

The Circular and Cumulative Structure of Administered Pricing

by

Mark W. Nichols, Ph.D.
Associate Professor of Economics
Department of Economics
University of Nevada – Reno
Reno, Nevada 89557
mnichols@unr.edu

Oleg V. Pavlov, Ph.D.
Assistant Professor of Economics
Department of Social Science & Policy Studies
Worcester Polytechnic Institute
Worcester, Massachusetts 01609
opavlov@wpi.edu

Michael J. Radzicki, Ph.D.
Associate Professor of Economics
Department of Social Science & Policy Studies
Worcester Polytechnic Institute
Worcester, Massachusetts 01609
mjrads@wpi.edu

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Introduction

How are prices determined? This is a very basic economic question that many economists have sought to answer. The short explanation from neoclassical economics is that firms, seeking to maximize profits, produce until their marginal revenue equals their marginal cost, thereby generating a supply of goods and services. Consumer demand for these products arises from income-constrained utility maximization. Together, the interaction of firms and consumers, supply and demand, determines price in the market.

Many, if not most, economists will also tell you that this is not literally how things work. However, neoclassical economists will usually invoke the “Friedman (1953) defense”, claiming that a more literal explanation is unnecessary because the neoclassical model predicts well. It is as if the firm’s only goal is profit maximization, achieved as if it equated marginal revenue and cost. A model’s usefulness is judged by its ability to predict firm-level data well, not by its realism. Indeed, extremely simple models, devoid of institutional detail, are to be preferred because their results are not specific to any particular time or place.

Yet even the ability of the neoclassical model to predict well can be questioned. The economy in general, and prices in particular, are not as frictionless as the theory predicts. Studies by Means (1935, 1936, 1972), Blinder (1998), Lee (1994, 1995), and others [see Lee (1999)], have demonstrated the inflexibility of prices over long periods of time. Moreover, heterodox economists have long emphasized the simple fact that, when actual decision processes used by managers to set prices are studied they rarely, if ever, resemble the neoclassical explanation. As a result, institutional and Post Keynesian economists have sought a more literal explanation of price setting, one that is dynamic and open, possibly path-dependent, and that accounts for the historical, social, cultural, and institutional context of the firm, industry, or economy.

The purpose of this paper is to report on the administered pricing sub-sector of a Post Keynesian-Institutionalist-System Dynamics (PKI-SD) “core” model that is currently under development by the authors. When complete, the model will be used to examine the dynamics of heterodox economic theory, as well as to test the implications of heterodox policy alternatives.

Mark-Up Pricing

A complete overview of the heterodox pricing literature is impossible in this paper. Rather, what is reviewed here are some of the key studies that are relevant for representing managerial behavior in the goods sector of the PKI-SD model. For a thorough review of the Post Keynesian pricing literature see Lee (1994, 1995, 1999) and Downward (1999).

According to Downward and Reynolds (1996) one of the key features of Post Keynesian price theory is the focus on the mark-up, where price is set as some mark-up over costs, as opposed to the equating of marginal revenue and marginal cost. The calculation of costs, the sensitivity of price to changes in demand, the dynamics of price over time, and the determinants of the mark-up are all issues that have been explored.

One of the seminal studies in Post Keynesian pricing was conducted by Hall and Hitch (1939), who had the novel idea of simply going out and asking managers how they set prices. Their conclusion is that managers set prices using a rule of thumb they termed full-cost pricing. Hall and Hitch found that firms use direct costs as a base, to which is added a percentage for overhead, including selling or marketing costs, and an addition for profits. Interestingly, Hall and Hitch (1939, 18) note that “maximum profits, if they result at all from the application of this rule, do so as an accidental (or possibly evolutionary) by product.”

Andrews (1949) introduced the “normal cost principle” where average direct costs are “grossed up” by an amount sufficient to cover overhead costs and ensure a profit under “normal” production. In other words, the mark-up is such that firms may normally cover their costs of production. For this reason, Andrews is often credited with coining the term “normal cost pricing.”

