CAN MONEY SUPPLY PREDICT STOCK PRICES?

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ABSTRACT

A positive causal relation from money supply to stock prices is frequently hypothesized by some financial media and financial analysts. The basis of this assertion is an assumed negative causal relation from money supply to interest rates, and a negative causal relation from interest rates to stock prices. In this paper, we argue against a stable causal relation from money supply to stock prices. An empirical analysis, based on cointegration and Granger Causality tests, supports our argument.

Introduction

The relationship between money supply and stock prices has been examined in many studies. Beryl Sprinkel (1964) compared the turning points in a stock price index with the turning points in the growth rate of money. He concluded that a bear stock market was predicted 15 months after each peak in monetary growth, and that a bull market was predicted two months after each monetary trough was reached.

Homa and Jaffe (1971) estimated the relationship between the supply of money and an index of common stock prices, seeking a forecasting tool in the implementation of investment strategies. Their findings indicated that the price of any common stock is determined by three variables: the level and growth rate of dividends, the risk-free rate of interest, and the risk premium. The risk-free rate of interest being a function of money supply, they concluded that the average level of stock prices is positively related to the money supply.

Hamburger and Kochin (1972) started with the standard valuation model and added current price level and the corporate bond rate to capture the direct and indirect impacts of money supply on the stock market. They concluded that changes in monetary growth could have a number of different effects on the stock market. Pesando (1974) found empirical and theoretical problems in the models used by Hamburger-Kochin and Homa-Jaffe. He concluded that the inability of these models to generate accurate forecasts of stock prices was evidence against a structural and stable relationship between money supply and common stock prices.

Gupta (1974) adopted a probabilistic approach to predict the turning points in stock prices within a predetermined time period. Using monthly data over a 23-year period, and a turning point observed in the money supply, he found that that 59% of the peaks in the stock market could be accurately predicted. Kraft and Kraft (1977) used time series analysis and found no causal relationship from money supply to stock prices. Pearce and Roley (1985) examined the effects of money supply news on stock prices, finding a negative relationship between unanticipated increases in the money supply and stock prices.

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Money Supply and Interest Rates

The hypothesized causal relation from money supply to stock prices is often derived in two steps: an assumed negative causal relation from money supply to interest rates, followed by an assumed negative causal relation from interest rates to stock prices. Accordingly, the absence of a causal relation from money supply to stock prices may be partly due to uncertainty over whether interest rates will fall (rise) as a result of an increase (decrease) in the money supply.

The negative causal relation from money supply to interest rates is often based on the short-term liquidity effect. According to the liquidity effect, an increase in the supply of money creates an excess supply of money at existing income, interest rate, and price levels. Money demand is a decreasing function of nominal interest rates, because the interest rate is the opportunity cost of holding cash. An increase in the supply of money must cause interest rates to decrease in order to keep the money market in equilibrium.

In technical terms, assuming no shift in the money demand curve, a rightward shift in the money supply curve will cause a downward movement along the money demand curve, causing the equilibrium interest rate to decline. If at the same time that money supply shifts to the right, money demand curve also shifts to the right, however, the new equilibrium interest rate may be the same or higher than the old equilibrium rate. Money demand may shift to the right as the result of a higher price level or higher real output. For example, if the economy experiences stagflation, rising prices may cause households to increase their demand for money. This causes a rightward shift in the money demand curve. In such a scenario, an expansionary monetary policy may result in an increase or no change in interest rates.

Another reason that interest rates may not react negatively to changes in the money supply stems from the real output and price effects. As the result of expansionary monetary policy, real output and the price level may rise, causing a rightward shift in money demand, and leading to higher interest rates.

A positive relation between money supply and interest rates is also implied in the Fisher equation. According to the Fisher equation, the nominal interest rate equals the real interest rate plus the expected rate of inflation. Since the public expects expansionary monetary policy to be inflationary, increases in the money supply may cause expected inflation and, therefore, and increase in nominal interest rates. In short, as the money supply increases, interest rates might not decrease.

