to also purchase other items such as furnishings and furniture.

must first obtain a permit. Further, building permits are often used as a forward-looking measure of economic activity in econometrics.

Evidently, research relating to the relationship between construction permits and stock markets during the early 1900s continues. For example, in his recent paper titled *Stock Volatility During the Great Depression*, Weidenmier – along with Cortes – concluded that "the largest stock volatility spike in American history can be predicted by an increase in volatility of building permits" (Weidenmier and Cortes, 2017). More specifically, Weidenmier (2017) leverages a unique dataset to examine stock volatility at time t incorporating building permits volatility.

In general, current research studies possible causes of the Wall Street Crash of 1929 and the subsequent price swings observed in the stock market. However, while some examine stock *volatility*[5] and construction permit *volatility* during the Great Depression, I focus on the S&P 500 *returns* and the number of construction permits *returns* on a monthly basis for this interesting and unique period. Utilizing leading economic indicators (LEIs)[6] – namely, monthly stock returns and monthly construction permit returns[7] – I test and see if the lags of stock returns and the lags of the growth of permits can predict stock returns.[8]

[5] Classified as the "volatility puzzle" by (Schwert, 1989).
[6] Leading economic indicators (i.e., stock market, retail sales, building permits) help economists forecast the economy's direction.
[7] Both stock "returns" and permit "returns" are calculated as percent change between months.
[8] While Weidenmier (2017) employs a six-month time lag, in addition to this, I incorporate a three-month time lag.

Data

I initially intended to utilize U.S. home prices as a major metric, but the data is the most limiting factor – as is often the case. I simply do not have access to reputable and reliable direct home prices data (on the national level) dating back to the 1920s. That being said, interestingly, through research, I uncovered some historical estimates regarding this; however, reliability remained questionable. For example, Nicholas and Scherbina (2013) constructed Great Depression real estate prices using market-based transactions (Nicholas and Scherbina, 2013). For "simpler economics" – which, as Professor Weidenmier says, is often "better economics" – I use the number of construction permits as a leading indicator for new real estate construction. As White (1990) points out, "empirical evidence on movements in real estate prices is limited for this period." Evidently, little, if any, reliable data about U.S. real estate prices during the Great Depression, specifically from 1929 to 1932 exists; therefore, I shifted my thinking away from direct real estate prices to construction permit data, a source of relatively reliable LEIs for my purposes.

I thank Professor Gustavo S. Cortes, an economist at the University of Illinois at Urbana-Champaign, and Professor Weidenmier for kindly providing me with data on construction permits during the Great Depression. My data set is simple. I draw upon the monthly number of construction permits and the S&P 500 monthly returns from January 1920 until December 1939 - essentially the two-decade period between 1920 and 1940. I take stock returns data from Global Financial Data's GFD Data Series titled, *S&P 500*

Composite Price Index (w/GFD extension). The symbol for S&P 500 composite price index is "SPXD."[9]

The direct dataset[10] from Cortes spans twenty years from 1920 up to – but not including – 1940 (displayed in **Table 2**). He notes that the number of cities varies year to year. Furthermore, not indicated in the table, there is some disparity in the dataset from 1923 to 1925; more specifically, in 1923, 177 (January, February), 178 (remaining), 180 (October, November, December); in 1924, 177 (January, February), 178 (remaining), 180 (October, November, December); in 1925, 185 (January, February, March, April), 187 (remaining). While some years are missing complete monthly data, as I target a more specific and shorter timeframe from 1929 through 1932, this inconsistency becomes trivial, since they are completely separate periods during the very unpredictable 1920s. Only the data from 1929 to 1932 prove useful for my purposes because this four-year period yields more significant and noteworthy results after running multiple regressions with similar timeframes. **Table 2A** below summarizes these inconsistencies.

[9] For more information on the dataset, please visit https://www.globalfinancialdata.com/.
[10] Professor Cortes emailed me the monthly construction permit data in an excel spreadsheet format.

Table 2A: Construction Permits and Number of Cities, 1920-1939

Year	Number of Cities Included
1920	164
1921	164
1922	164
1923	177 (Jan,Feb), 178 (remaining), 180 (Oct,Nov,Dec)
1924	177 (Jan,Feb), 178 (remaining), 180 (Oct,Nov,Dec)
1925	185(Jan,Feb,Mar,Apr), 187(remaining)
1926	200
1927	215
1928	215
1929	215
1930	215
1931	215
1932	215
1933	215
1934	215
1935	215
1936	215
1937	215
1938	215
1939	215

Empirical Strategy

My empirical strategy is simple. I want to see if the lags of stock returns and the lags of growth of permits can predict stock returns. To formally evaluate the effects of growth rates of construction permits on the S&P 500 returns; I use a simple linear regression model of the general form:

$$StockRetur_{t} = \beta_0 + \beta_1 stockreturn_{t-1} + \beta_2 stockreturn_{t-2} + \beta_3 stockreturn_{t-3} + \beta_4 stockreturn_{t-4} + \beta_5 stockreturn_{t-5} + \beta_6 stockreturn_{t-6} + \beta_7 permitreturn_{t-1} + \beta_8 permitretu_{t-2} + \beta_9 permitreturn_{t-3} + \beta_{10} permitreturn_{t-4} + \beta_{11} permitreturn_{t-5} + \beta_{12} permitreturn_{t-6} + \varepsilon_t$$

where $StockReturn_t$ is the monthly S&P 500 stock return at time t, $stockreturn_{t-1}$ is the S&P 500 stock return at time t – 1, $permitreturn_{t-1}$ is the return (i.e., the growth rate) of the number of permits issued at time t – 1, and ε_t is the error term. I run two lagged regressions using both monthly S&P 500 stock returns and monthly construction permit returns[11] as the two independent variables and monthly S&P 500 stock returns as the dependent variable. The first regression implements the three-month lag:

$$StockReturn_t = \beta_0 + \beta_1 stockreturn_{t-1} + \beta_2 stockreturn_{t-2} + \beta_3 stockreturn_{t-3} + + \beta_4 permitreturn_{t-1} + \beta_5 permitreturn_{t-2} + \beta_6 permitreturn_{t-3} + \varepsilon_t$$

and the second regression follows the prior general form model, which includes all lags.

