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WALL STREET HAS IT WRONG: THE TRUE IMPACT OF THE MONEY SUPPLY ON PRICE INDEXES

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WALL STREET HAS IT WRONG: THE TRUE IMPACT OF THE MONEY SUPPLY
ON PRICE INDEXES

By

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B.A in Economics: The Ohio State University, 2005

A Research Paper Submitted in Partial Fulfillment of the Requirements for
the Master of Science degree

Department of Economics

in the Graduate School

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RESEARCH PAPER APPROVAL
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Approved by:

Dr. Scott Gilbert, Chair

Graduate School

Southern Illinois University Carbondale

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AN ABSTRACT OF THE RESEARCH PAPER OF

Bamidele Adesida, for the Master of Science degree in Economics, presented on April 14th, at Southern Illinois University Carbondale.

TITLE: WALL STREET HAS IT WRONG: THE TRUE IMPACT OF THE MONEY SUPPLY ON PRICE INDEXES

MAJOR PROFESSOR: Dr. Scott Gilbert

The purpose of this particular paper is to analyze the impact of the money supply on consumer price indexes within the U.S. The intent of this paper is to probe the impact of the M1 and M2 money supplies on consumer and producer prices indexes by estimating a multitude of equations taking core CPI, general CPI, core PPI, commodity PPI, and personal consumption expenditures as a measure of inflation, with M1, and M2 money supply, as explanatory variables. For this analysis, the OLS technique is used to cover time series data from 1980-81 to 2009-10. The results for general CPI, core CPI, core PPI, and PCE, show a positive correlation with the M1 money supply. Commodity PPI however, is negatively correlated with M1. General CPI, core PPI, commodity PPI, and the PCE are positively correlated with M2. Results show that only the cores CPI, general CPI, are positively correlated with the M3 money supply. It may be concluded that the supply of money M1 and M2 affect the core and general price indices in the same way. The central question that this paper attempts to answer is: Do the domestic money supplies have the same effect on both general pricing indexes as they do on the core pricing indexes? The most important revelation within this project is that the M1 money

supply affects general CPI stronger than the core CPI, thus contradicting the analysis posited by the equity research analysts on Wall Street.

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CHAPTER 1

INTRODUCTION

Over the last 50 years, academic researchers have scrutinized subsets of data that are intended to measure inflation. One of the most common indicators that are studied in order to measure inflation is the consumer price index with the exception of food and energy, i.e. core CPI. This particular measure of inflation excludes the few items that are volatile in the sense that their prices fluctuate heavily. Core CPI is intended to be a predictor and an indicator of long term inflation. Headline or general inflation on the other hand, is a measure of inflation that concerns the total inflation within an economic environment. General CPI may be affected by areas of the broader economic market by areas of the market that experience sudden spikes in inflation. With this in mind, general CPI may not be the best, or paint the most accurate picture of the state of the economy. It differs slightly from core CPI in that general CPI does not include food and energy.

The Producer Price Index or PPI consists of a consortium of indexes that essentially measure the average change over time in the selling prices received by domestic producers of good and services. The PPI's strictly measure the change in prices from the perspective of the seller. The PPI contrasts with the CPI in the sense that CPI is a measure of the change in prices from the purchaser's perspective. The price collected for an item included in the PPIs is the revenue received by its producer. Sales and excise taxes are not included in the price because they do not represent revenue to the producer. The price collected for an item included in the CPI is the out-of-pocket expenditure by a consumer for the item. Sales and excise taxes are included in the price because they are necessary expenditures by the consumer for the item. The price collected for an item

included in the PPIs is the revenue received by its producer. Sales and excise taxes are not included in the price because they do not represent revenue to the producer. The price collected for an item included in the CPI is the out-of-pocket expenditure by a consumer for the item. Sales and excise taxes are included in the price because they are necessary expenditures by the consumer for the item. As an economic indicator, PPI's tend to capture price movements prior to retail levels. They foreshadow subsequent price changes for businesses and consumers. Personal Consumptions Expenditures or (PCE), is the measure in price changes in consumer goods and services. PCE consists of the imputed and the actual expenditures of households; which includes data pertaining to durable and non-durable goods, and services pertaining to those goods. In essence, PCE is a measure of goods and services that is targeted towards individuals and consumed by individuals. Although predictable, PCE too is a measure of inflation from the perspective of the consumer.