Interest Rates and Stock Prices

Even if we ignore the possible lack of a causal relation from money supply to interest rates, we are faced with the uncertainty of a negative causal relation from interest rates to stock prices. This assumed negative relationship is partly based on the view that a decrease in interest rates leads to lower borrowing costs for firms, higher future profits, and thus higher stock prices. It is also argued that lower interest rates prompt investors to move money from the bond market to the equity market.

Nevertheless, future profits may not change, if interest rates decline at the same time that demand for firms' products, and thus their sales, decline. In this case, stock prices may not change and, depending on the effects of lower interest rates and lower sales on profit, stock prices could even decline. A decline in interest rates may occur simultaneously with an increase in the cost of some major inputs, such as oil. In this case, total cost may not decrease, and profits and stock prices may not increase.

Further, a decline in interest rates may lead to expectations of even further declines. This may prompt some investors to stay in the bond market, since they might see an opportunity to make profit at lower risk. Moreover, those investors who were not investing in the bond market may switch from stocks to bonds, because of the inverse relationship between interest rates and bond prices. While interest rates are the most important determinant of bond prices, stock prices depend on many other factors.

In short, when the money supply increases, interest rates may not fall, and if interest rates decline, stock prices may not increase. These uncertainties may result in no reliable negative causal relation from money supply to stock prices.

Methodology and Test Results

We used monthly data from 1965-2005 to empirically analyze the relationship between money supply and stock prices. Seasonally adjusted M1 data were used to measure money supply; S&P 500 index data were used to measure stock prices. The interest rate was measured by both the three month Treasury bill rate (SR) and the average treasury bond rate (LR). Our empirical analysis includes three tests; the Augmented Dickey-Fuller test, the Engle-Granger cointegration test, and the Granger causality test.

Augmented Dickey-Fuller Test

The first step in performing the cointegration test is to test for the presence of a unit root in the individual series. We employ the Augmented Dickey-Fuller test (1979)for this purpose. Table 1 displays the results of the Augmented Dickey-Fuller tests. In each case, a log polynomial in first differences of each variable was taken out six periods to render the residuals approximate white noise. The Ljung-Box "Q" statistic was used to test the hypothesis that all of the autocorrelations are zero. For all the variables examined, absolute values of calculated t-statistics were lower than the MacKinnon critical values. Consequently, the null hypothesis of difference-stationary could not be rejected at any standard significance level. Although this does not prove there are unit roots in each of the variables, the consequences of specifying spurious deterministic trends convinced us that defining the variables as the first differences in the logs was the prudent way to proceed.

TABLE 1: Augmented Dickey-Fuller (ADF) Unit Root Tests, 1965-2005

Variable	ADF Coefficient	t-stat
S&P500	.0041	1.4278
SR	-.0210	-1.4363
LR	-.0111	-1.3272
M1	.0048	1.6546

MacKinnon Critical Values (491 observations): 1%   -3.46
                                                                              5%   -2.87
                                                                             10% -2.57

Engle-Granger Cointegration Test

The concept of correlation in a growing economy is that of a common stochastic trend or cointegration. Many economic time series are not stationary. If, however, the first difference of a series is stationary, the original series is said to be integrated of order one. As described in Engle and Granger (1987), two or more variables are said to be cointegrated, if individually each is non-stationary (has one or more unit roots), but there exists a linear combination of the variables that is stationary. To investigate the cointegration properties of stock prices, money supply, and interest rate, we first test for cointegration between stock prices and money supply. Next, we test for cointegration between stock prices, interest rate and money supply.

Table 2 reports the results of the Engle-Granger test for cointegration between stock prices and money supply. Table 3 displays the results of the test for all three variables. In both tests, absolute values of calculated t-statistics were below the conventional MacKinnon critical values. That is, there is no evidence of cointegration or common stochastic trends among money supply, interest rate, and stock prices. This contradicts the view that money supply and stock prices hold a stable long-run relationship. The cointegration results further confirm that money supply does not have any long-run explanatory power in predicting movements in stock prices, and provide support for the view presented in this paper.