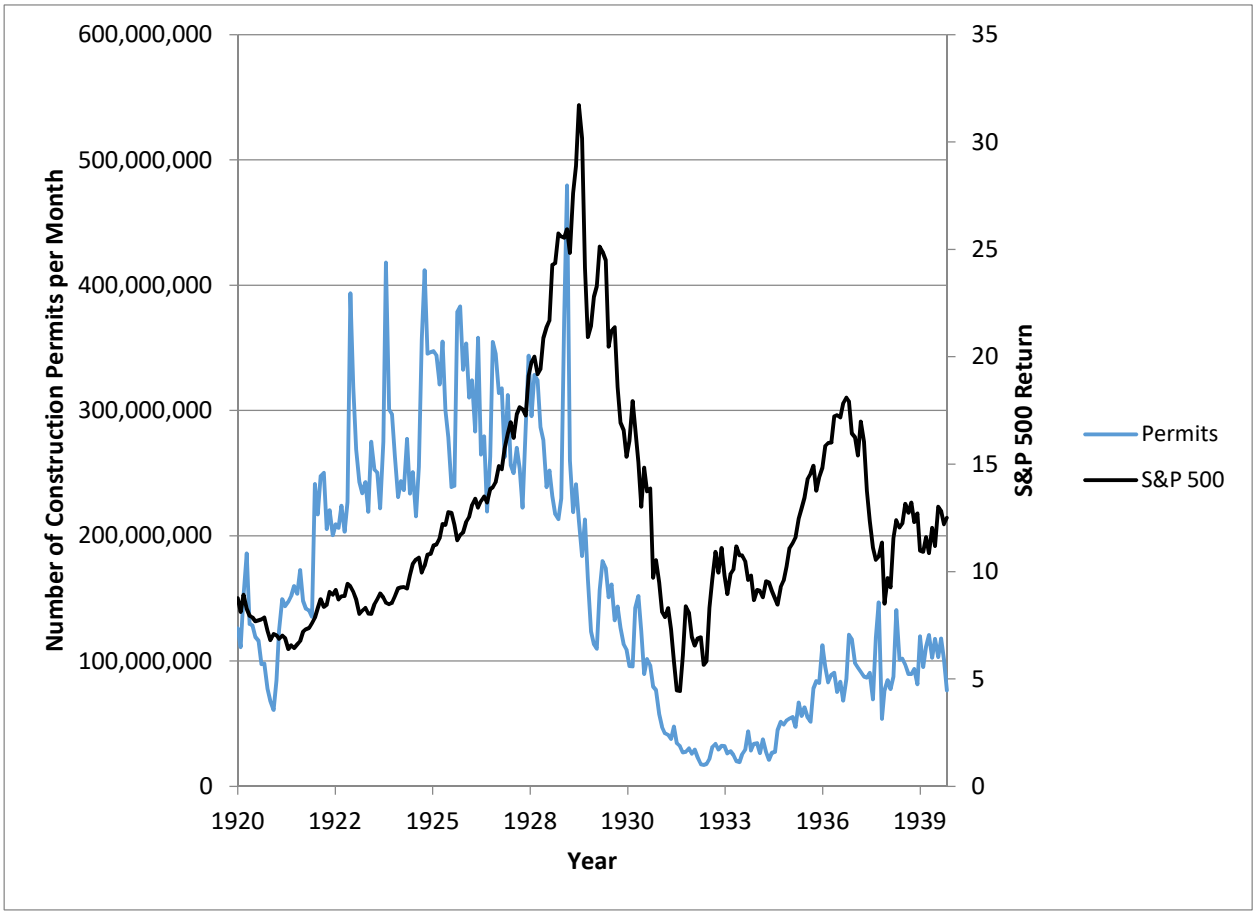
[11] "Returns" is analogous to monthly change or growth rates; calculated by (Present-Past)/Past.

I hypothesize that based on my data, the six-month lag model yields optimal results, as this has been the most convincing lag based on my research. Through analyzing multiple regression outputs, I narrowed down the specific time window I wanted to observe, ultimately settling on monthly data spanning exactly four years from July 1929, up to and including July 1932. I perform all data analysis using Microsoft Excel and Stata.

Discussion

Based on recent prior works (Weidenmier, 2017) – and depicted below in **Figure 4 –** clearly some lead-lag effect is present between the stock market and real estate market existed throughout this time, namely construction permits and S&P 500 returns.

Figure 4: Monthly Construction Permits and S&P 500 Returns, 1920-1939



Going off previous literature (and through examining **Figure 4**), a six-month time lag for the monthly number of construction permits and stock returns seems fitting. That is, during this period, based on this simple chart, it appears construction permits – and the growth rates (return) of construction permits – may serve as a forward-looking economic indicator for stock returns in the S&P 500 market index. The Appendix contains the results of the STATA data analysis (referred to herein as the STATA Analysis) performed for the 3-month and 6-month lag evaluation and the restricted and unrestricted cases (refer to STATA Analysis of Data Set Using 3-Month Lag – Unrestricted, STATA Analysis of Data Set Using 3-Month Lag – Restricted, STATA Analysis of Data Set Using 6-Month Lag – Unrestricted, STATA Analysis of Data Set Using 6-Month Lag – Restricted). F-test may be calculated by:

$$F^0 = \frac{(SSR_R - SSR_{UR})/q}{SSR_{UR}/(n-k-1)} \sim F_{q,n-k-1}$$

OR

$$F_0 = \frac{(R_{UR}^2 - R_R^2)/q}{(1-R_{UR}^2)/(n-k-1)} \sim F_{q,n-k-1}$$

The formula for joint significance is given by:

$$F - \frac{RSS_R - RSS_U/m}{RSS_U/n-k}$$

where,

m = number of restrictions

k = parameters in restricted model

RSSU = unrestricted RSS

RSSR = restricted RSS

Referring to the referenced data analysis, running both econometric regressions (i.e. three-month and then six-month lag) appears to prove useful. The six-month lag model yields more impressive statistical results compared to the three-month lag model. For the F-test, because the numerator measures the variance of the means, if the means are unequal then the measurement of variance increases and the null hypothesis is false. If my null hypothesis is true, the F-statistic should, in theory, be close to one, since it is essentially comparing variance. Ultimately, my findings are consistent with this notion. The six-month lag unrestricted model exhibits superior results. As the Stata analysis indicates, the three-month time unrestricted lag regression has an F-statistic of 1.62[12] and an R-squared of 0.25. The restricted three-month permit lag model has an F-statistic of 2.6 and a lower R-squared of only 0.19. Suggesting that there is indeed a relationship, these findings led me to look at the six-month permit unrestricted model, which produces an F-statistic of 1.08 and a staggeringly higher R-squared of 0.35. Compared to both the unrestricted and restricted models examining the impact of a three-month lag for construction permits, this model seems to fit better. The 10% higher R-squared from the six-month time lag model further validates that this model is worthy. Interestingly, restricting the six-month model lowered the R-squared from 0.35 to 0.20, and raises the F-statistic from 1.08 to 1.25.