The work of Kalecki (1954) is also important in that prices are set based on a mark-up of average direct costs and the pricing activity of other firms. The influence of other firms, which varies with the degree of concentration, advertising and promotion, and the influence of unions will also influence pricing over the business cycle. For example, during an economic downturn, falling sales will squeeze profit margins as average overhead costs rise. Firms may cooperate and raise prices or possibly engage in cut-throat competition. Their response depends on, among other things, their collective history and the competitive, institutional, and social environment in which they operate. Kalecki’s model is thus non-deterministic and non-marginalist.

Finally, the work of Means (1935, 1936, 1939, 1972) is seminal in the price mark-up/rigidity literature. Means was interested in the price setting process in large corporations. That method of pricing, a mark-up a la full/normal cost pricing based on uncertain long-run profits, was termed “administered prices.” Prices, in stark contrast to neoclassical economics, were set by administrative fiat as opposed to the auction-place of the market.

According to Downward and Lee (2001, p. 474), the studies reviewed above “constitute the core of an open-system approach to pricing for Post Keynesian economics.” Among heterodox economists there is an ongoing debate over differences between simple mark-up, normal cost, and target rate of return pricing [see Lee (1994, 1995) and Downward and Reynolds (1996)]. The current configuration of the PKI-SD model embodies a labor-based, vertically integrated mark-up that is modified by several pressures that are inherent in the system. However, exploring normal cost pricing variations could easily be added and the implications of these structural changes on economic outcomes explored.

Wage Determination and Inflation

Central to the problem of modeling pricing in actual economic systems is the issue of inflation. Since inflation significantly influences wage demands, and since changes in the general level of prices cause inflation, understanding the wage determination process is crucial for understanding the administered pricing process.

According to neoclassical theory, prices and wages are market clearing mechanisms. As a result, inflation is caused by excess demand. Heterodox economists, however, point out that this explanation is not credible since firms always possess planned excess capacity. Instead, they argue that inflation is caused by two mechanisms: “mark-up” inflation and “cost-push” inflation (Wray 2000).

Mark-up inflation is due to the competitive behavior of firms. A firm’s market power determines its ability to charge a higher mark-up price which, in turn, influences the distribution of industry surplus between firms. The industry-level surplus depends only on the aggregate mark-up level and is not affected by the market power of individual firms.

Cost-push inflation occurs as a result of a conflict over income shares between labor and management. Strong labor may be able to push-up wages. To maintain profit margins, managers must respond by raising prices. If labor is able to reciprocate, this leads to the familiar wage-price spiral. A wage-price spiral is more likely when labor is unionized and/or the labor market is tight, and it is less pronounced when centralized wage bargaining is employed.

Heterodox prescriptions to control inflation are very different from the ones offered by the orthodox school. Since heterodox economists do not believe that excess demand causes inflation, they do not advocate cooling down the economy as a way to reduce inflation. Instead, they have proposed policies to control the mark-ups being imposed by firms with market power such as **Tax-Based Incomes Policies - TIPs** (which tax firms that allow wage increases in excess of productivity increases [Wallich and Weintraub (1971)]) and **Market Anti-Inflation Policies - MAPs** (which allow firms to trade the rights to raise prices [Lerner and Colander (1980)]). For firms in the competitive sector of the

economy, they have proposed more traditional buffer stock policies (Wray 2000). Finally, a novel approach to stabilizing prices has been proposed by Mosler (1995, 1997-1998), who argues that the government should fix the price of labor employed in an “employer of last resort” (buffer stock) program and let the quantity of the labor it “purchases” for the program float. Since labor is used to produce everything in the economy, the ELR labor price, along with the government’s buffer stock behavior (i.e., “buying” labor for the program when labor is unemployed and “selling” labor out of the program when the private sector needs workers), will act to stabilize the economy’s general level of prices and eliminate involuntary unemployment.

