Some Tweaks to the Andersen – Jordan St. Louis Equation

Peter V. Bias
Barney Barnett School of Business and Free Enterprise
Florida Southern College
111 Lake Hollingsworth Dr.
Lakeland Florida 33801
pbias@flsouthern.edu

Abstract

This paper briefly reviews the published arguments and criticisms related to the famous Andersen – Jordan (1968) St. Louis equation. The improvements and critiques that have evolved over the past forty-five years are outlined and a new set of refinements are offered. Agreeing with Wilkins' (2013) argument for using a lagged dependent variable, a fresh empirical analysis is performed by the author. A new private consumption dependent variable is employed; monetary aggregates rather than monetary base are used, as is total government spending rather than surpluses or deficits, although those are also run for comparison. Endogeneities are fleshed out by adding unemployment and inflation gap variables. Ultimately, the results here show no empirical support for aggregate demand management, either fiscal or monetary, effectively altering private consumption.

Keywords: St. Louis equation, lagged dependent variable, monetary policy, fiscal policy

JEL Classifications: E52, E62, E63

1. Introduction

This paper briefly reviews the published arguments and criticisms related to the famous Andersen – Jordan (1968) St. Louis equation. The critiques and the resulting improvements have evolved over the past forty-five years are outlined and a new set of refinements are offered. A fresh empirical analysis is employed by the author along with a summary of the resulting impacts to the Andersen – Jordan interpretation. Significant changes to the St. Louis equation introduced here, beyond the simple inclusion of new time periods, are the use of a new dependent variable, the employment of a lagged dependent variable to proxy aggregate supply effects, and the introduction of unemployment and inflation gap variables to tease out the unbiased impacts of monetary and fiscal policies.

2. Andersen and Jordan (1968) and the "St. Louis equation"

A little over a half century ago, during the heyday of the Keynesian revolution, Milton Friedman and David Meiselman (1963) used a simple reduced form ordinary least squares regression equation to compare the effectiveness of monetary and fiscal policies, but even more so to compare and empirically test Keynesian and monetarist theories. Their brash study was designed to ultimately show that monetarism should supersede Keynesianism as the correct macroeconomic theory.

There were many criticisms of Friedman and Meiselman's seminal study, but most important was the need to put their empirical study into first difference form. One early paper that attempted to answer that particular criticism was to become one of the classics in monetary literature: Leonall C. Andersen and Jerry L. Jordan's "Monetary and Fiscal Actions: A Test of Their Relative Importance in Economic Stabilization" (Andersen and Jordan, 1968), published in the Federal Reserve Bank of St. Louis *Review*. Andersen and Jordan's study fully supported the Friedman and Meiselman single-equation approach but expanded it to answer several of the criticisms that had befallen that seminal paper. Their new single equation was much like the following:

$$\Delta Y_t = a + \sum_{i=0}^{4} m_i \Delta M_{t-i} + \sum_{i=0}^{4} e_i \Delta E_{t-i} + \sum_{i=0}^{4} z_i \Delta Z_{t-i}$$

In the Andersen – Jordan equation above all variables are in first difference form (but *not* log first difference, which puts the data into rate of growth form, as has become the norm today) as denoted by Δ, a is a constant, Y is nominal domestic spending; M represents monetary policy, which was defined either by monetary base or money stock; E represents variously high-employment government expenditures, high-employment government receipts, or high-employment government surplus; and Z represents a catch-all variable they defined as "a variable summarizing all other forces that influence total spending." Those forces would include things such as weather, international trade, preferences, technology, resources, infrastructure, war, and the like. Using an Almon lag technique with fourth degree polynomials and a four period (quarterly) lag, they combined various measures of monetary and fiscal policies to determine whether changes in those policy variables had a significant impact on the economy's nominal spending. They used quarterly

data from 1953.1 to 1969.4 and concluded, just as Friedman and Meiselman had found, that monetary policy seemed to have an impact on whatever measure was used for the nominal national spending variable, while fiscal policy did not.

3. A general synopsis of the St. Louis Equation Approach Literature

The debate and evolution of the Andersen and Jordan St. Louis equation went in two separate directions. One fairly large group rather quickly dismissed Andersen and Jordan's methodology as unsalvageable, and enumerated several critical problems with the single equation approach. That group (call them Group 1) had more or less finished with the approach by 1980. Most of the members of Group 1 of course did not bother to write on the subject. They read the dismissive literature and were swayed by those who had already tackled the problem.