TABLE 2:   Cointegration Test Between Stock Prices and Money Supply, 1965-2005

Variables	Coefficient	t-stat
S&P500, M1	-.0419	-2.23

MacKinnon Critical Values (491 observations):	1%	-4.3468
	5%	-3.7717
	10%	-3.4730

TABLE 3:   Cointegration Test Between Stock Prices, Interest Rates, and Money Supply, 1965-2005

Variables	Coefficient	t-stat
SP500, SR, M1	-.0714	-3.1269
SP500, LR, M1	-.0678	-3.5076

MacKinnon Critical Values (491 observations):	1%	-4.3468
	5%	-3.7717
	10%	-3.4730

Granger Causality Test

In performing the Granger causality tests, the hypothesized dependent variable is regressed on its lagged values. The lag length in the regression equation must be selected in such a way that the resulting residuals are white noise, eliminating any first order serial correlations. Next, the lagged values of the hypothesized independent variable are added to the right side of the regression equation and the new regression is executed. Using an F test, the resulting sums of squared residuals from the two regression equations are compared. A relatively large difference between the two sums of squared residuals (a large F) would provide evidence that the hypothesized independent variable Granger causes the dependent variable.

The Granger Causality test results are shown in Table 4. The small F statistic of the Granger Causality test (0.0814), lower than the critical F value at the 5% confidence level (3.66), supports the view that there is no causal relation from money supply to stock prices.

TABLE 4:   Granger Causality Test, 1965-2005

Null Hypothesis:	F-Stat	Probability
M1 does not cause S&P	0.0814	0.970
S&P does not cause M1	4.1834	0.006
Lag:3		

Our test results conform well to our logical explanations presented earlier that money supply does not have any explanatory power in predicting changes in stock prices.

Conclusion

A change in the money supply is frequently assumed to positively affect stock prices. This positive causal relation is often based on an hypothesized inverse causal relation from money supply to interest rates and an hypothesized inverse causal relation from interest rates to stock prices. In this paper, we argue against the existence of these relationships. We show that the lack of a stable negative causal relation from money supply to interest rates, and from interest rates to stock prices, results in no significant long-term causal relation from money supply to stock prices. Using the Engle-Granger cointegration test and the Granger causality test, we find empirical support for our view.

 References

Dicky, D. A. and Fuller, W. A. 1979. "Distribution of the estimators for autoregressive time series with a unit root." *Journal of the American Statistical Association*, 74(336): 427-431.

Engle, R.F. and C.W.J. Granger. 1987. "Cointegration and Error Correction: Representation, Estimation, and Testing." *Econometrica*, 55: 251-276.

Gupta, Manak C. 1974. "Money Supply and Stock Prices: A Probabilistic Approach", *Journal of Financial and Quantitative Analysis*, 9(1): 57-68.

Hamburger Michael J. and Levis A. Kochin. 1971. "Money and Stock Prices: The Channels of Influences." *The Journal of Finance*, 27(2): 231-249.

Homa, Kenneth E. and Dwight M. Jaffee. 1971. "The Supply of Money and Common Stock Prices." *The Journal of Finance*, 26(5): 1045-1066.

Kraft, John and Arthur Kraft. 1976. "Determinants of Common Stock Prices: A Time Series Analysis." *The Journal of Finance*, 32(2): 417-425.

Pearce, Douglas K. and V. Vance Roley. 1985. "Stock Prices and Economic News." *The Journal of Business*, 58(1): 49-67.

Pesando, James E. 1974. "The Supply of Money and Common Stock Prices: Further Observations on the Econometric Evidence." *The Journal of Finance*, 29(3): 909-921.

Sprinkel, Beryl. 1964. *Money and Stock Prices*. Homewood, Illinois: Richard Irwin, Inc.