The Model

Figure 1 presents an overview of the PKI-SD core model [see also Radzicki (2003, 2006)]. It consists of six main interacting sectors, five of which constitute the domestic economy and one of which represents the “rest of the world” economy. The five sectors making up the domestic economy include a household sector, a goods producing sector, a capital producing sector, a financial or banking sector, and a government sector. The government sector is subdivided into a monetary authority and a fiscal authority and these two sub-sectors share a consolidated set of financial accounts. For the purposes of this paper, only the interactions between the goods producing and household sectors, as they relate to the issue of administered pricing, will be examined. The rest of the model’s sectors, which are currently under development, have been switched off.

The PKI-SD model embodies many ideas from Post Keynesian and institutional economics including administered pricing structures, circular and cumulative relationships, endogenous money creation, economic power relationships, path dependent structures, and policies based on, among other things, principles of functional finance. The primary purpose of the model is to explore the dynamics of heterodox theory and policy prescriptions such as the various anti-inflation policies described above. It is termed a “core model” because it is envisioned that it will be extended and modified by others who will use it to look at fresh questions such as the size and scope of the underground economy, the effects of alternative tax, energy, and health care policies on the economy, the future of the euro, the implications of functional finance for developing nations, and terrorist threats to the banking system. A tool for this purpose is sorely needed as the details of many interesting heterodox policy recommendations have yet

to be explored, and conveying many of these recommendations to policy makers and the general public has been difficult.¹

Figure 2 presents a causal loop diagram of the primary circular and cumulative causal factors that underlie the goods producing sector's administered pricing behavior. Its behavioral origins can be traced to Cyert and March's (1963) study of the pricing behavior of department store managers, as well as to the mark-up pricing and system dynamics literatures. Variables that appear to be exogenous, such as "Goods Sector Gross Profits" and "Goods Sector Inventory Coverage" are actually connected to other parts of the model and serve as parts of multiple feedback loops.

Inspection of Figure 2 reveals that price is influenced by seven main factors including wage costs, labor productivity, the amount of inflation expected by the household sector, the goods producing sector's traditional mark-up, and pressures on the sector's mark-up from its inventory coverage, profit flow, and international competitor's price. Basically, the sector's wage costs are passed-on in the form of higher prices. Price increases in excess of productivity increases cause inflation and force the household sector to raise its wage demands. If the household sector has the ability to make the goods producing sector pay the higher wage rate (due to a high time for the goods producing sector to fill employment vacancies) and the goods producing sector has the ability to pay the higher wage rate (due to the absence of liquidity constraints), the wage rate increase is granted [see Craypo (1986)]. In the absence of any other pressures, this relationship would produce a wage-price spiral. The positive feedback loop that has the capability of generating a wage-price spiral is shown with thick arrows in the lower left portion of Figure 2.

The model does not typically generate an unchecked wage-price spiral, however, because pressures from negative feedback loops work to keep the positive loop under control. More specifically, pressure from a comparison of the goods producing sector's price with its international competitor's price may reduce the mark-up, as will pressure from lean inventories as judged by a decreasing inventory coverage in the sector. On the other hand, if

¹ Consider, for example, Wray's (2002) frustration: "Stephanie Bell and I have been trying to explain [functional finance] in a series of articles, but have been making little progress because no one can follow balance sheets any more." In addition, consider Sawyer's (2005) recent comments on employer of last resort programs: "The ELR schemes are underdeveloped and a range of the difficulties which I have raised might be addressed if the ELR schemes were developed beyond the sketch outline stage."

gross profits fall below their traditional value, the goods sector will increase its mark-up above what it would otherwise have been.

Model Testing

Figure 3 presents three fifty-year simulations of the PKI-SD core model. The base run at this point is an equilibrium simulation because the model is still undergoing testing.²

In addition to the equilibrium “base” run, two test runs are presented in Figure 3. The first is a “baby boom” run, in which the demographic sub-sector of the household sector undergoes an eighteen year increase in its birth rate. The goods producing sector responds by increasing its mark-up, and hence its price (Figures 3a and 3c), due to upward pressure from a shortening of its inventory coverage (Figure 3f). In other words, the baby boom floods the sector with orders and draws-down its inventory, because it takes some time for the new children to grow old enough to enter the labor force and contribute to production. Although the wage rate and pressure from desired profits remain unchanged (Figures 3d and 3e), the upward pressure on the mark-up from inventory coverage is mitigated by downward pressure from the international competitor's price (Figure 3b). On net, however, the pressure from shortening inventory coverage is stronger and the mark-up is increased.

