Is New Keynesian investment theory really "Keynesian"?

reflections on Fazzari and Variato

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In the Spring 1994 issue of this journal, Steve Fazzari and Anna Marie Variato pursue two related themes. First, they argue that New Keynesian theory of financial markets provides the rigorous microfoundation for investment instability missing from the less formal Post Keynesian theory.[1]

Second, though New Keynesian theory is based on the standard ergodic stochastic assumption of Neoclassicism while Post Keynesian theory posits a nonergodic world of fundamental uncertainty (FU), Fazzari and Variato argue that the New Keynesian assumption of asymmetric information (AI) makes the two theories complements rather than substitutes. While their effort at cross-paradigm fertilization is admirable, the arguments they present in support of the complementarity thesis are not convincing.[2]

Moreover, New Keynesian theory has more substantial theoretical problems and Post Keynesian theory greater analytical strengths than Fazzari and Variato suggest. This paper evaluates the place of New Keynesian theories of finance and investment instability in the Keynesian tradition.

The next section summarizes and critically evaluates New Keynesian theories of finance and investment instability. The section after that argues that some of Keynes's most important contributions-including his theories of investment instability, business cycles, speculative financial asset pricing, and the "crisis"--are incompatible with New Keynesian assumptions and methods. Fazzari and Variato' s contention that FU alone cannot generate key Keynesian results is then challenged in the final section.

New Keynesian theories of financial markets and investment instability

There are few significant methodological differences between New Keynesian and Neoclassical theories.[3] The New Keynesian approach rests "on formal optimization models derived from Neoclassical first principles" (Fazzari and Variato, 1994, p. 354)[4].

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[1] Fazzari and Variato primarily focus on those static, partial equilibrium New Keynesian models of financial markets similar in method and structure to the seminal paper of Stiglitz and Weiss (1981). The comments about and criticisms of New Keynesian financial theory in this paper are primarily directed at, and thus largely limited to, the same literature. Though there are New Keynesian models of dynamic financial processes, such as "rational bubbles" and "noise trading," the relation of such models to the Stiglitz- Weiss literature has not been clearly articulated.

[2] For an informative general discussion of the relationship between New and Post Keynesian theories, see Dymski (1994).

[3] An undeniable advantage to New Keynesians of the close affinity of their assumptions and methodology to Neoclassical theory is that it has permitted them to be taken seriously by mainstream

What are the core assumptions that New Keynesian financial theory appropriates from the Neoclassical theory of rational agent choice under uncertainty? There are three that are crucial to a comparison of New and Post Keynesianism. First, and by far most important, the models are ergodic stochastic.[5]

Expectations are assumed to take the form of probability distributions over possible future outcomes that satisfy the complete ordering axiom of expected utility theory. Distributions are usually "objective" and always believed by the agent to be both complete and correct-the truth and nothing but the truth about the stochastic environment within which decisions are taken. Second, there is individual, insurable risk, but no systemic, uninsurable risk. Third, real capital is typically assumed to be liquid and the investment process reversible. Post Keynesians reject all three assumptions.

Readers of this journal are quite familiar with the Post Keynesian critique of the Neoclassical theory of choice under uncertainty through the writings of Shackle (1992), Davidson (1982-83, 1987, 1991), Vickers (1994), and others. Because New Keynesian theory is based on the same set of assumptions as Neoclassical theory (with two ingenious and important innovations discussed immediately below), it is subject to the same Post Keynesian methodological criticism as Neoclassical theory.

The distinctive New Keynesian innovations are the assumptions that (1) information is asymmetric (AI), and (2) contracts are inherently incomplete and therefore not externally or third-party enforceable. These innovations create important differences between Neoclassical and New Keynesian models of financial markets, including the way they relate investment to finance. While the models are ergodic, so that New Keynesian borrowers are assumed to possess complete and correct probability distributions for the expected outcomes of investment projects, lenders either cannot distinguish, within a given risk class, between borrowers with "good" (low-risk) projects and borrowers with "bad" (high- risk) projects (adverse selection), or they cannot monitor and control the allocation of borrowed funds between good and bad projects (moral hazard)[6]. In either case, non-Neoclassical results follow: borrowers with good projects have to pay a "lemons premium" large enough to cover the expected default on bad projects in the same risk class; credit might be rationed; excessive collateral might be required; and equity capital might be excessively costly. These problems cause (a) credit to be misallocated (some bad projects are funded while some good ones are not), (b) internal

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economists and in mainstream journals, a status denied to those who base their work on the assumption of FU.