The other smaller group (call them Group 2), however, patiently attempted to address the problems and make improvements to the analysis with new suggestions and innovations in econometric techniques and/or additional variables. From that second group, significant progress slowly emerged over time, although most researchers had given up on it long before and most other economists ignored the literature, feeling that the issues with the St. Louis equation had already been 'proven' to be insurmountable.

Early criticisms regarded the possibly improper use of particular consumption functions or gross national (or domestic) product as the dependent variable, but the most severe criticisms of the single equation approach ultimately revolved around three things: 1) that various empirical data do or do not truly measure what theory specifies; 2) that it is necessary to find a means to untangle the exogenous from the endogenous policy behaviors; and 3) that there must be a way to remove the inherent negative bias to coefficients when using any countercyclical policy variables. To the first group, these criticisms were so severe and damning that the use of the single equation approach was and still is considered to be incontrovertibly wrong and its findings dismissed as useless. Many of these have moved on to vector autoregression or other multiple equation approaches.

Still, there continued to be a smattering of supporting studies and papers that conceded to a few of the criticisms but held fast to the concept of the single equation approach as well as the broad empirical outcome that fiscal policy is ineffective, while monetary policy is effective. All of these studies died out by 1986. However, after a very long pause the St. Louis equation was resurrected by Belliveau (2011), whose findings were supportive of the original results.

A brief outline of the significant supporting and critical papers of the debate is given below in Table 1 (a paper-by-paper chronological survey of these papers can be found in Bias (2014)). The parenthetical "more or less" conveys the overall tenor because some authors diverge a bit. Reiterating, a summary of the main criticisms would be: a) that the St. Louis equation is misspecified; b) that there is no way to untangle endogenous movements from exogenous movements using a single-equation approach; and c) that fiscal policy is improperly analyzed using the single-equation approach specifically because its use as a counter-cyclical policy tool almost guarantees that there will be no statistically significant positive influence.

Table 1

Andersen – Jordan (1968) Critiques

Group 1 – (More or less) critical studies

1. *Silber, 1971*
2. *Goldfeld, Blinder, Kareken and Poole, 1972*
3. *Modigliani and Ando, 1976*
4. *B. Friedman, 1977*
5. *Van Order, 1978*
6. *Stein, 1980*

Group 2 – (More or less) supporting or neutral studies

1. *De Leeuw and Kalchbrenner, 1969*
2. *Gramlich, 1971*
3. *Poole and Kornblith, 1973*
4. *Elliot 1975*
5. *Carlson, 1978*
6. *Batten and Hafer, 1983*
7. *Ahmed and Johannes, 1984*
8. *Batten and Thornton, 1986*
9. *McCallum, 1986*
10. *Jordan, 1986*
11. *Belliveau, 2011*

4. The Tweaks

There are some significant changes made to the Andersen – Jordan St. Louis equation here beyond the simple inclusion of new time periods. New variables have been included to tease out the unbiased impacts of monetary and fiscal policies. These changes, and all of the new approaches, are explored in the appropriate sections below. However, as a first step, it is re-asserted here that the single-equation regression approach is an econometrically sound methodology for confirming theory, although possibly not for determining policy rules. Many of the criticisms of the single equation approach, particularly those regarding countercyclical impacts and endogeneity, could be levied against nearly every time series regression equation in any discipline. If these common criticisms are indeed true, it puts to question time series regression analysis itself, not Andersen and Jordan. This assertion has already been made by Jordan (1986) and McCallum (1986) among others, all of whom have averred that the single equation approach is econometrically viable.

On the other hand, Jordan did worry that policy-makers and many economists had misinterpreted the Andersen - Jordan paper. Jordan despaired that economists and policy wonks had interpreted their results as supporting not only monetarism but, ironically, also supporting discretionary monetary policy as an aggregate demand management tool. This misinterpretation lives on even to this day (see, for instance, Walsh *3e*, 2010), but Jordan adamantly insisted the latter was never the intention, nor the proper interpretation, of their paper.

The dependent variable: consumption minus transfers

Almost all of the Andersen – Jordan-inspired studies, including Andersen and Jordan themselves, have used a dependent variable different from the seminal Friedman – Meiselman study, which used private consumption as the dependent variable. Most moved to nominal GNP or GDP as the dependent variable. However, given that especially fiscal spending is a direct component of GDP, using government expenditures and GDP simultaneously in the same regression equation is a well-known statistical error. Many were aware of this, of course, but they felt that the problem was erased by altering the data to first differences in these variables. Unfortunately, putting the data into first differences or rates of change does not change the inherent component connection. A change in government spending alters GDP, by definition, even if not by fact.