Incorporating the six-month lag component generates more compelling and convincing effects than does the three-month lag model. The R-squared value tells how well the line fits the data points; that is, it explains the variation in stock returns explained by the variation in the lags of stock returns and the lags of the growth of permits. While

[12] Calculated dividing variation within both samples by variation between sample means.

the R-squared does not indicate causality, the six-month lag model exhibits more appealing results than the three-month model, especially in the unrestricted model. Thus, these findings support my original hypothesis that the lags of the growth of permits can predict stock returns.

Conclusion

The Great Depression is indeed one of the worse economic downturns the U.S. has ever endured. The great crash of 1929, and the following period marked a weak foreign and domestic economy – categorized by lower employment levels, lower GDP, widespread poverty – still baffles scholars and economists alike. Additionally, public equity markets faced extreme downward pressure as worried investors sold shares, sparking a brief period of great stock volatility. Convincing literature and research regarding *how* and *why* the stock market crashed (i.e., Weidenmier's "volatility puzzle") still continues. Based on my past experiences, the relationship between the housing market and the stock market captivated me. Thus, I decide to utilize the monthly growth rate of construction permits as a forward-looking indicator of the U.S. public equities market. My findings suggest that there is indeed a relationship. The lags of stock returns and the lags of the growth of permits can predict stock returns. Specific to my thesis, further future research could potentially examine additional variables that potentially affected stock returns during this period. Also, perhaps future scholars will explore the issue of causality in their econometric analysis.

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Data Appendix

Table 2
Number of Construction Permits and S&P 500
1920 - 1939 Data Set

Year	Month	Number of Permits	Growth Rate Number of Permits	S&P 500	Growth Rate S&P 500
1920	January	126,126,080	N/A	8.7647	N/A
1920	February	111,065,718	-0.119407	8.1176	-0.073830
1920	March	151,846,777	0.367180	8.9176	0.098551
1920	April	185,874,860	0.224095	8.2706	-0.072553
1920	May	129,471,580	-0.303448	7.9412	-0.039828
1920	June	128,575,888	-0.006918	7.8706	-0.008890
1920	July	119,336,202	-0.071862	7.6823	-0.023924
1920	August	116,094,692	-0.027163	7.7294	0.006131
1920	September	97,572,670	-0.159542	7.7765	0.006094
1920	October	98,049,785	0.004890	7.8706	0.012101
1920	November	77,899,390	-0.205512	7.2353	-0.080718
1920	December	67,911,479	-0.128216	6.8118	-0.058532
1921	January	61,133,167	-0.099811	7.0941	0.041443
1921	February	84,480,760	0.381914	7.0353	-0.008289
1921	March	124,337,045	0.471779	6.8706	-0.023411
1921	April	149,457,989	0.202039	7.0235	0.022254
1921	May	143,699,279	-0.038531	6.8941	-0.018424
1921	June	147,328,348	0.025255	6.3882	-0.073382
1921	July	151,862,525	0.030776	6.5647	0.027629
1921	August	159,940,684	0.053194	6.4353	-0.019711
1921	September	153,763,676	-0.038621	6.6118	0.027427
1921	October	172,517,220	0.121963	6.7647	0.023125
1921	November	148,066,886	-0.141727	7.2000	0.064349
1921	December	141,694,615	-0.043036	7.3176	0.016333
1922	January	140,517,763	-0.008306	7.3765	0.008049
1922	February	135,452,009	-0.036051	7.6000	0.030299
1922	March	241,460,369	0.782627	7.8471	0.032513
1922	April	217,171,601	-0.100591	8.2941	0.056964
1922	May	247,722,281	0.140675	8.7176	0.051060
1922	June	250,172,411	0.009891	8.3529	-0.041835
1922	July	205,244,105	-0.179589	8.4588	0.012678
1922	August	220,456,973	0.074121	9.0588	0.070932
1922	September	200,588,817	-0.090123	8.9294	-0.014284
1922	October	209,070,208	0.042282	9.1412	0.023719
1922	November	206,345,905	-0.013031	8.6941	-0.048910

Table 2
Number of Construction Permits and S&P 500
1920 - 1939 Data Set

Year	Month	Number of Permits	Growth Rate Number of Permits	S&P 500	Growth Rate S&P 500
1922	December	223,861,943	0.084887	8.8471	0.017598
1923	January	203,379,425	-0.091496	8.8588	0.001322
1923	February	226,964,373	0.115965	9.4353	0.065077
1923	March	393,548,864	0.733968	9.3059	-0.013714
1923	April	318,678,783	-0.190243	9.0588	-0.026553
1923	May	269,005,985	-0.155871	8.6941	-0.040259
1923	June	242,800,332	-0.097417	8.0235	-0.077133
1923	July	233,888,611	-0.036704	8.1765	0.019069
1923	August	242,750,246	0.037888	8.3059	0.015826
1923	September	219,141,518	-0.097255	8.0471	-0.031159
1923	October	274,922,511	0.254543	8.0235	-0.002933
1923	November	252,765,662	-0.080593	8.4706	0.055724
1923	December	250,442,139	-0.009192	8.7176	0.029160
1924	January	221,895,647	-0.113984	8.9765	0.029699
1924	February	275,082,145	0.239691	8.7882	-0.020977
1924	March	418,025,105	0.519637	8.5529	-0.026775
1924	April	300,710,909	-0.280639	8.4823	-0.008255
1924	May	297,082,401	-0.012066	8.5294	0.005553
1924	June	263,592,733	-0.112729	8.8353	0.035864
1924	July	230,898,957	-0.124031	9.2235	0.043937
1924	August	243,688,196	0.055389	9.2706	0.005107
1924	September	236,551,695	-0.029285	9.2823	0.001262
1924	October	277,437,215	0.172840	9.2000	-0.008866
1924	November	233,641,249	-0.157859	9.8353	0.069054
1924	December	250,764,725	0.073290	10.3529	0.052627
1925	January	215,506,867	-0.140601	10.5647	0.020458
1925	February	254,918,494	0.182879	10.6588	0.008907
1925	March	356,434,553	0.398229	9.9529	-0.066227
1925	April	411,936,738	0.155715	10.2588	0.030735
1925	May	345,259,223	-0.161863	10.7882	0.051604
1925	June	346,457,825	0.003472	10.8353	0.004366
1925	July	347,299,886	0.002430	11.2235	0.035827
1925	August	343,907,894	-0.009767	11.2588	0.003145
1925	September	320,664,901	-0.067585	11.5529	0.026122
1925	October	354,947,252	0.106910	12.2118	0.057033