[4] Fazzari and Variato argue that the fact that New Keynesian, New Classical and Neoclassical theories "share methodological features" has "more to do with form than substance" (p. 366), but they are mistaken. The fact that New Keynesian theory can generate important hypotheses that conflict with those of their more orthodox relatives cannot by itself sustain the conclusion that methodological "form" and theoretical "substance" can be effectively segregated.

[5] See Davidson (1987 and 1991) for an explanation of the difference between ergodic and nonergodic models.

[6] Davidson (1994) points out that the New Keynesian assumption that borrowers may mislead lenders about the use to which credit will be put could be considered more a legal than an economic matter. It "interjects the concept of 'honesty' and 'law abiding' behavior into economics." He argues that "misrepresenting oneself in signing a loan contract is, after all, fraud" (p. 550).

funds to be less expensive than either debt or new equity (the "wedge" stressed by Fazzari and Variato), (c) the aggregate level of investment spending to be too small relative to a Neoclassical model (if credit is rationed), and (d) investment to be unstable under exogenous shock. All these problems are transmitted through alterations in the cost of financial capital function. There is no distinctive New Keynesian theory of the demand for financial capital by the investing firm.

Two troublesome aspects of the New Keynesian assumptions about agent expectations should be noted. First, there is a severe logical contradiction inherent in the New Keynesian assumption set. AI is a sine qua non of New Keynesian theory, but (as noted by Fazzari and Variato) AI logically implies FU. However, FU is logically inconsistent with the ergodic stochastic underpinnings of the New Keynesian theory of expectations.

Fazzari and Variato argue that in the real world, "there will be asymmetric information, and thus there must be fundamental uncertainty" (p. 364). They are right about this: AI does imply FU. Agents can appropriate the future as knowledge only if (1) future states of the economy are predetermined and directly knowable, or (2) each agent knows the choices that all other agents will make and can construct future states of the economy from these micro data. But AI makes the extent of future market clearing contingent on the degree and distribution of informational asymmetry existing at each future point in time, information denied to agents by assumption. And agents cannot know the choices other agents will make because, by assumption, they do not know information that is known by others. Thus, borrowers cannot possibly know the expected returns on their own investment projects with actuarial certainty because expectations cannot possibly take the "complete and correct" form required for such certainty. Since AI Implies FU and there is no logically consistent way to integrate FU in a New Keynesian model, there is no logically consistent way to incorporate AI either. These models must be misspecified.

Second, while New Keynesian theorists stress the inadequacy of information available to lenders as the source of financial market "imperfections," the analytical method used in many of the models actually requires the assumption that lenders possess information about the borrower population not available to traditional Neoclassical lenders. The models are often game-theoretic in structure. Borrowers optimize given the market rate of interest; their "reaction functions" describe credit demand and project choice as a function of the interest rate. Lenders-the market's "leaders"-then select the equilibrium interest rate so as to maximize their expected utility *given borrowers' reaction functions.* But in order to be able to construct these reaction functions, lenders have to know not only the population of potential investment projects, but also borrower preference functions. In other words, lenders must possess all the information required to solve *the borrowers'* optimal choice problem in order to solve their own.[7]

[7] This expanded information requirement is true of most New Keynesian labor market theory as well. Firms must know how workers will react to changes in wages or working conditions in order to select the wage and monitoring process that maximizes their expected profits. But this requires knowledge of the workers' reaction functions, which in turn requires knowledge of their preference functions.

Note that there is no formal general equilibrium theory that integrates these New Keynesian partial

Thus, while the information attributed to lenders in New Keynesian financial theory may be insufficient to guarantee market clearing, it is not clear that this information set is "smaller" than in Neoclassical theory. The typical Neoclassical lending institution in a competitive market is in the strategic position of the New Keynesian borrower (or market "follower"), needing only knowledge of the interest rate and the lender's own cost structure to make an optimal choice. As Fazzari and Variato put it, in Neoclassical theory "so little information is relevant" to agent choice that "No one needs or wants to know more than the prevailing vector of market prices" (p. 366). So, if the Neoclassical lender can be said to have "perfect" (though stochastic) information, then the New Keynesian lender must possess information that is in some sense beyond perfect, yet inadequate.