The second test is a permanent increase in price by the good sector's international competitor. This time the sector responds in a much more complicated way. Although, generally speaking, the sector tries to follow its competitor (Figure 3b) and increase its price (Figure 3a), this pressure is mitigated by several factors. More specifically, at times a loose labor market causes the household sector to lose power and it thus fails to make the goods producing sector pay its desired wage rate (Figure 3e). This, along with some unemployment, leads to fewer orders placed to the goods producing sector and a lengthening of the sector's inventory coverage. Despite periodic upward pressure on the mark-up from the sector's desire to maintain its profits (Figure 3d), the periodic downward

² Equilibrium in a system dynamics model means that all of a system's stocks are simultaneously at their desired levels and that all of its net flows are zero. As a result, there is no pressure for change. The later criterion means that either all of the in-flows to each stock are exactly balanced by their out-flows, or that all of the in- and out-flows to each stock are zero. The resulting model behavior is a set of horizontal lines over time. For purposes other than model testing, this is quite an uninteresting state of affairs.

pressure from its inventory coverage is stronger (Figure 3f). As a result, on net, price occasionally falls back to its original level.

Conclusions

This paper describes the circular and cumulative administered pricing structure of the goods producing sector of a Post Keynesian-Institutionalist- System Dynamics model that is currently being created by the authors. Based on its response to numerous test inputs, some of which are shown here, it appears to be working properly and, as such, is ready to be integrated with the other sectors of the model. Once this is accomplished, the model's mark-up pricing dynamics will begin to increasingly resemble those observed in the actual economy and its structure will be able to be used to examine heterodox theory and policy alternatives.

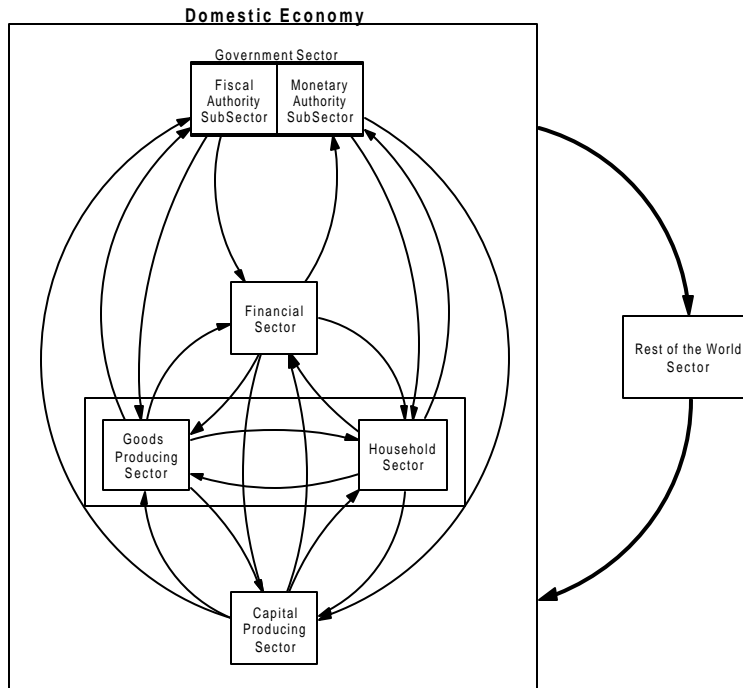


Figure 1: Sector Diagram of the Post Keynesian-Institutionalist-System Dynamics Core Model

