

Does M1 Money Supply Affect US Exports?

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Abstract

M1 money is defined by the Federal Reserve as money in circulation as well as money in demand deposit accounts such as a checking account. The Fed, as it is commonly referred to as, uses this figure to target interest rates in the economy. This is done to either stimulate the economy to provide growth, or to slow economic growth to curb inflation. By manipulating interest rates in the economy however, the Fed can also encourage or deter foreign investment, as investors always seek the highest return. If many investors wish to invest in the United States this strengthens the U.S. dollar, effectively raising the price of exported goods. Due to the inverse relationship between price and quantity demanded, higher prices should lead to lower quantities of American goods demanded and vice versa. Depending on the elasticity of this demand, an increase in M1 money supply could either increase or decrease U.S. exports. In this study, regression analysis which of these is in fact the case.



A time series graph of M1 money and US total exports

Methodology & Data

In this study a regression analysis was conducted using ordinary least squares methodology, which acts as an unbiased and consistent estimator with minimum variance, as long as certain assumptions of the error term are held true. These four assumptions are that of linearity, constant variance, normal distribution, and independent disturbances. The model had to be modified more than once to satisfy all of these assumptions. This left a model that was log-linear, that is it contains the log of the dependent variable, and is also a first difference model. This means that the coefficient produced by the regression actually represent the change from a variables value for one observation, from their value in the previous observation. All of the data was gathered from the St. Louis Federal Reserve Bank Database (Federal Reserve Economic Data). A total of 180 observations of quarterly time series data containing the following variables was used in the analysis:

- US Exports
- M1 Money Supply
- US GDP
- Unemployment Rate
- Personal Savings rate

Unemployment rate was used to generate a dummy variable in which a 1 represented a year with unemployment rate above that of the mean and a 0 for years with unemployment below the mean.

Variables	1	2	3	4	5
$\Delta M1$	-0.000273	-0.000285	-0.000292	-0.000293	-0.000293
	0.0000719	0.0000655	0.0000668	0.0000669	0.0000669
ΔGDP		0.000144	0.000147	0.000145	0.000145
		0.0000235	0.000024	0.0000242	0.0000242
$\Delta Sav. Rate$			0.00145	0.00136	0.00136
			0.00242	0.00244	0.00244
$\Delta H Unempl.$				-0.00365	-0.00365
				0.00877	0.00877
Constant	0.0214	0.00583	0.00571	0.00583	0.00583
	0.00261	0.00348	0.0035	0.00352	0.00352
Obs.	180	180	180	180	180
R-Sq.	0.075	0.237	0.238	0.239	0.239

Summary Statistics

Variable	Obs.	Mean	S.D.	Min	0.25	Med	0.75	Max
Exports (Billions)	181	1073.08	780.90	134.10	315.12	947.29	1703.51	2568.28
M1 (Billions)	181	1344.69	970.57	274.00	651.80	1102.80	1531.70	4068.10
GDP (Billions)	181	9703.48	5827.60	1616.12	4545.34	8662.82	14651.25	21694.46
Unemployment (%)	181	6.27	1.65	3.60	5.00	5.90	7.40	10.70
Sav. Rate (%)	181	7.71	2.52	2.50	6.10	7.40	9.50	15.30

In a typical year, the United States economy exported about 1.07 trillion dollars, with 1.3 trillion dollars of M1 money, produced 9.7 trillion dollars in gross domestic product, while maintaining an unemployment rate of 6.27%, and a personal savings rate of 7.71%.

Selected References

St. Louis Federal Reserve. (1975–2020, April 28). *FRED Economic Data* [Dataset]. Federal Reserve Economic Data. <https://fred.stlouisfed.org/series/GDP>

St. Louis Federal Reserve. (1975–2020b, April 29). *FRED Economic Data* [Personal Saving Rate]. Federal Reserve Economic Data. <https://fred.stlouisfed.org/series/PSAVERT>

Results & Conclusion

Above is a table containing the results from running several regressions, each time controlling for an additional explanatory variable to observe how the relationship between the first differenced log of United States exports and the first difference of M1 money in the US economy changes. Standard errors of the coefficients are contained directly below the coefficients in the white rows. All of the coefficients highlighted in yellow are significant at a level of significance of at least 1%. After running the analysis, a significant relationship was observed between the two variables that remained fairly consistent as more variables were added to the model. This relationship was in fact negative suggesting that the elasticity of demand for American goods must be rather low. A significant relationship was also found between the first difference of US GDP and the log of US exports.