The New Keynesian argument about investment instability is as follows: Internal funds are less expensive than external funds, and external funds may not be available at any price to a not inconsiderable number of firms. The cost of credit is inversely related to the collateral available to the firm and thus directly related to the firm's debt-to-equity ratio. Both the level of internal funds and the size of the debt-equity ratio are implicitly assumed to be functions of sales or capacity utilization.[8]

The typical New Keynesian models considered here are static equilibrium models, but they can shift from one stable equilibrium point to another if subject to exogenous shock. For example, a negative exogenous shock to aggregate demand will raise the cost of financial capital to the firm (and perhaps increase the number of firms subject to credit rationing) because it will decrease internal funds and may lower the value of collateral and raise the debt-equity ratio. These financial reactions to the shock will cause investment spending to decline, it is suggested, exacerbating the initial demand shock. New Keynesian financial structures thus "'can magnify the effect of disturbances and introduce new propagation mechanisms into the economy" (Mankiw and Romer, 1991, p. 13). These structures create "a link between investment and the cycle" and "explain aggregate fluctuations as an inherent feature of market economies" (Fazzari and Variato, 1994, pp. 366-367). Such instability provides the justification for Fazzari and Variato's support of government aggregate demand management.

Note, however, that all such discussion of cycles, shock propagation, and macrostabilization is analytically *informal*. These are partial equilibrium, single-market models, structurally devoid of spillovers. As such, they cannot be used to formally analyze such real-financial sector interactions as the transmission of aggregate demand shocks to investment via financial markets. That is, these New Keynesian theories of instability or cycles are really ad hoc "stories" in the spirit of the "rhetorical" method of McClosky or Klamer. This is not meant to be critical of informal methods of dynamic analysis. As Keynes stressed, there are important dynamic issues too complex and

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equilibrium models. And there is no counterpart to the Walrasian theory of the interaction of these markets in the notional dynamics of out of equilibrium behavior. Indeed, because the individual lender's decision process already incorporates or internalizes the behavior of the entire demand side of the market, the interest rate set by the lender *is* the equilibrium rate; there *is* no out-of-equilibrium market adjustment process here even in notional or logical time.

[8] Ceteris paribus, high sales and capacity utilization raise profits, cash flow, and the value of equity, and thus lower the debt to equity ratio.

contingent to be adequately represented by fixed mathematical formulas. Rather, the problem is that while New Keynesians point with pride to their "rigorous microfoundations" and formal optimization processes--and criticize Post Keynesian theory for its ad hoc-ery, rigor and formality are jettisoned when their attention turns to the crucial dynamic implications of their own theory. Simple logical consistency dictates that they cannot have it both ways.

Is the New Keynesian theory of investment instability really Keynesian?

Fazzari and Variato ask whether the New Keynesian theory of investment instability fits comfortably into the "Keynesian" tradition, a central question they find "difficult to answer" (1994, p. 355). The question *is* difficult because selecting the appropriate criteria to distinguish Keynesian from non-Keynesian theory is inherently controversial. Should we focus on core assumptions, analytical method, and/or the character of derived hypotheses?

Though their essay is devoted to theoretical issues, Fazzari and Variato answer this question by focusing on the character of one derived hypothesis--the investment equation. "The view of investment that emerges from these new models is unmistakably Keynesian in its empirical implication" (p. 366). Since Fazzari's work is primarily empirical, it would be understandable if he believed that the compatibility of econometrically testable investment equations and their policy implications between New and Post Keynesian theory should be our primary concern.[9] Fazzari and Variato conclude that the New Keynesian investment equation is "Keynesian" because: (1) investment is unstable (when subject to exogenous shock); and (2) "finance affects investment." While these two criteria are not unreasonable, they are far too restrictive to provide a satisfactory answer to the question at issue.

For those concerned with theoretical as well as econometric issues, including Fazzari and Variato, core assumptions and analytic method must also be considered. The core assumptions of these theories (those concerned with the nature of expectations, the presence of systemic risk, the reversibility of investment and so forth) are profoundly incompatible. But the question of the compatibility of analytic method is more complex because the Keynesian tradition incorporates different kinds of models and methods, including not only static equilibrium models, but dynamic models of cyclical and secular instability as well. Post Keynesians often disagree about the proper theoretical relation between statics and dynamics and between long and short-term expectations in Keynes's theory. Not all Post Keynesians will agree with the position on these issues taken here.[10]

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[9] Moreover, though New Keynesian *theory* is based on complete and correct expectations, Fazzari and Variato believe that FU does exist "in the real world," so that, as they see it, the two schools may disagree about theory but not necessarily about reality.