Table 2
Number of Construction Permits and S&P 500
1920 - 1939 Data Set

Year	Month	Number of Permits	Growth Rate Number of Permits	S&P 500	Growth Rate S&P 500
1925	November	300,041,729	-0.154686	12.1765	-0.002891
1925	December	278,512,468	-0.071754	12.7600	0.047920
1926	January	238,673,498	-0.143042	12.7400	-0.001567
1926	February	239,689,874	0.004258	12.1800	-0.043956
1926	March	378,648,160	0.579742	11.4600	-0.059113
1926	April	383,128,787	0.011833	11.6900	0.020070
1926	May	332,598,413	-0.131889	11.8100	0.010265
1926	June	353,429,268	0.062631	12.3200	0.043184
1926	July	310,321,723	-0.121969	12.5500	0.018669
1926	August	324,165,227	0.044610	13.1000	0.043825
1926	September	283,095,854	-0.126693	13.4000	0.022901
1926	October	358,125,283	0.265032	12.9800	-0.031343
1926	November	264,825,267	-0.260523	13.2700	0.022342
1926	December	279,401,428	0.055041	13.4900	0.016579
1927	January	219,354,934	-0.214911	13.2100	-0.020756
1927	February	263,038,477	0.199145	13.8400	0.047691
1927	March	354,803,287	0.348865	13.9300	0.006503
1927	April	345,222,447	-0.027003	14.1700	0.017229
1927	May	313,815,377	-0.090976	14.9100	0.052223
1927	June	317,656,761	0.012241	14.7700	-0.009390
1927	July	262,890,056	-0.172408	15.7300	0.064997
1927	August	312,344,946	0.188120	16.4300	0.044501
1927	September	256,605,841	-0.178454	16.9600	0.032258
1927	October	250,021,123	-0.025661	16.2300	-0.043042
1927	November	270,118,501	0.080383	17.3300	0.067776
1927	December	253,607,296	-0.061126	17.6600	0.019042
1928	January	222,405,519	-0.123032	17.5700	-0.005096
1928	February	287,658,215	0.293395	17.2600	-0.017644
1928	March	343,635,395	0.194596	19.1300	0.108343
1928	April	295,593,198	-0.139806	19.7500	0.032410
1928	May	328,300,669	0.110650	20.0000	0.012658
1928	June	323,983,272	-0.013151	19.1900	-0.040500
1928	July	286,915,666	-0.114412	19.4300	0.012507
1928	August	276,219,504	-0.037280	20.8700	0.074112
1928	September	238,691,374	-0.135863	21.3700	0.023958

Table 2
Number of Construction Permits and S&P 500
1920 - 1939 Data Set

Year	Month	Number of Permits	Growth Rate Number of Permits	S&P 500	Growth Rate S&P 500
1928	October	252,058,125	0.056000	21.6800	0.014506
1928	November	231,609,345	-0.081127	24.2800	0.119926
1928	December	217,436,810	-0.061192	24.3500	0.002883
1929	January	213,268,231	-0.019171	25.7400	0.057084
1929	February	229,746,142	0.077264	25.5900	-0.005828
1929	March	372,377,754	0.620823	25.5300	-0.002345
1929	April	479,483,093	0.287626	25.9400	0.016060
1929	May	259,909,572	-0.457938	24.8300	-0.042791
1929	June	218,835,481	-0.158032	27.6200	0.112364
1929	July	241,104,766	0.101763	28.8800	0.045619
1929	August	211,926,287	-0.121020	31.7100	0.097992
1929	September	183,865,680	-0.132407	30.1600	-0.048880
1929	October	213,089,242	0.158940	24.1500	-0.199271
1929	November	166,026,423	-0.220860	20.9200	-0.133747
1929	December	123,498,929	-0.256149	21.4500	0.025335
1930	January	113,500,939	-0.080956	22.7960	0.062751
1930	February	109,805,789	-0.032556	23.2871	0.021543
1930	March	156,703,002	0.427092	25.1385	0.079503
1930	April	179,811,014	0.147464	24.8992	-0.009519
1930	May	174,197,501	-0.031219	24.4962	-0.016185
1930	June	151,047,894	-0.132893	20.4660	-0.164523
1930	July	161,186,305	0.067121	21.2091	0.036309
1930	August	132,470,702	-0.178152	21.3728	0.007718
1930	September	143,598,104	0.083999	18.5894	-0.130231
1930	October	126,659,921	-0.117955	16.9395	-0.088755
1930	November	113,316,967	-0.105345	16.5743	-0.021559
1930	December	109,105,240	-0.037168	15.3400	-0.074471
1931	January	96,063,912	-0.119530	16.0957	0.049263
1931	February	95,895,959	-0.001748	17.9345	0.114242
1931	March	142,107,807	0.481896	16.6877	-0.069520
1931	April	152,029,087	0.069815	15.0882	-0.095849
1931	May	123,632,095	-0.186787	13.0227	-0.136895
1931	June	89,543,442	-0.275727	14.8363	0.139265
1931	July	101,553,346	0.134124	13.7280	-0.074702
1931	August	96,431,866	-0.050431	13.8665	0.010089