It is necessary to use a different dependent variable if we are investigating the impact of fiscal policy on economic behaviors. In this study we use something akin to the original Friedman – Meiselman paper. Total private consumption minus transfers is used here. That variable reveals any possible economic impact of government spending without including any possibility of being a direct component of the dependent variable. If there is a fiscal policy impact on this new dependent variable, particularly if the impact is part of some multiplier effect, then consumption minus transfers must be impacted by it, but not as a first round effect. This eliminates the concern for exogeneity or endogeneity because *all* government spending will have damped secondary and tertiary effects, and that is what we are measuring. True, multiplier impacts require idle resources, but the periods of idle resources are known and can be accounted for in the analysis by the inclusion of unemployment and inflation gap variables.

The independent variables: Monetary Aggregates

Attempts to empirically model monetary policy with the Andersen – Jordan approach have historically used monetary aggregates and/or different forms of monetary base. Early on, a change in monetary base was commonly used because it was felt to be a proper indicator of discretionary policy. However, over the years it has become clear that a monetary base variable tends to be counter-cyclically correlated with velocities and is largely determined endogenously as a response to market behaviors. Moreover, the monetary base variable is suspect due to recent Federal Reserve changes whereby payments are now made for holding reserve balances. Therefore, monetary endogeneity and exogeneity, in this paper, are modeled using binary variables as discussed below, while monetary aggregates have become the important empirical variable for indicating discretionary exogenously determined events.

The independent variables: Proxy for aggregate supply

As acknowledged by Andersen and Jordan with their inclusion of ΔZ, given that final outcomes in an economy are not solely aggregate demand driven it seems imperative to somehow include aggregate supply function impacts in developing the appropriate final form equation. That is, a variable like ΔZ is necessary for the proper functional form, indeed it is perhaps the most important variable in the long run. The problem is finding the proper variable to add into the single equation model.

One way to incorporate the aggregate supply side of the equation is to use a two-stage least squares approach, and theoretically this is perhaps the best way to go. However, determining the variables to use for that approach is still rather difficult and to some extent ad hoc. Another variable to fill that role may be a lagged dependent variable. The problems and benefits of using a lagged dependent variable have been chronicled over the years and in many differing disciplines, with a substantial majority ultimately feeling that the problems are too many and significant to use it at all (see Achen (2000) for a survey). But there is a growing minority that has come to believe that the use of lagged dependent variables is acceptable, even necessary, for unbiasedness in some OLS regressions. These researchers have shown mathematically that in many cases a regression is actually biased without the inclusion of a lagged dependent variable.

Arjun Wilkins (2013) has recently shown that the use of lagged dependent variables is more complicated than simply determining whether lagged dependent variables should or should not be included. He points out that most studies try only to answer the question: should our model include or not include a lagged dependent variable, i.e. should the model be $y_t = f(x_t, y_{t-1})$ or $y_t = f(x_t)$? However, if one starts with the following functional relationships,

$$y_t = \alpha y_{t-1} + \beta x_t + \varepsilon_t$$

$$x_t = \rho x_{t-1} + e_{1t}$$

$$\varepsilon_t = \phi \varepsilon_{t-1} + e_{2t},$$

assuming that the *y* and *x* variables are stationary time series, then Wilkins shows that both interpretations of the simple model are incorrect and will lead to the OLS model being misspecified. By a series of substitutions from those three equations he shows that the correctly specified model is instead

$$y_t = (\alpha + \phi) y_{t-1} + (-\alpha\phi) y_{t-2} + \beta x_t + (-\beta\phi) x_{t-1} + e_{2t}.$$

We take Wilkins' approach to remodel the Andersen – Jordan equation below while adapting it to two independent variables rather than one.