[10] The reader should especially note that my interpretation of Keynes's theory of conventional expectation formation (discussed below) would appear to be incompatible with the views on decision making under FU expressed by Paul Davidson. (See, for example, Davidson, 1991, pp. 129-136.)

In this section I argue that conventional expectation and confidence formation can create conditional "tendencies" and "regularities" in a Keynesian dynamic model. The regularity of the typical business cycle discussed by Keynes in chapter 22 of *The General Theory* is one example of this. However, in my view, the existence of such tendencies is not inconsistent with the assumption of FU. Their existence

Contrary to the claims of Fazzari and Variato, New Keynesianism has no adequate substitute for Keynes's dynamic theory of investment instability, or any effective counterpart to Keynes's explanation of speculation in financial markets, business cycles, and moments of discontinuity and crisis. Keynes's unique theory of conventional expectation and confidence formation, which is central to his dynamic theory, is logically incompatible with the ergodic foundation of New Keynesianism.

This is not to deny that there are dynamic financial market theories labeled New Keynesian, in particular, "noise trading" and "rational bubbles." However, the relation between static credit rationing theories and these dynamic New Keynesian models is, to say the least, unclear. Moreover, since noise trading and rational bubbles are single market models, they cannot formally connect investment with financial market dynamics. Most dynamic New Keynesian financial models assume that real sector magnitudes, including the level of investment, are independent of the model's financial cycles. Finally, both these theories rely on key assumptions---irrational agents (noise trading) and efficient markets (rational bubbles)-that seem at odds with the optimal long-term properties of the models.[11]

Let us consider static and dynamic Keynesian models in turn. Keynes wanted to develop a model that could explain the secularly high unemployment that plagued Britain in the 1920s and 1930s, thereby justifying powerful and sustained state economic intervention. An equilibrium model was needed to counteract the belief, prevalent at the time, that unemployment was, however long its duration, a disequilibrium phenomenon that would eventually be eliminated either through the operation of market forces (the

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can never make the models ergodic because the timing, duration, amplitude, turning points, and other attributes of future cycles are inherently unknowable, as is the trend around which the cycle fluctuates.

In his methodological essays, Davidson often stresses the "arbitrary and inconsistent" nature of choice, an emphasis that seems inconsistent with my interpretation of conventional expectations formation. "The past would appear to be meaningless in forming expectations about the future" (1991, pp. 135, 136). However, he also believes that social institutions bring some degree of continuity to our uncertain world. "Sensible decision makers believe they operate in a nonergodic environment; they try to form *sensible expectations* which rely on the existence of social institutions that have evolved (e.g., contracts and money) to permit humans to cope with the unknowable" (1987, p. 149).

These differences may be, to some extent, a matter of emphasis and degree. We both believe that economic and social institutions such as money and contracts (as well as social practices such as conventional expectation formation) create "stickiness" and impart some variable degree of continuity to economic life. And there are other causes of "stickiness" as well. The capital stock is slow to change, worker skills are relatively inert, and geographical aspects of industry location, living patterns, and transportation networks adjust slowly over time. Basic political and economic structures do not normally undergo qualitative change quickly, nor does the distribution of wealth. Since there are many aspects of our economic structure that are likely to remain the same one month from now or one year from now, and some attributes that are not likely to be substantially different ten years from now, information about the relevant past is likely to be useful in forming "sensible" expectations about the future-though one can never be absolutely sure about this.

Thus, we both agree that the future is inherently unpredictable and that there is normally some degree of continuity between today and tomorrow that agents rely on when constructing their fallible expectations. I seem to put more stress on continuity, while Davidson emphasizes unpredictability and discontinuity.

[11] See Fortune (1991) for a brief exposition and critical evaluation of these theories.

"Treasury View") or via *temporary* government aggregate demand stimulus (Pigou's view). The core chapters of *The General Theory* develop a static model designed to demonstrate that the economy could easily attain a high unemployment equilibrium position that market forces alone could not eliminate. By holding the long-term expectations reflected in the marginal efficiency of capital function fixed, and assuming that short-term expectations were approximately correct, comparative static exercises could be used to demonstrate the power of vigorous and sustained government aggregate demand stimulus to restore full employment.[12]

The New Keynesian models considered here are analytically consistent with the core General Theory model to the extent that both are short-run static equilibrium models, and both hold long-run expectations constant in their comparative static exercises.[13] (Of course, long-term expectations have fundamentally different characteristics in the two theories.)