CHAPTER 2 LITERATURE REVIEW

In this particular section, I am going to review a few literary works that assist in building the framework for my analysis, including the model and the variables that will be selected. There have been decade long debates as to whether monetary aggregates clearly explain inflation. A multitude of variables either indirectly or directly related to the monetary variables have been used in order to explain the relationship between the monetary aggregates and inflation. The variables range all the from short dated treasury bills all the way to a specific kind of money supply. Still though, there are many contradictory views concerning the explanation of the role of money on inflation. Edelstein and Kilian (2009) were able to develop a rather simple monetary model of inflation essentially on the basis of the assumption that any kind of disequilibrium in the real money markets adjusts itself through the price level, but instantaneously. From their particular results, both domestic and a few external factors were deemed as the determinants of inflation.

Michael T. Kiley (2008) was able to examine a trend in inflation for consumer prices and consumer prices excluding prices of food and energy. Both the personal consumption expenditures (PCE) index, and the consumer prices (CPI) were carefully examined. He developed bivariate and univariate statistical models in order to forecast the nature of the movements of the Consumer prices indexes. His results suggest that the relationship between overall consumer prices, and consumer prices excluding the prices of food and energy, have changed significantly over time. There is also a study by Khan and Hussain (2005) that tests the empirical soundness of the monetary aggregates M1, M2, and M3. They wanted to explore the relevance of financial assets and they role that it

played within the realm of consumption and inflation. In their particular study the functional and the empirical (F-M) approaches were used.

CHAPTER 3 MODEL SPECIFICATION AND PROCEDURE

I have employed linear regression models and the method of ordinary least squares in order to examine the relationships between general PPI, core PPI, commodity PPI, and the personal consumption expenditures with M1, the liquid measure of money, M2, (the broader money supply). Through this, I have developed a series of models that clearly explain the effects of the two different types of money supplies, on the collection of price indexes. The series of the models that were constructed are as follows:

$$\text{LOG (PCE)} = B_0 + B_1\text{LOG (M1)} + B_2\text{LOG (M2)} + U_t \quad (1)$$

$$\text{LOG (CCPI)} = B_0 + B_1\text{LOG (M1)} + B_2\text{LOG (M2)} + U_t \quad (2)$$

$$\text{LOG (CPPI)} = B_0 + B_1\text{LOG (M1)} + B_2\text{LOG (M2)} + U_t \quad (3)$$

$$\text{LOG (COMPPI)} = B_0 + B_1\text{LOG (M1)} + B_2\text{LOG (M2)} + U_t \quad (4)$$

$$\text{LOG (GCPI)} = B_0 + B_1\text{LOG (M1)} + B_2\text{LOG (M2)} + U_t \quad (5)$$

Where the dependent variables are, LOG (PCE), the log of personal consumer expenditures, LOG (CCPI) demonstrates the log of core CPI, LOG (GCPI) shows the log of general CPI, LOG (CPPI) is the log of core PPI, and LOG (COMPPI) is the log of commodity PPI. The explanatory variables are LOG (M1), which is the log of M1 money supply, LOG (M2), and the log of M2 money supply. Since I am using time series data in this particular model, it was important for me to ensure that there was no violation of any OLS assumptions in this particular analysis. In order to avoid such a case, the Durbin Watson D statistic was calculated in order to ensure that there were no spurious or

random regressions. I was comfortable applying the OLS method due to the fact that my Durbin Watson D statistics were significantly lower than the coefficients of determination, which virtually means that the OLS method is a valid method to use in order to analyze the regressions. For this particular project, time series data was collected from January of 1980 up until March of 2011. The data from M1 and M2 were taken from the FREDDIE system at the Federal Reserve Board in St Louis. They are monthly, and they are seasonally adjusted. The Price index data too, are seasonally adjusted, monthly data, extracted from the BLS, (Bureau of Labor and Statistics).