Table 2
Number of Construction Permits and S&P 500
1920 - 1939 Data Set

Year	Month	Number of Permits	Growth Rate Number of Permits	S&P 500	Growth Rate S&P 500
1931	September	79,589,466	-0.174656	9.7103	-0.299730
1931	October	76,929,109	-0.033426	10.5290	0.084313
1931	November	57,604,868	-0.251195	9.4962	-0.098091
1931	December	47,582,316	-0.173988	8.1234	-0.144563
1932	January	42,429,665	-0.108289	7.8841	-0.029458
1932	February	41,008,745	-0.033489	8.2997	0.052714
1932	March	37,676,746	-0.081251	7.3174	-0.118354
1932	April	47,741,687	0.267139	5.8312	-0.203105
1932	May	34,566,714	-0.275964	4.4710	-0.233262
1932	June	32,173,221	-0.069243	4.4332	-0.008454
1932	July	26,970,804	-0.161700	6.0957	0.375011
1932	August	27,565,795	0.022061	8.3879	0.376036
1932	September	30,437,268	0.104168	8.0856	-0.036040
1932	October	26,107,428	-0.142255	6.9521	-0.140187
1932	November	29,301,309	0.122336	6.5491	-0.057968
1932	December	23,279,690	-0.205507	6.8892	0.051931
1933	January	17,744,805	-0.237756	6.9395	0.007301
1933	February	17,161,943	-0.032847	5.6549	-0.185114
1933	March	17,789,441	0.036563	5.8438	0.033405
1933	April	22,091,417	0.241827	8.3123	0.422413
1933	May	31,525,523	0.427048	9.6474	0.160617
1933	June	34,098,384	0.081612	10.9194	0.131849
1933	July	29,484,891	-0.135299	9.9496	-0.088814
1933	August	32,391,868	0.098592	11.0957	0.115191
1933	September	32,243,704	-0.004574	9.8363	-0.113503
1933	October	26,198,342	-0.187490	8.9547	-0.089627
1933	November	28,021,688	0.069598	9.8866	0.104068
1933	December	24,915,270	-0.110858	10.1008	0.021666
1934	January	20,250,018	-0.187245	11.1713	0.105982
1934	February	19,326,964	-0.045583	10.7557	-0.037202
1934	March	25,505,005	0.319659	10.7557	0.000000
1934	April	29,280,666	0.148036	10.4660	-0.026935
1934	May	43,825,268	0.496731	9.6096	-0.081827
1934	June	28,621,565	-0.346916	9.8111	0.020969
1934	July	33,891,677	0.184131	8.6776	-0.115532

Table 2
Number of Construction Permits and S&P 500
1920 - 1939 Data Set

Year	Month	Number of Permits	Growth Rate Number of Permits	S&P 500	Growth Rate S&P 500
1934	August	34,452,738	0.016555	9.1436	0.053701
1934	September	26,520,686	-0.230230	9.1058	-0.004134
1934	October	37,446,293	0.411965	8.8035	-0.033199
1934	November	27,413,602	-0.267922	9.5466	0.084410
1934	December	21,125,723	-0.229371	9.4962	-0.005279
1935	January	26,826,268	0.269839	9.1058	-0.041111
1935	February	27,636,367	0.030198	8.7405	-0.040117
1935	March	45,063,852	0.630600	8.4635	-0.031692
1935	April	51,717,570	0.147651	9.2821	0.096721
1935	May	49,327,248	-0.046219	9.5844	0.032568
1935	June	52,672,794	0.067823	10.2300	0.067359
1935	July	54,191,787	0.028838	11.0831	0.083392
1935	August	55,536,546	0.024815	11.3224	0.021591
1935	September	47,479,944	-0.145068	11.5869	0.023361
1935	October	66,965,705	0.410400	12.4685	0.076086
1935	November	56,276,588	-0.159621	12.9471	0.038385
1935	December	62,992,039	0.119329	13.4383	0.037939
1936	January	54,938,059	-0.127857	14.3199	0.065604
1936	February	51,559,661	-0.061495	14.5592	0.016711
1936	March	78,072,223	0.514211	14.9244	0.025084
1936	April	83,903,095	0.074686	13.7657	-0.077638
1936	May	82,517,596	-0.016513	14.3955	0.045751
1936	June	112,640,106	0.365043	14.8363	0.030621
1936	July	95,281,845	-0.154104	15.8564	0.068757
1936	August	83,109,753	-0.127748	15.9824	0.007946
1936	September	88,791,762	0.068368	16.0076	0.001577
1936	October	90,701,556	0.021509	17.2166	0.075527
1936	November	75,464,623	-0.167990	17.2796	0.003659
1936	December	83,562,063	0.107301	17.1788	-0.005833
1937	January	68,512,318	-0.180103	17.8337	0.038123
1937	February	85,829,336	0.252758	18.0982	0.014831
1937	March	121,118,706	0.411157	17.9219	-0.009741
1937	April	117,598,966	-0.029060	16.4358	-0.082921
1937	May	98,370,954	-0.163505	16.2594	-0.010733
1937	June	94,752,583	-0.036783	15.4030	-0.052671

Table 2
Number of Construction Permits and S&P 500
1920 - 1939 Data Set

Year	Month	Number of Permits	Growth Rate Number of Permits	S&P 500	Growth Rate S&P 500
1937	July	91,334,405	-0.036075	16.9773	0.102207
1937	August	87,584,238	-0.041060	16.0453	-0.054897
1937	September	86,769,028	-0.009308	13.7657	-0.142073
1937	October	90,712,493	0.045448	12.3678	-0.101550
1937	November	69,567,549	-0.233098	11.1083	-0.101837
1937	December	118,716,151	0.706487	10.5416	-0.051016
1938	January	146,866,125	0.237120	10.6927	0.014334
1938	February	54,010,213	-0.632249	11.3476	0.061247
1938	March	76,598,907	0.418230	8.5013	-0.250828
1938	April	84,842,365	0.107618	9.6977	0.140731
1938	May	77,606,469	-0.085286	9.2695	-0.044155
1938	June	87,636,427	0.129241	11.5617	0.247284
1938	July	140,803,564	0.606679	12.3929	0.071893
1938	August	101,024,415	-0.282515	12.0529	-0.027435
1938	September	101,801,460	0.007692	12.2418	0.015673
1938	October	97,111,919	-0.046066	13.1612	0.075103
1938	November	89,659,369	-0.076742	12.7330	-0.032535
1938	December	89,582,203	-0.000861	13.2116	0.037587
1939	January	93,628,089	0.045164	12.3048	-0.068637
1939	February	81,383,080	-0.130783	12.7078	0.032751
1939	March	119,690,399	0.470704	10.9824	-0.135775
1939	April	95,268,241	-0.204044	10.9194	-0.005736
1939	May	111,488,630	0.170260	11.5995	0.062284
1939	June	120,912,252	0.084525	10.8564	-0.064063
1939	July	102,750,445	-0.150207	12.0403	0.109051
1939	August	117,832,387	0.146782	11.1839	-0.071128
1939	September	103,203,666	-0.124149	13.0227	0.164415
1939	October	117,913,884	0.142536	12.8337	-0.014513
1939	November	101,054,240	-0.142983	12.2040	-0.049066
1939	December	76,636,645	-0.241629	12.4937	0.023738