Keynes, however, was also concerned with dynamic aspects of economic experience in the interwar years. In the opening paragraph of chapter 22 of *The General Theory*, Keynes stated that "if we are right, ...our theory must be capable of explaining the phenomena of the trade cycle" (p. 313). Keynes summarized his work as follows: the theory "I offer is, therefore, a theory of why output and employment are so liable to fluctuation" (1937, p. 221). He also stressed that capitalism's normal dynamic tendencies were not discontinuous or dramatically unstable. Keynes wrote that "it is an outstanding feature of the economic system in which we live that, whilst it is subject to severe fluctuations... it is not violently unstable" and that "there is some recognizable degree of regularity in the time-sequence of upward and downward movements" of the trade cycle (1936, pp. 249, 314).

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[12] See Carvalho (1984-85, 1992) for one interpretation of the relation between short- run and long-run expectations in Keynes's theory.

Though as Keynes stressed in chapter 12 long-term expectations are subject to bouts of instability, projections of the continuance or long-lived, deep-seated depression may be difficult to alter. For this reason, his use of short-term comparative statics to analyze longer-term contemporary problems was perhaps not unwarranted. Nevertheless, as Keynes made unmistakably clear in his compelling argument in chapter 21 (pp. 297, 298), holding long-term expectations constant in the face of significant change in important exogenous or endogenous variables is, *in genera/,* a serious error and a "method of blind manipulation" (1936, p. 297).

[13] There is an apparent inconsistency in the treatment of the long-term expectations that influence investment in New Keynesian comparative static exercises. On the one hand, expectations are generally assumed to be "objective" and, therefore, fully endogenous. On the other hand, expectations are held constant in New Keynesian comparative static exercises; that is, they are treated "as if" they are exogenous. This seeming inconsistency may reflect the fact that these are all single-market models, not the general equilibrium models needed to calculate the effect of a change in one variable on the equilibrium values of all other variables. This inability to endogenize expectations may also explain why New Keynesian financial theory avoids the use of formal dynamic models. Its theory of credit rationing is static, ...a full cyclical analysis requires a more explicitly dynamic theory, yet to be formulated" (Jaffee and Stiglitz., 1~90, p. 873). Jaffee and Stiglitz point.to.one particular impediment to the dynamlzatlon of New Keynesian theory. Equilibrium values in these models depend crucially on the *relative* characteristics of expected returns on "good" versus "bad" projects (see Jaffee and Stiglitz (1990, pp. 860-862).) To dynamize the models would require a theory of the way that events such as recessions and expansions differentially affect high- and low-risk projects. But there is no widely accepted theory to fall back on here.

Though Keynes's dynamic theory relies on concepts such as the multiplier, its centerpiece is the treatment of expectation formation. He posits an institutionally specific and historically contingent *social* process of expectation and confidence formation that is logically incompatible with the ergodic foundation of New Keynesian theory. Keynes argued that even though "we simply do not know" the information needed to make optimal and safe "crucial" or "momentous" decisions, as human beings (rather than Neoclassical calculating machines) we have a *psychological* need "to behave in a manner which saves our faces as rational, economic men" (1937, p. 214).[14] He tells us that we have a deep-seated need to calm our anxieties and alleviate the constant stress created by forced decision making under inadequate information. "Peace and comfort of mind require that we should hide from ourselves how little we foresee" (Keynes, 1973, p. 124).

To help accomplish this calming of our nerves, Keynes argues, people develop a collective or social "conventional" process of expectations and confidence formation (discussed in chapter 12 of *The General Theory* but best described in his famous 1937 article).[15] In place of the ergodic expectations-as-knowledge fairy tale of New Keynesian theory, Keynes proposed an expectations formation process based on custom, habit, tradition, instinct, and other socially constituted practices that only make sense in an environment of human agency and FU. The two key conventions suggested by Keynes are: (1) "we assume that the past is a more serviceable guide to the future than a candid examination of past experience would show it to have hitherto been," and (2) "Knowing that our individual judgment is worthless, we endeavor to fall back on the judgment of the rest of the world, which is perhaps better informed" (1937,p.214).