CHAPTER 4 EMPIRICAL RESULTS

The estimated OLS regression of the effect of the money supply in food, price, commodity, and their general indexes are for the most part, statistically significant at a minimum of the 5 percent level. The explanatory power of each of the equations (R-squared) is very high. The estimated equation of the first model is given as $\text{LOG (PCE)} = .302\text{LOG (M1)} + .323 \text{LOG (M2)}$ R squared: .988 Adjusted R-squared: .998, DW: .0198, this is pictured in Table 5. Table 3, yields the estimated equation for model 2. It is $\text{LOG (CCPI)} = .892 + .388 \text{LOG (M1)} - .0318\text{LOG (M2)}$, R squared: .984, Adjusted R squared: .9848, F-stat: 7981.978 DW: .0176. Referring to table 2, the estimated equation yields $\text{LOG (GCPI)} = .794 + .251 \text{LOG (M1)} + .148 \text{LOG (M2)}$, R squared: .985. Adjusted R squared: .985, F-stat: 8234 DW: .0237. The results for table 4, yield $\text{LOG (CPPI)} = 1.578 + .314 \text{LOG (M1)} + .191 \text{LOG (M2)}$, R squared: .982, Adjusted R square: .982, F-stat: 6976.4, DW: .02435. And finally, the estimation equation for model 5 in table 1 is $\text{LOG (COMPPI)} = .272 + .074 \text{LOG (M1)} + .941 \text{LOG (M2)}$, R squared: .932, Adjusted R square: .931, F-stat: 1668.4 and DW: .0363. The explanation for model 1 is that there normally are positive relationships between an increase in the money supply and personal consumption expenditures. A purported reason for this could be that consumers do not tend to spend during recessionary time periods, and instead decide to accumulate capital. These theories are in accordance with the school of general thought. With respect to model 2, core CPI tends to have a positive relationship with the money supply of M1. There is a negative relationship between core CPI and M2, but within the statistics, there is evidence that this particular relationship is statistically insignificant. Examining the

equation for model number 3, we see that there is a positive relationship between the general CPI and M1, and M2. This goes without saying that an increase in the money supplies, tend to increase the general consumer price index. With respect to model 4, we see that core PPI is positively correlated with M1 and M2. The relationships between the dependent and the explanatory variables in this particular model still lie within the general theoretical thought of monetary economics. When examining equation 5, we see that there are negative relationships between the commodity producer pricing index, and M1. There however is a positive relationship between commodity producer price index, and M2. The rationale for this is more difficult. Since the commodity producer price index's inception, it has been difficult to come up with a solid story about its fluctuating relationship between it, and the money supply indicators. It would be reasonable to think that due to the wild volatility of the index itself, the relationship between the commodity producer price index and the money supply indicators still has a notion of uncertainty to it.

TABLE 1

Model for Commodity PPI

Dependent Variable: COMPPI

Sample: 1980M01 2011M03

Included observations: 369

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.272247	0.217019	1.254484	0.2105
M1	-0.074498	0.023460	-3.175467	0.0016
M2	0.941683	0.074568	12.62845	0.0000
R-squared	0.932035	Mean dependent var		4.827373
Adjusted R-squared	0.931477	S.D. dependent var		0.194014
S.E. of regression	0.050787	Akaike info criterion		-3.111568
Sum squared resid	0.941455	Schwarz criterion		-3.069174
Log likelihood	578.0842	Hannan-Quinn criter.		-3.094727
F-statistic	1668.477	Durbin-Watson stat		0.036378
Prob(F-statistic)	0.000000			