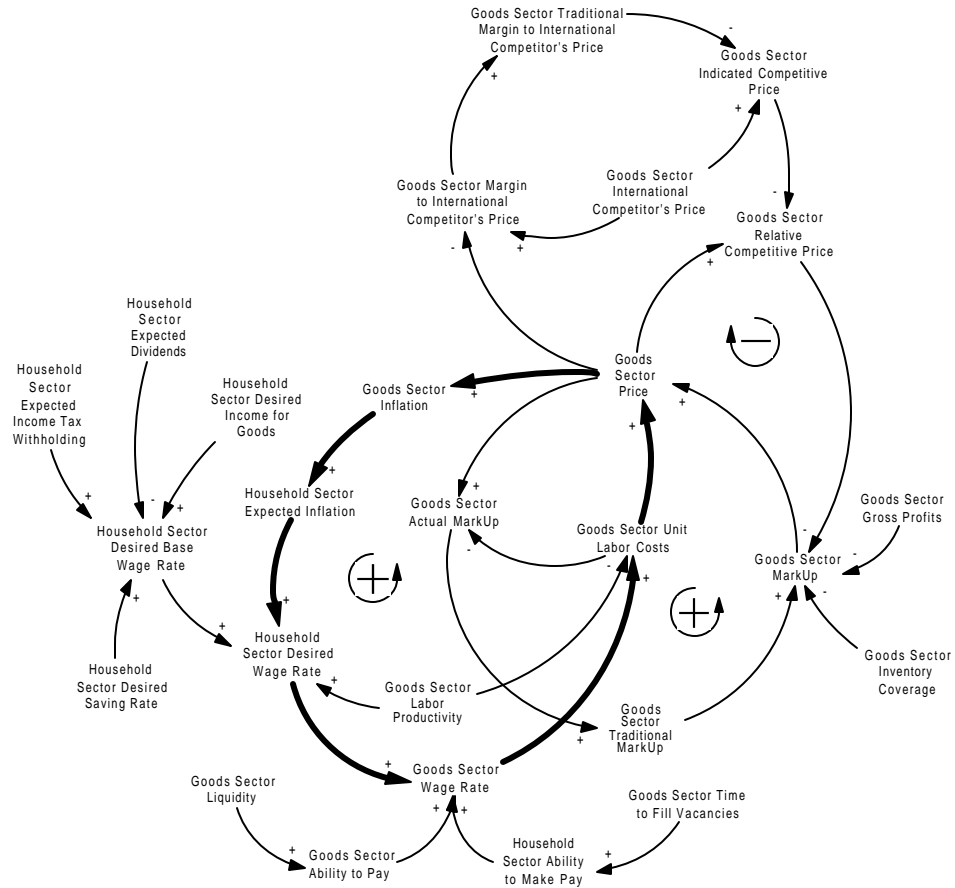


Figure 2: Causal Loop Diagram of the Goods Producing Sector's Administered Pricing Behavior