Table 3

Growth Rate of Construction Permits and S&P 500 Returns with 3-Month Lag

July 1929 - July 1932 Data Set

		S&P 500 Returns				Growth Rate of Construction Permits Issued			
Date	T	$SPXD_t$	$SPXD_{t-1}$	$SPXD_{t-2}$	$SPXD_{t-3}$	$Permit_t$	$Permit_{t-1}$	$Permit_{t-2}$	$Permit_{t-3}$
07/01/29	1	0.0456	0.1124	-0.0428	0.0161	0.1018	-0.1580	-0.4579	0.2876
08/01/29	2	0.0980	0.0456	0.1124	-0.0428	-0.1210	0.1018	-0.1580	-0.4579
09/01/29	3	-0.0489	0.0980	0.0456	0.1124	-0.1324	-0.1210	0.1018	-0.1580
10/01/29	4	-0.1993	-0.0489	0.0980	0.0456	0.1589	-0.1324	-0.1210	0.1018
11/01/29	5	-0.1337	-0.1993	-0.0489	0.0980	-0.2209	0.1589	-0.1324	-0.1210
12/01/29	6	0.0253	-0.1337	-0.1993	-0.0489	-0.2561	-0.2209	0.1589	-0.1324
01/01/30	7	0.0628	0.0253	-0.1337	-0.1993	-0.0810	-0.2561	-0.2209	0.1589
02/01/30	8	0.0215	0.0628	0.0253	-0.1337	-0.0326	-0.0810	-0.2561	-0.2209
03/01/30	9	0.0795	0.0215	0.0628	0.0253	0.4271	-0.0326	-0.0810	-0.2561
04/01/30	10	-0.0095	0.0795	0.0215	0.0628	0.1475	0.4271	-0.0326	-0.0810
05/01/30	11	-0.0162	-0.0095	0.0795	0.0215	-0.0312	0.1475	0.4271	-0.0326
06/01/30	12	-0.1645	-0.0162	-0.0095	0.0795	-0.1329	-0.0312	0.1475	0.4271
07/01/30	13	0.0363	-0.1645	-0.0162	-0.0095	0.0671	-0.1329	-0.0312	0.1475
08/01/30	14	0.0077	0.0363	-0.1645	-0.0162	-0.1782	0.0671	-0.1329	-0.0312
09/01/30	15	-0.1302	0.0077	0.0363	-0.1645	0.0840	-0.1782	0.0671	-0.1329
10/01/30	16	-0.0888	-0.1302	0.0077	0.0363	-0.1180	0.0840	-0.1782	0.0671
11/01/30	17	-0.0216	-0.0888	-0.1302	0.0077	-0.1053	-0.1180	0.0840	-0.1782
12/01/30	18	-0.0745	-0.0216	-0.0888	-0.1302	-0.0372	-0.1053	-0.1180	0.0840
01/01/31	19	0.0493	-0.0745	-0.0216	-0.0888	-0.1195	-0.0372	-0.1053	-0.1180
02/01/31	20	0.1142	0.0493	-0.0745	-0.0216	-0.0017	-0.1195	-0.0372	-0.1053
03/01/31	21	-0.0695	0.1142	0.0493	-0.0745	0.4819	-0.0017	-0.1195	-0.0372
04/01/31	22	-0.0958	-0.0695	0.1142	0.0493	0.0698	0.4819	-0.0017	-0.1195
05/01/31	23	-0.1369	-0.0958	-0.0695	0.1142	-0.1868	0.0698	0.4819	-0.0017
06/01/31	24	0.1393	-0.1369	-0.0958	-0.0695	-0.2757	-0.1868	0.0698	0.4819
07/01/31	25	-0.0747	0.1393	-0.1369	-0.0958	0.1341	-0.2757	-0.1868	0.0698
08/01/31	26	0.0101	-0.0747	0.1393	-0.1369	-0.0504	0.1341	-0.2757	-0.1868
09/01/31	27	-0.2997	0.0101	-0.0747	0.1393	-0.1747	-0.0504	0.1341	-0.2757
10/01/31	28	0.0843	-0.2997	0.0101	-0.0747	-0.0334	-0.1747	-0.0504	0.1341
11/01/31	29	-0.0981	0.0843	-0.2997	0.0101	-0.2512	-0.0334	-0.1747	-0.0504
12/01/31	30	-0.1446	-0.0981	0.0843	-0.2997	-0.1740	-0.2512	-0.0334	-0.1747
01/01/32	31	-0.0295	-0.1446	-0.0981	0.0843	-0.1083	-0.1740	-0.2512	-0.0334
02/01/32	32	0.0527	-0.0295	-0.1446	-0.0981	-0.0335	-0.1083	-0.1740	-0.2512
03/01/32	33	-0.1184	0.0527	-0.0295	-0.1446	-0.0813	-0.0335	-0.1083	-0.1740
04/01/32	34	-0.2031	-0.1184	0.0527	-0.0295	0.2671	-0.0813	-0.0335	-0.1083
05/01/32	35	-0.2333	-0.2031	-0.1184	0.0527	-0.2760	0.2671	-0.0813	-0.0335
06/01/32	36	-0.0085	-0.2333	-0.2031	-0.1184	-0.0692	-0.2760	0.2671	-0.0813
07/01/32	37	0.3750	-0.0085	-0.2333	-0.2031	-0.1617	-0.0692	-0.2760	0.2671