Gap variables to proxy endogeneity/exogeneity

Another problem is the separation of exogenous from endogenous policy behaviors. Recall that in previous studies countercyclical policy variables were thought to have a negative

bias in the coefficients. While it is true that if policies are countercyclical, then the single-equation approach must have a sorting mechanism, and generally sorting mechanisms have been inadequate. Researchers have attempted to determine behaviors from the policy variables themselves, for instance using 'high-employment' data or only deficit spending rather than the true numbers. Instead, here the unemployment gap variable is introduced as a means to disentangle the fiscal policy behaviors. Given that a balanced-budget multiplier for fiscal spending will be nearly the same strength as the deficit spending multiplier, it is asserted here that changes in total government spending with the addition of the unemployment gap is a better measure of exogenous policy than mere deficit spending, which takes place even in times of full employment. Moreover, an inflation gap variable is similarly introduced to determine endogenous/exogenous monetary policy behaviors and with the same reasoning as that for fiscal spending; the only time monetary policy can impact real consumption is when there are idle resources.

5. The Empirical Results

The updated runs here incorporate the several changes to the original Andersen – Jordan approach enumerated above. The data for all of the regression runs are in first difference, annual form and cover from 1961 – 2012. All data used were downloaded from the Federal Reserve Bank of St. Louis's "Federal Reserve Economic Data" website (FRED) including government transfer payment data. For each equation the dependent variable was the change in consumption minus government transfers, *dc* as described earlier. No corrections were made for possible progressive tax implications to the consumption function as consumption changes through time. The remaining variables below were: *dm2* and *dm2-1*, the change in M2 monetary aggregate with no lag or a one period lag; *dmzm* and *dmzm-1*, the change in MZM monetary aggregate with no lag or a one period lag; *ddef* and *ddef-1*, the change in federal deficit spending with no lag or a one period lag; *dg* and *dg-1*, the change in government spending with no lag or a one period lag; *unem gap*, the difference between the actual unemployment rate and the natural rate; and *infl gap*, the difference between the actual inflation rate and the theorized target inflation rate of 2%. The change in consumption minus transfer variable is included as two independent variables lagged one, *dc-1*, and two periods *dc-2*.

Of the many runs performed, three are given below. These three equations yield the most information for comparisons and the efficacies of policy variables.

The first equation below is an updated version of the classical Andersen – Jordan model using first differences and uses the MZM monetary aggregate to represent monetary policy. The run also contained nominal government expenditures to represent discretionary fiscal policy rather than deficit spending. All government spending, whether discretionary or not should have similar impacts on private consumption. The dependent variable is nominal consumption minus transfers as discussed earlier. The regression output is given below.

The results from the run show no short-run aggregate demand effects to be statistically significant. Only the one period lagged dependent variable is statistically significant in explaining the dependent variable. If this result is correct, it may suggest that both monetary and fiscal policies are ineffective for stimulating aggregate demand, even in the short run. Of course, because only private consumption is being considered here, the

impact of these macro tools might be hidden in non-private consumption. Still, the reason only private consumption is being used is to specifically remove any potential for government spending to automatically be counted.

Another explanation could be that the government spending and monetary policies are fully anticipated and are offset as they are implemented, i.e. a rational expectations approach. This explanation was not tested here. A final explanation for the negative results might be that movement in the monetary aggregate MZM is not a good proxy for monetary policy given that it is mainly transactions money.

Equation 1.

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	1.009873	0.30283	3.33478	0.00182
dmzm	-0.08363	0.101136	-0.8269	0.413081
dmzm-1	0.016573	0.096553	0.171649	0.864558
dc-1	0.602781	0.172162	3.501249	0.001132
dc-2	-0.00289	0.18831	-0.01533	0.987843
dg	-0.51083	0.37145	-1.37524	0.176526
dg-1	0.160551	0.362425	0.442991	0.660101
unem gap	0.029068	0.072354	0.401744	0.689959
infl gap	0.03004	0.042519	0.70651	0.483867

$n = 50$; $\bar{R}^2 = 0.218$; $F = 2.705$

Equation 2.

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	40.38884	33.30447	1.212715	0.23218
dm2	-0.81293	0.238088	-3.41441	0.001452
dm2-1	0.973876	0.260868	3.733212	0.000575
dc-1	1.310292	0.195787	6.692446	4.49E-08
dc-2	-0.59798	0.22934	-2.60742	0.012666
dg	-0.61073	0.437146	-1.39709	0.169901
dg-1	0.639186	0.434978	1.469467	0.149338
unem gap	-0.27623	12.72625	-0.02171	0.982788
infl gap	-0.00871	5.808429	-0.0015	0.998811

$n = 50$; $\bar{R}^2 = 0.674$; $F = 10.611$

The second equation below is a re-run of the first equation except that M2 is substituted for MZM to represent monetary policy. Perhaps M2 is a better proxy for monetary policy because this time M2 is statistically significant in both periods, alternating plus and minus effects as seen so often with lagged components. Aggregating these M2 coefficients shows a slight positive overall impact; however, that impact is hardly adequate to be considered a demand management tool given the wildly alternating plus/minus coefficients. Lagged private consumption minus transfers is again significant and positive. Finally, government spending is once again statistically insignificant, but barely so, and interestingly the aggregation of the coefficients is very slightly positive.