TABLE 2

Model For General CPI

Dependent Variable: GCPI

Method: Least Squares

Sample: 1980M01 2011M03

Included observations: 369

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.794374	0.142483	5.575209	0.0000
M1	0.251574	0.015403	16.33296	0.0000
M2	0.148650	0.048958	3.036288	0.0026
R-squared	0.985440	Mean dependent var		4.981215
Adjusted R-squared	0.985320	S.D. dependent var		0.275209
S.E. of regression	0.033344	Akaike info criterion		-3.953088
Sum squared resid	0.405819	Schwarz criterion		-3.910694
Log likelihood	733.3447	Hannan-Quinn criter.		-3.936247
F-statistic	8234.608	Durbin-Watson stat		0.023714
Prob(F-statistic)	0.000000			

TABLE 3

Model for core CPI

Dependent Variable: CCPI

Method: Least Squares

Sample: 1980M01 2011M03

Included observations: 369

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.892574	0.150426	5.933648	0.0000
M1	0.388141	0.016261	23.86875	0.0000
M2	-0.031870	0.051687	-0.616606	0.5379
R-squared	0.984986	Mean dependent var		5.013923
Adjusted R-squared	0.984863	S.D. dependent var		0.286125
S.E. of regression	0.035203	Akaike info criterion		-3.844596
Sum squared resid	0.452324	Schwarz criterion		-3.802202
Log likelihood	713.3279	Hannan-Quinn criter.		-3.827755
F-statistic	7981.978	Durbin-Watson stat		0.017621
Prob(F-statistic)	0.000000			

TABLE 4

Model for General PPI

Method: Least Squares

Sample: 1980M01 2011M03

Included observations: 369

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.578361	0.100685	15.67619	0.0000
M1	0.314431	0.010884	28.88831	0.0000
M2	0.191283	0.034596	5.529088	0.0000
R-squared	0.982859	Mean dependent var		4.888386
Adjusted R-squared	0.982718	S.D. dependent var		0.179238
S.E. of regression	0.023563	Akaike info criterion		-4.647537
Sum squared resid	0.202645	Schwarz criterion		-4.605144
Log likelihood	861.4706	Hannan-Quinn criter.		-4.630696
F-statistic	6976.475	Durbin-Watson stat		0.024352
Prob(F-statistic)	0.000000			

TABLE 5

Model For Personal Consumption Expenditures

Dependent Variable: PCE

Method: Least Squares

Sample: 1980M01 2011M03

Included observations: 369

Variable	Coefficient	Std. Error	t-Statistic	Prob.
M1	0.302673	0.011356	26.65218	0.0000
M2	0.323656	0.011178	28.95400	0.0000
R-squared	0.988278	Mean dependent var	4.360442	
Adjusted R-squared	0.988214	S.D. dependent var	0.238368	
S.E. of regression	0.025878	Akaike info criterion	-4.462742	
Sum squared resid	0.245102	Schwarz criterion	-4.430947	
Log likelihood	826.3758	Hannan-Quinn criter.	-4.450111	
Durbin-Watson stat	0.019896			

CHAPTER 5 CONCLUSION

There are a multitude of economic indicators that are used by Wall Street, and academics alike, in order to capture the true determinants of inflation. From a domestic perspective, this particular paper demonstrates the relationships between a handful of what are considered to be logical economic indicators of inflation, and studied them against the money supply. The most important goal for monetary policy makers here in the U.S, and all over the world, is to be able to control monetary policy with the handful of tools that they have. The most important, being the supplies of money circulating within the economic environment. The main conclusion of this paper shows that M1 seems to be the strongest gauge of inflation. This should follow the notion that if an increase in money supply is not followed by an increase in output, then inflation will occur. The effect of M2 is very considerable in these cases as well. The biggest surprise though is the differences in effects between the core CPI and general CPI with respect to the money supplies. The findings within this research project should serve as a reminder to the equity research analysts on Wall Street, who have the power to make considerable shifts in the prices of the stocks in which they cover, that, the underlying productivity of the domestic economy lies in more than just money, and the general consumer price index.

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