Table 4

Growth Rate of Construction Permits and S&P 500 Returns with 6-Month Lag

July 1929 - July 1932 Data Set

		S&P 500 Returns							Growth Rate of Construction Permits Issued						
Date	T	$SPXD_t$	$SPXD_{t-1}$	$SPXD_{t-2}$	$SPXD_{t-3}$	$SPXD_{t-4}$	$SPXD_{t-5}$	$SPXD_{t-6}$	$Permit_t$	$Permit_{t-1}$	$Permit_{t-2}$	$Permit_{t-3}$	$Permit_{t-4}$	$Permit_{t-5}$	$Permit_{t-6}$
07/01/29	1	0.0456	0.1124	-0.0428	0.0161	-0.0023	-0.0058	0.0571	0.1018	-0.1580	-0.4579	0.2876	0.6208	0.0773	-0.0192
08/01/29	2	0.0980	0.0456	0.1124	-0.0428	0.0161	-0.0023	-0.0058	-0.1210	0.1018	-0.1580	-0.4579	0.2876	0.6208	0.0773
09/01/29	3	-0.0489	0.0980	0.0456	0.1124	-0.0428	0.0161	-0.0023	-0.1324	-0.1210	0.1018	-0.1580	-0.4579	0.2876	0.6208
10/01/29	4	-0.1993	-0.0489	0.0980	0.0456	0.1124	-0.0428	0.0161	0.1589	-0.1324	-0.1210	0.1018	-0.1580	-0.4579	0.2876
11/01/29	5	-0.1337	-0.1993	-0.0489	0.0980	0.0456	0.1124	-0.0428	-0.2209	0.1589	-0.1324	-0.1210	0.1018	-0.1580	-0.4579
12/01/29	6	0.0253	-0.1337	-0.1993	-0.0489	0.0980	0.0456	0.1124	-0.2561	-0.2209	0.1589	-0.1324	-0.1210	0.1018	-0.1580
01/01/30	7	0.0628	0.0253	-0.1337	-0.1993	-0.0489	0.0980	0.0456	-0.0810	-0.2561	-0.2209	0.1589	-0.1324	-0.1210	0.1018
02/01/30	8	0.0215	0.0628	0.0253	-0.1337	-0.1993	-0.0489	0.0980	-0.0326	-0.0810	-0.2561	-0.2209	0.1589	-0.1324	-0.1210
03/01/30	9	0.0795	0.0215	0.0628	0.0253	-0.1337	-0.1993	-0.0489	0.4271	-0.0326	-0.0810	-0.2561	-0.2209	0.1589	-0.1324
04/01/30	10	-0.0095	0.0795	0.0215	0.0628	0.0253	-0.1337	-0.1993	0.1475	0.4271	-0.0326	-0.0810	-0.2561	-0.2209	0.1589
05/01/30	11	-0.0162	-0.0095	0.0795	0.0215	0.0628	0.0253	-0.1337	-0.0312	0.1475	0.4271	-0.0326	-0.0810	-0.2561	-0.2209
06/01/30	12	-0.1645	-0.0162	-0.0095	0.0795	0.0215	0.0628	0.0253	-0.1329	-0.0312	0.1475	0.4271	-0.0326	-0.0810	-0.2561
07/01/30	13	0.0363	-0.1645	-0.0162	-0.0095	0.0795	0.0215	0.0628	0.0671	-0.1329	-0.0312	0.1475	0.4271	-0.0326	-0.0810
08/01/30	14	0.0077	0.0363	-0.1645	-0.0162	-0.0095	0.0795	0.0215	-0.1782	0.0671	-0.1329	-0.0312	0.1475	0.4271	-0.0326
09/01/30	15	-0.1302	0.0077	0.0363	-0.1645	-0.0162	-0.0095	0.0795	0.0840	-0.1782	0.0671	-0.1329	-0.0312	0.1475	0.4271
10/01/30	16	-0.0888	-0.1302	0.0077	0.0363	-0.1645	-0.0162	-0.0095	-0.1180	0.0840	-0.1782	0.0671	-0.1329	-0.0312	0.1475
11/01/30	17	-0.0216	-0.0888	-0.1302	0.0077	0.0363	-0.1645	-0.0162	-0.1053	-0.1180	0.0840	-0.1782	0.0671	-0.1329	-0.0312
12/01/30	18	-0.0745	-0.0216	-0.0888	-0.1302	0.0077	0.0363	-0.1645	-0.0372	-0.1053	-0.1180	0.0840	-0.1782	0.0671	-0.1329
01/01/31	19	0.0493	-0.0745	-0.0216	-0.0888	-0.1302	0.0077	0.0363	-0.1195	-0.0372	-0.1053	-0.1180	0.0840	-0.1782	0.0671
02/01/31	20	0.1142	0.0493	-0.0745	-0.0216	-0.0888	-0.1302	0.0077	-0.0017	-0.1195	-0.0372	-0.1053	-0.1180	0.0840	-0.1782
03/01/31	21	-0.0695	0.1142	0.0493	-0.0745	-0.0216	-0.0888	-0.1302	0.4819	-0.0017	-0.1195	-0.0372	-0.1053	-0.1180	0.0840
04/01/31	22	-0.0958	-0.0695	0.1142	0.0493	-0.0745	-0.0216	-0.0888	0.0698	0.4819	-0.0017	-0.1195	-0.0372	-0.1053	-0.1180
05/01/31	23	-0.1369	-0.0958	-0.0695	0.1142	0.0493	-0.0745	-0.0216	-0.1868	0.0698	0.4819	-0.0017	-0.1195	-0.0372	-0.1053
06/01/31	24	0.1393	-0.1369	-0.0958	-0.0695	0.1142	0.0493	-0.0745	-0.2757	-0.1868	0.0698	0.4819	-0.0017	-0.1195	-0.0372
07/01/31	25	-0.0747	0.1393	-0.1369	-0.0958	-0.0695	0.1142	0.0493	0.1341	-0.2757	-0.1868	0.0698	0.4819	-0.0017	-0.1195
08/01/31	26	0.0101	-0.0747	0.1393	-0.1369	-0.0958	-0.0695	0.1142	-0.0504	0.1341	-0.2757	-0.1868	0.0698	0.4819	-0.0017
09/01/31	27	-0.2997	0.0101	-0.0747	0.1393	-0.1369	-0.0958	-0.0695	-0.1747	-0.0504	0.1341	-0.2757	-0.1868	0.0698	0.4819
10/01/31	28	0.0843	-0.2997	0.0101	-0.0747	0.1393	-0.1369	-0.0958	-0.0334	-0.1747	-0.0504	0.1341	-0.2757	-0.1868	0.0698
11/01/31	29	-0.0981	0.0843	-0.2997	0.0101	-0.0747	0.1393	-0.1369	-0.2512	-0.0334	-0.1747	-0.0504	0.1341	-0.2757	-0.1868
12/01/31	30	-0.1446	-0.0981	0.0843	-0.2997	0.0101	-0.0747	0.1393	-0.1740	-0.2512	-0.0334	-0.1747	-0.0504	0.1341	-0.2757
01/01/32	31	-0.0295	-0.1446	-0.0981	0.0843	-0.2997	0.0101	-0.0747	-0.1083	-0.1740	-0.2512	-0.0334	-0.1747	-0.0504	0.1341
02/01/32	32	0.0527	-0.0295	-0.1446	-0.0981	0.0843	-0.2997	0.0101	-0.0335	-0.1083	-0.1740	-0.2512	-0.0334	-0.1747	-0.0504
03/01/32	33	-0.1184	0.0527	-0.0295	-0.1446	-0.0981	0.0843	-0.2997	-0.0813	-0.0335	-0.1083	-0.1740	-0.2512	-0.0334	-0.1747
04/01/32	34	-0.2031	-0.1184	0.0527	-0.0295	-0.1446	-0.0981	0.0843	0.2671	-0.0813	-0.0335	-0.1083	-0.1740	-0.2512	-0.0334
05/01/32	35	-0.2333	-0.2031	-0.1184	0.0527	-0.0295	-0.1446	-0.0981	-0.2760	0.2671	-0.0813	-0.0335	-0.1083	-0.1740	-0.2512
06/01/32	36	-0.0085	-0.2333	-0.2031	-0.1184	0.0527	-0.0295	-0.1446	-0.0692	-0.2760	0.2671	-0.0813	-0.0335	-0.1083	-0.1740
07/01/32	37	0.3750	-0.0085	-0.2333	-0.2031	-0.1184	0.0527	-0.0295	-0.1617	-0.0692	-0.2760	0.2671	-0.0813	-0.0335	-0.1083