In general the second equation does not inspire confidence that either fiscal or monetary policies are useful for aggregate demand management.

The third equation below is like equation 2, but government expenditures have been replaced with solely deficit spending. The resulting changes are dramatic. Monetary policy variables are no longer significant while the deficit spending coefficients are statistically significant. However, summing the government spending coefficients suggests an overall slightly negative impact on the dependent variable. The lagged dependent variable, private consumption minus transfers, is again prominently significant.

Equation 3.

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	46.22681	23.12767	1.998767	0.052293
dm2	-0.08014	0.207517	-0.3862	0.701348
dm2-1	0.194826	0.26402	0.737922	0.464765
ddef	-0.51807	0.080774	-6.41378	1.12E-07
ddef-1	0.312631	0.159376	1.961594	0.056624
dc-1	0.951071	0.188491	5.045718	9.68E-06
dc-2	-0.23077	0.149232	-1.5464	0.129692
unem gap	9.776192	8.944247	1.093015	0.280768
infl gap	-2.10361	4.050118	-0.5194	0.606277

$n = 50$; $\bar{R}^2 = 0.805$; $F = 26.272$

6. Summary

In this paper, we have attempted to address many of the criticisms listed above by first introducing the lagged dependent variable into the St. Louis equation, which proxies for aggregate supply and ensures that there is no misspecification due to missing variables. We have also updated the dependent variable to private consumption minus transfers to avoid any possibility of miscounting first round effects such that any impact by aggregate demand policies will be required to impact the largest portion of aggregate expenditures, consumption, via re-spending only. And unemployment gap and inflation gap variables

have been added to separate discretionary policies from endogenous movements. These changes combined are fairly extensive and a sincere change from any previous St. Louis equation study.

The results of all of these changes made to the original Andersen – Jordan St. Louis equation are quite interesting. The empirical work here suggests that neither monetary nor fiscal policies have a meaningful impact on the changes in private non-governmental consumption. Instead, the short and long-run movements of private consumption appear to be dramatically impacted by general economic growth. Indeed, no support is found for standard Keynesian or monetarist thought. Of course this study will not be sufficient to alter the economic profession's solid belief in its ability to direct the economy, indeed Belliveau (2011) comes to the opposite conclusion from this study; however, indications here are that economists' policies may have less impact than is generally believed.

It has been forty-five years since Leonall Andersen and Jerry Jordan used their St. Louis equation to seek an answer to the simple question: what is the efficacy of monetary policy compared to that of fiscal policy? But, the numerous papers, models, results, and interpretations that have transpired since then have not yet left us with a consensus in the profession, and the results here are not likely to change that. Here we have proceeded with the St. Louis equation from a new orientation and found that there is very little support for aggregate demand management in improving or even altering short-run private consumption patterns in the US. This result might be due to the 'thermostat effect' (some bloggers have begun calling it the 'Sumner Effect') of very successful aggregate demand management, but even anecdotally the evidence tends to dismiss that. Perhaps aggregate demand management is simply not very effective in meaningfully altering private economic conditions.

This is sobering and suggests that the stark reality may be that markets must slowly grind to their new equilibriums on their own. If this is true, then private consumption appears to be stimulated only by production improvements in currently produced goods and services, i.e. supply-side factors. This certainly makes sense in the long run, but has generally not been considered important in the short run. Indeed, it has been thought that supply-side "management" is not a short-run policy tool. Aggregate demand management has been the tool of choice ever since Keynes because, if it is effective, it is theoretically a simple short-run means to get an economy back to its production possibilities. Maybe this long held view is incorrect.

References

Achen, Christopher H., 2000. "Why lagged dependent variables can suppress the explanatory power of other independent variables." *Ann Arbor* 1001 (2000): 48106-1248.

Ahmed, Ehsan and James M. Johannes, 1984. "St. Louis Equation Restrictions and Criticisms Revisited: Note" *Journal of Money, Credit and Banking* 16.4, Part 1 (Nov. 1984), pp. 514-520.