Figure 3a: Goods Sector Price

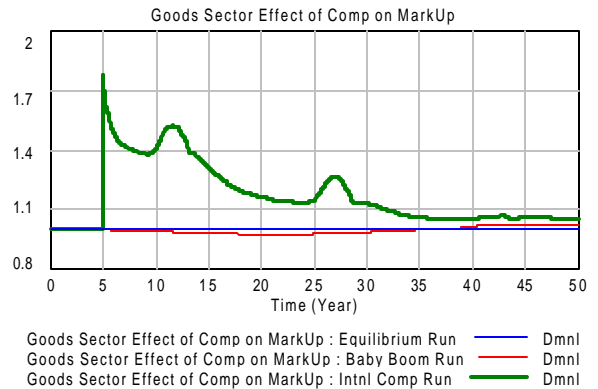


Figure 3b: Goods Sector Effect Competition

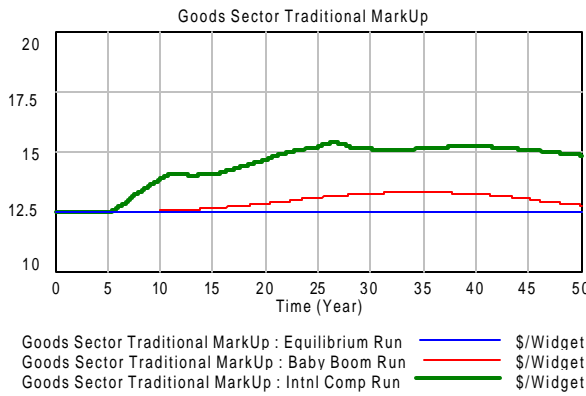


Figure 3c: Goods Sector Trad. Mark-Up

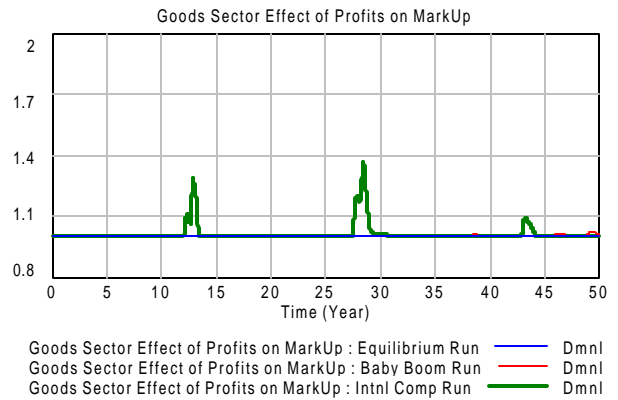


Figure 3d: Goods Effect Profits

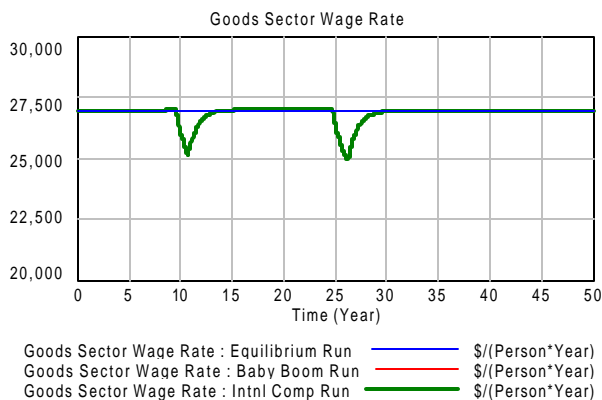


Figure 3e: Goods Sector Wage Rate

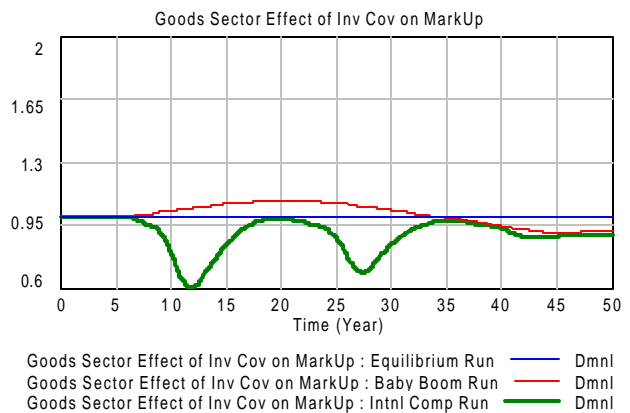


Figure 3f: Goods Sector Effect Inventory

Figure 3: Three Simulations of the Post Keynesian-Institutionalist-System Dynamics Core Model