STATA Analysis of Data Set Using 3-Month Lag

Unrestricted Model

Source	SS	df	MS
Model	0.136980391	6	0.022830065
Residual	0.421750117	30	0.014058337
Total	0.558730508	36	0.015520292

Number of Observations:	37
F(6, 30):	1.62
Prob > F:	0.175
R-squared:	0.2452
Adj R-squared:	0.0942
Root MSE:	0.11857

Parameter	Coef.	Std. Err.	t	P>|t |	95% Confidence Interval	
$StockReturn_{t-1}$	0.0474429	0.1938056	0.24	0.808	-0.3483609	0.4432467
$StockReturn_{t-2}$	-0.2130068	0.2012275	-1.06	0.298	-0.6239682	0.1979546
$StockReturn_{t-3}$	-0.4449735	0.2286635	-1.95	0.061	-0.9119666	0.0220196
$PermitReturn_{t-1}$	0.0639848	0.1355038	0.47	0.640	-0.2127508	0.3407205
$PermitReturn_{t-2}$	-0.1012513	0.1139832	-0.89	0.381	-0.3340359	0.1315334
$PermitReturn_{t-3}$	0.1093571	0.1082067	1.01	0.320	-0.1116305	0.3303448
Constant	-0.0527251	0.0246191	-2.14	0.040	-0.1030041	-0.0024461

STATA Analysis of Data Set Using 3-Month Lag

Restricted Model

Source	SS	df	MS
Model	0.106679384	3	0.035559795
Residual	0.452051123	33	0.013698519
Total	0.558730508	36	0.015520292

Number of Observations:	37
F(3, 33):	2.6
Prob > F:	0.0689
R-squared:	0.1909
Adj R-squared:	0.1174
Root MSE:	0.11704

Parameter	Coef.	Std. Err.	t	P>|t |	95% Confidence Interval	
$StockReturn_{t-1}$	0.0736700	0.1828039	0.40	0.690	-0.2982473	0.4455874
$StockReturn_{t-2}$	-0.2328864	0.1832493	-1.27	0.213	-0.6057098	0.139937
$StockReturn_{t-3}$	-0.4506442	0.1917273	-2.35	0.025	-0.8407163	-0.0605721
Constant	-0.0540280	0.0226048	-2.39	0.023	-0.1000178	-0.0080382

STATA Analysis of Data Set Using 6-Month Lag

Unrestricted Model

Source	SS	df	MS
Model	0.195613707	12	0.016301142
Residual	0.363116800	24	0.015129867
Total	0.558730508	36	0.015520292

Number of Observations:	37
F(12, 24):	1.08
Prob > F:	0.4193
R-squared:	0.3501
Adj R-squared:	0.0252
Root MSE:	0.123

Parameter	Coef.	Std. Err.	t	P>|t |	95% Confidence Interval	
$StockReturn_{t-1}$	0.0372603	0.2253504	0.17	0.870	-0.4278401	0.5023607
$StockReturn_{t-2}$	-0.2918702	0.2359868	-1.24	0.228	-0.778923	0.1951825
$StockReturn_{t-3}$	-0.4214646	0.2644059	-1.59	0.124	-0.9671715	0.1242423
$StockReturn_{t-4}$	0.0510723	0.2654121	0.19	0.849	-0.4967114	0.598856
$StockReturn_{t-5}$	-0.3065474	0.2606794	-1.18	0.251	-0.8445632	0.2314684
$StockReturn_{t-6}$	-0.0793417	0.2795963	-0.28	0.779	-0.6564001	0.4977166
$PermitReturn_{t-1}$	0.0689996	0.1658467	0.42	0.681	-0.2732912	0.4112905
$PermitReturn_{t-2}$	-0.0947507	0.1464408	-0.65	0.524	-0.3969896	0.2074883
$PermitReturn_{t-3}$	0.2208737	0.1374274	1.61	0.121	-0.0627625	0.5045098
$PermitReturn_{t-4}$	0.0157681	0.1360153	0.12	0.909	-0.2649537	0.2964899
$PermitReturn_{t-5}$	0.1938266	0.1145419	1.69	0.104	-0.0425762	0.4302294
$PermitReturn_{t-6}$	-0.0054003	0.1237836	-0.04	0.966	-0.2608771	0.2500765
Constant	-0.0546942	0.0278490	-1.96	0.061	-0.1121718	0.0027833

STATA Analysis of Data Set Using 6-Month Lag

Restricted Model

Source	SS	df	MS
Model	0.111412447	6	0.018568741
Residual	0.447318060	30	0.014910602
Total	0.558730508	36	0.015520292

Number of Observations:	37
F(6, 30):	1.25
Prob > F:	0.3118
R-squared:	0.1994
Adj R-squared:	0.0393
Root MSE:	0.12211

Parameter	Coef.	Std. Err.	t	P>|t |	95% Confidence Interval	
$StockReturn_{t-1}$	0.1064049	0.2010403	0.53	0.601	-0.3041741	0.5169839
$StockReturn_{t-2}$	-0.2617362	0.2016155	-1.30	0.204	-0.67349	0.1500175
$StockReturn_{t-3}$	-0.4439094	0.2064227	-2.15	0.040	-0.8654808	-0.0223379
$StockReturn_{t-4}$	0.0665168	0.2159156	0.31	0.760	-0.3744417	0.5074753
$StockReturn_{t-5}$	-0.0938662	0.2217989	-0.42	0.675	-0.54684	0.3591076
$StockReturn_{t-6}$	0.0445480	0.2188635	0.20	0.840	-0.4024309	0.4915269
Constant	-0.0530446	0.0268561	-1.98	0.058	-0.1078922	0.0018029