The first convention suggests that agents form expectations (in normal or noncrisis periods) by extrapolation, using data from the relevant past. Therefore, it suggests that even the longer-term expectations relevant to the investment decision tend eventually to adjust to some degree to changes in the actual trends of relevant variables "except in so far as [there are] specific reasons to expect a change" (p. 152). The second convention stresses the social and organic character of expectations formation. In a world of FU there are no probability distributions that infallibly represent the future. The future is not "out there" waiting to be discovered; rather, the future depends on the actions we take now in light of our own fallible expectations of it. Knowing this, Keynesian agents form their own expectations by trying to guess the expectations of others in an endless iterative process. Each agent also looks directly to average or aggregate expectations--to "conventional wisdom "-for guidance. We "endeavor to conform with the behavior of the majority or the average" and try "to copy the others" (1937, p. 214). In sum, expectations are formed through complex, time-consuming, institutionally contingent patterns of social dynamics. Both conventions, therefore, impose some degree of *endogeneity* on the expectations formation process.[16]

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[14] Shackle stressed the importance of "crucial" or "momentous" decisions in Keynes's theory. Such decisions are unique or nonrepeatable, central to the economic welfare of the agent, and reversible only at substantial cost. The capital investment decision of the enterprise and the portfolio selection decision of the individual or institutional rentier are two of the most important "momentous" decisions in macro theory.

[15] See Crotty (1994) for one interpretation of the role played by conventional expectations and confidence formation in Keynes's theory.

[16] For example, chapter 19 of *The General Theory* emphasizes the endogeneity of wage and price

Because conventions are socially constituted and therefore socially and externally sanctioned, they can create "confidence" that the expectations thus formed have a degree of meaningfulness or validity or truth content that idiosyncratic figments of the imagination of atomized agents could never realistically be expected to attain[17]. The social and external nature of conventional expectations permits agents to sensibly attribute a quasi-scientific or quasi-objective character to the "conventional wisdom," even under FU.

Conventional expectation and confidence formation, according to Keynes, is "compatible with a considerable measure of continuity and stability in our affairs, so long as we can rely on the maintenance of the convention[s]" (1936, p. 152). As long as agents continue to maintain allegiance to the social conventions on which expectations are based, even a dynamic Keynesian model will exhibit a relatively continuous trajectory.[18] But because expectations are "based on such a flimsy foundation, [they] are subject to sudden and violent changes. The practice of calmness and immobility, of certainty and security, [can] suddenly break...down" (1937, pp. 214-215). Points of discontinuity are thus to be expected in Keynes's dynamic theory, though their timing, amplitude, duration, and so forth are fundamentally uncertain.

Consider Keynes's theory of the late expansion phase of the cycle. Keynes's admittedly sketchy theory of the "representative" business cycle outlined in chapter 22 of *The General Theory*, as well as Minsky's financial fragility hypothesis critically depend on the recurrent generation (and subsequent deflation) of a speculative financial boom in which asset prices become too high and leverage too large and too widespread to be perpetually sustained by future cash flows. In an expansion, increased profits and rising financial asset prices eventually create expectations of further growth through the endogenous conventional processes described above. Under conditions commonly found in mid-expansion, these optimistic expectations can become self-fulfilling as banks begin to "push" loans, firms raise investment in response to more buoyant profit expectations, rentiers shift toward riskier assets, and all agents willingly increase leverage.[19] The longer

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expectations.

[17] The term confidence is not a synonym for optimism; it refers to the agent's degree of belief in the objective truth-content of her expectations. According to Keynes, "confidence" is distinct from "the most probable forecast we can make." It indicates "how highly we rate the likelihood of our best forecast turning out quite wrong" (1936, p. 148).

[18] Since the social and conventional character of expectations and confidence formation generates continuity much of the time in Keynesian macro models, there is no inherent impediment to their formalization as suggested by Fazzari and Variato. The key difference between Post Keynesian and New Keynesian or Neoclassical models with regard to formalism is that Post Keynesian models will be subject to endogenously generated cycles as well as to occasional financial and economic crises or discontinuities whose dynamics cannot be adequately represented by any fixed mathematical formula. In a Keynesian model, the future is inherently unpredictable and expectational disappointment is virtually inevitable.

[19] Neoclassicists have argued that the endogenous expectations and confidence formation process in Keynes-Minsky models of instability presume agent irrationality because rational agents would incorporate past cycles into their expectations formation process, correctly anticipating the occurrence of future downturns and crises.

There are a number of reasons why, in a nonergodic stochastic world, this criticism is misplaced. Here I note three. First, agents are susceptible to the "New Era syndrome." Since the institutional structures

the process continues, the more confident agents may become that their optimism is well founded.[20]

In the dynamics of Keynes's model-in contrast with the New Keynesian static model, *it is the similarities rather than the differences in borrower and lender expectations that are important; both* agents may get caught up in boom euphoria. Increased leverage does not automatically reduce investment as it would in a New Keynesian comparative static exercise because the degree of leverage generally considered to be "safe" or "prudent," a conventionally determined and thus partly endogenous variable, may rise in the boom by as much as or more than actual leverage.