References

- Andrews, Philip W. S.** 1949. "A Reconsideration of the Theory of the Individual Business." Oxford Economic Papers. New Series. 1(1): 54-89.
- Blinder, Alan S., Elie R. D. Canetti, David E. Lebow, and Jeremy B. Rudd.** 1998. Asking About Prices: A New Approach to Understanding Price Stickiness. New York: Russell Sage Foundation.
- Craypo, Charles.** 1986. The Economics of Collective Bargaining: Case Studies in the Private Sector. Washington, D.C.: The Bureau of National Affairs, Inc.
- Cyert, Richard M. and James G. March.** 1963. A Behavioral Theory of the Firm. Englewood Cliffs, NJ: Prentice-Hall, Inc.
- Downward, Paul.** 1999. Pricing Theory in Post Keynesian Economics: A Realist Approach. Cheltenham, UK: Edward Elgar.
- Downward, Paul and Reynolds.** 1996. "Alternative Perspectives on Post Keynesian Price Theory." Review of Political Economy 8(1): 67-78.
- Downward, Paul and Frederic S. Lee.** 2001. "Post Keynesian Pricing Theory 'Reconfirmed'? A Critical Review of Asking About Prices." Journal of Post Keynesian Economics 23(3): 465-483.
- Friedman, Milton.** 1953. "The Methodology of Positive Economics." Essays in Positive Economics Chicago: Chicago University Press.
- Hall, Robert L. and Charles J. Hitch.** 1939. "Pricing Theory and Business Behaviour." Oxford Economic Papers 2(May): 12-45.
- Kalecki, Michal.** 1954. Theory of Economic Dynamics. New York: Rinehart.
- Lee, Frederic S.** 1994. "From Post Keynesian to Historical Price Theory. Part 1: Facts, Theory, and Empirically Grounded Pricing Model." Review of Political Economy 6(3): 303-336.
- _____. 1995. "From Post Keynesian to Historical Price Theory. Part 2: Facts, Theory, and Empirically Grounded Pricing Model." Review of Political Economy 7(1): 72-124.
- _____. 1999. Post Keynesian Price Theory. Cambridge, UK: Cambridge University Press.
- Lee, Frederic S. and Paul Downward.** 1999. "Retesting Gardiner Means's Evidence on Administered Prices." Journal of Economic Issues 33 (December): 861-86.

- Lerner, Abba P. and David C. Colander.** 1980. MAP: A Market Anti-Inflation Plan. New York: Harcourt Brace Jovanovich, Inc.
- Means, Gardiner C.** 1935. "Industrial Prices and Their Relative Inflexibility." U.S. Senate Document 13, 74th Congress, 1st Session, Washington, D.C.
- _____. 1936. "Notes on Inflexible Prices." American Economic Review 26(Supplement): 23-35.
- _____. 1939. The Structure of the American Economy. Part I: Basic Characteristics. Washington, D.C.: Government Printing Office.
- _____. 1972. "The Administered Price Theory Reconfirmed." American Economic Review 62(3): 292-306.
- Mosler, Warren.** 1995. Soft Currency Economics. 3rd Edition. West Palm Beach, FL: Self Published.
<http://www.warrenmosler.com/>
- _____. 1997-1998. "Full Employment and Price Stability." Journal of Post Keynesian Economics 20(2): 167-182.
- Radzicki, Michael J.** 2003. "Mr. Hamilton, Mr. Forrester and a Foundation for Evolutionary Economics." Journal of Economic Issues. 37(1): 133-173.
- _____. 2006. "Institutional Economics, Post Keynesian Economics, and System Dynamics: Three Strands of a Heterodox Economics Braid." In John T. Harvey and Robert F. Garnett, Jr., eds. The Future of Heterodox Economics. Ann Arbor, MI: University of Michigan Press. Forthcoming.
- Sawyer, Malcolm C.** 2005. "Employer of Last Resort: An Extended Response to my Critics." Journal of Economic Issues 39(1): 256-264.
- Wallich, Henry C. and Sidney Weintraub.** 1971. "A Tax-Based Incomes Policy." Journal of Economic Issues 5: 1-19.
- Wray, L. Randall.** 2002. "A Monetary and Fiscal Framework for Economic Stability." Policy Note 02/02. Center for Full Employment and Price Stability. University of Missouri – Kansas City.
<http://cfeps.org/pubs/pn/pn0202/pn0202.html/>
- _____. 2001. "Money and Inflation." Pp. 79-91 in Richard Holt and Steven Pressman, eds. A New Guide to Post Keynesian Economics. London: Routledge.