Andersen, Leonall C. and Keith M. Carlson, 1970. "A monetarist model for economic stabilization." *Federal Reserve Bank of St. Louis Review*, April, 1970. pp. 1 – 19.

Andersen, Leonall C., Jerry L Jordan 1968. “Monetary and fiscal actions: a test of their relative importance in economic stabilization.” *Federal Reserve Bank of St. Louis Review*, 1968.
pp. 29–44.

Batten, Dallas S. and Daniel L. Thornton. "The monetary-fiscal policy debate and the Andersen-Jordan equation." *Federal Reserve Bank of St. Louis Review* 68.8 (1986): 9-17.

Batten, Dallas S. and R. W. Hafer., 1983 “The Relative Impact of Monetary and Fiscal Actions on Economic Activity: A Cross-Country Comparison” *Federal Reserve Bank of St. Louis Review (65)*. Jan. 1983 pp. 5–12.

Belliveau, Stefan., 2011. “A St. Louis Equation to reassess the influence of macroeconomic policy instruments” Working Paper No. 28839, Posted 15 February 2011. *Munich Personal RePEc Archive* online at http://mpra.ub.uni-muenchen.de/28839/

Bias, Peter V., 2014. “A chronological survey of the Friedman – Meiselman / Andersen – Jordan single equation debate” *Research in Business and Economics Journal*, AABRI, the Academic and Business Research Institute, Vol. 10, 1 – 21.

Carlson, Keith M., 1978. “Does the St. Louis Equation Now Believe in Fiscal Policy?” *Federal Reserve Bank of St. Louis Review (60)*. Feb. 1978 pp. 13–19.

DeLeeuw, Frank, and J. Kalchbrenner. "Monetary and Fiscal Actions: A Test of Their Relative Stability—Comment." *Federal Reserve Bank of St. Louis Review* 52 (1969): 6-11.

Elliot, J. W. “The Influence of Monetary and Fiscal Actions on Total Spending: The St. Louis Total Spending Equation Revisited” *Journal of Money, Credit and Banking*, Vol 7. Number 2 (May 1975) pp. 181-192.

Friedman, Benjamin M., 1977. “Even the St. Louis Model now Believes in Fiscal Policy” *Journal of Money, Credit and Banking*, (May 1977) pp. 365-67.

Friedman, Milton, and David Meiselman, 1963. “The Relative Stability of Monetary Velocity and the Investment Multiplier in the United States, 1897–1958.” *In Commission on Money and Credit: Stabilization Policies.* Englewood Cliffs, NJ: Prentice-Hall: 165–268.

Goldfeld, Stephen M., Alan S. Blinder, John Kareken and William Poole, 1972. Source: Brookings Papers on Economic Activity, Vol. 1972, No. 3 (1972), pp. 585-644.

Gramlich, Edward M., 1971. "The usefulness of monetary and fiscal policy as discretionary stabilization tools" *Journal of Money, Credit and Banking* 3.2 (1971): 506-532.

Jordan, Jerry L., 1986. “The Andersen-Jordan Approach after Nearly 20 Years.” *Federal Reserve Bank of St. Louis Review*: 5-8.

McCallum, Bennett T., 1986. “Monetary versus Fiscal Policy Effects: A Review of the Debate” in R.W. Hafer, ed. *The Monetary Versus Fiscal Policy Debate: Lessons from Two Decades*. Totowa, NJ: Rowman & Allanheld, 1986, pp. 9-32.

Modigliani, Franco, and Albert Ando, 1976. "Impacts of fiscal actions on aggregate income and the monetarist controversy: theory and evidence." *Monetarism, North-Holland Publishing Company, Amsterdam* (1976): 17-42.

Poole, William and Elinda B. F. Kornblith., 1973. “Friedman-Meiselman CMC Paper: New Evidence on an Old Controversy” *The American Economic Review*, Vol. 63, No. 5 (Dec., 1973), pp. 908-917.

Silber, William L., 1971. “The St. Louis Equation: ‘Democratic’ and ‘Republican’ Version and other experiments” *The Review of Economics and Statistics*, Vol. 53, No. 4 (Nov., 1971), pp. 362-367.

Stein, Sheldon H., 1980. “Autonomous Expenditures, Interest Rate Stabilization, and the St. Louis Equation” *The Review of Economics and Statistics*, Vol. 62, No. 3 (Aug., 1980), pp. 357-363.