As long as actual leverage does not exceed this elastic upper bound, the expansion process can continue. However, as soon as cash flows and/or financial asset prices fall below expectations by a substantial margin, the degree of leverage considered to be "prudent" can decline dramatically-indeed discontinuously--as optimism is shattered and the confidence agents place in their ability to make meaningful forecasts deteriorates. If expectational disappointment is severe enough, agents may lose faith in the meaningfulness of the social conventions that underpin the expectation formation

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and conventional practices of the economy change from time to time, agents can always find sensible reasons to believe that the current period or "New Era" will not be subject to the disruptions suffered in earlier times. To take one example, with the creation of the Federal Reserve System in 1913, many people came to believe that the 1920s and 1930s would no longer be susceptible to the financial panics that previously plagued the economy. For another, with the creation of the postwar Keynesian welfare/warfare state and the strengthening of the Fed, it was commonly assumed in the 1960s that we would never again experience a serious recession. The implication of the New Era syndrome for formal modeling is that the time series used for extrapolative forecasts should be truncated just after the end of the most recent Old Era or old regime. That is, at some point in the New Era, expectations will become relatively uncontaminated by data from previous crises.

Second, institutions often create an "asymmetric reward structure" to guide the decisions of agents who operate within them. As an expansion heats up, it is safer for an executive to act as if she is as optimistic and confident as "the crowd" than it is to act conservatively in anticipation of the boom's end. No one can know how long the boom will last. If it goes on for some time, the firm will quickly lose patience with the lost short-term profits associated with conservative behavior, but will fail to punish the aggressive (if myopic) executive who fails along with the rest of the industry when the expansion ends. When everyone fails at boom's end, no individual can be faulted for poor performance because everyone will believe that failure was exogenously induced. As Keynes put it. "A 'sound' banker, alas!, is not one who foresees a danger and avoids it, but one who, when he is ruined, is ruined in a conventional and orthodox way along with his fellows, so that no one can really blame him" (1936, p. 176; see also pp. 157-158).

Third, since the conventional wisdom is constructed through a social process, and therefore has an existence that is external to and independent of the individual agent, it is not irrational for the agent to develop confidence in its validity or truth content.

[20] Dymski (1993) took the position that "depending on the amount of dissonance between anticipations and outcomes, agents may interpret their environment as either [neoclassically] risky or as Keynesian-uncertain," arguing that "the question of whether the economic environment is "nonergodic" is separable from the question of how agents behave in that environment." (p. 53). While I do not believe these questions are separable, it is true that the concept of "confidence" makes Dymski's position empirically compatible with the Post Keynesian assumption set. If economic activity remains stable long enough, agents may begin to develop such confidence in the truth-content of their forecasts of the future that tile distinction between risky and uncertain expectations may become *empirically* irrelevant even under FU for a limited period of time.

process. Once faith in conventions is shattered, there is nothing solid to ground expectations.[21] Forecasts may then shift rapidly from optimism to pessimism, and confidence in the validity of forecasts may quickly evaporate. Interest rates will rise and investment spending will decline--and could collapse. Investment "is being made in conditions which are unstable and cannot endure, because it is prompted by expectations which are destined to disappointment" (Keynes, 1936, p. 321). Loss of faith in the validity of conventions can explain discontinuous points of crisis and financial panic.

I know of no adequate New Keynesian substitute for Keynes's dynamic theory. The methodological incompatibility of the New Keynesian theory of investment instability described by Fazzari and Variato and Keynes's theory of investment instability outlined here is striking. Keynes's theory of instability is dynamic whereas the New Keynesian theories are static. One prioritizes process, the other stasis. The dynamism of Keynes's theory is partly endogenous (though inherently unpredictable "shocks" to the economy are an essential component of the theory of long-term expectations), while New Keynesian theory must resort to the exogenous pseudo-dynamics of comparative statics in order to get investment to move. The economic system envisioned by Keynes can endogenously generate points of discontinuity; New Keynesian models cannot. Of course, the ultimate source of these methodological incompatibilities is to be found in the conflicting core assumptions about agent knowledge of the future. Keynes's brilliant insights into the social and psychological dynamics of expectation formation are logically excluded from the ergodic world of New Keynesian theory.

Two last points: First, while both Keynesian and New Keynesian theory can explain the existence of insufficient credit, only Keynes's dynamic theory can explain why there might be too much credit. His theory of expectation formation incorporates a dynamic process of speculative excess participated in by borrowers and lenders that can push financial asset prices and loan volume so high (and liquidity and safety margins so low) that they cannot possibly be permanently sustained by future cash flows. The question of whether the problem of overly restrictive credit due to New Keynesian credit rationing, or the Post Keynesian problem of excessive credit and financial fragility (due to overly optimistic or speculative expectations) has been more empirically important in the past fifteen years is an extremely important and underinvestigated question.[22]

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[21] The loss of majority allegiance to the validity of the conventions that underpin the expectation formation process is a precondition for the outbreak of crisis and of extreme instability in Keynes's theory. Once confidence in the meaningfulness of the forecasting process breaks down, irreducible uncertainty forces its way into the consciousness of agents, breaking down the conventional barriers they have created to conceal it. In Keynes's words:

> A conventional valuation which is established as the outcome of the mass psychology of ignorant individuals is liable to change violently as the result of a sudden fluctuation of opinion due to factors which do not really make much difference to the prospective yield; since there will be no strong [conventional] roots of conviction to hold it steady. In abnormal times in particular, when the hypothesis of an indefinite continuance of the existing state of affairs is less plausible than usual even though there are no express grounds to anticipate a definite change, the market will be subject to waves of optimistic and pessimistic sentiment which are unreasoning and yet in a sense legitimate where no solid base exists for a rational calculation (1936, p. 154).

[22] It is difficult (if not impossible) to subject distinctive New Keynesian conclusions, such as the existence of an excess demand for credit or an excess supply of labor in equilibrium, to direct empirical

Second, while FU is logically incompatible with New Keynesian theory, AI seems perfectly consistent with Post Keynesian core assumptions. As Fazzari and Variato note, "it is not just objective facts that affect expectations under fundamental uncertainty, but also the interpretation of these facts. ..[F]undamental uncertainty, by necessitating interpretation in advance of action, *implies* the existence of asymmetric information in any real world context" (p. 364).[23] For example, the assumption that lenders may not have access to all the relevant facts about potential investment projects possessed by borrowers (AI), or that borrowers and lenders might not adopt identical methods of expectation formation even if they had access to the same data, fit comfortably within Post Keynesian theory. Either assumption will lead to "asymmetric expectations.[24]

Bear in mind that Keynes discussed such asymmetries in chapter 12 of *The General Theory.* He argued that while managers were interested in the long term and were as informed as one can expect to be in a world of FU about the current status and the future prospects of their enterprises, stockholders "have no special knowledge, either actual or perspective, of the business in question" and were primarily concerned with short-term gains and losses.[25] Perhaps the most important contribution New Keynesian theory can make to Post Keynesianism is to focus its attention on the theoretical implications of the informational and expectational asymmetries inherent in its assumption set yet relatively unexplored by Post Keynesian theorists.

Other challenges to the centrality of FU raised by Fazzari and Variato

Fazzari and Variato argue that a model based on FU with no asymmetries--in their terms, on incomplete but symmetric information--cannot adequately theorize several important phenomena: limits to risk reduction through diversification; a "wedge" between the cost of internal and external funds; a link between finance and investment; an important micro and macro role for bankruptcy and insolvency; and the existence of credit rationing. In this section I argue that they are mistaken; FU alone is adequate to generate these results.

Systemic risk, insurance, and diversification

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verification. The number of credit-rationed agents or the dollar amount of credit rationing is unobservable. Econometric results often cited in support of New Keynesian conclusions, such as the various papers on investment econometrics by Fazzari and his colleagues, tend to involve reduced form rather than structural equations (see, for example, Fazzari, Hubbard, and Petersen, 1988, and Fazzari, 1994). Thus, their results are consistent with various theoretical traditions-- including the Post Keynesian.

[23] See Glickman (1994) on the necessity under FU for each agent to individually construct her expectations from the raw data about the past and the present available to her.

[24] The term "asymmetric expectations" appears in Wolfson (1996).

[25] Keynes observed that the small stockholder has "no knowledge whatever of [the firm's] real position" and that "each individual [businessman] spends his time concealing from his friends the facts about himself that would be useful for them to know" (1981a, pp. 642,644). See Crotty (1990a) on the relation of owners and managers in Keynes's theory.

Post Keynesian models, unlike Neoclassical or New Keynesian models, embody unpredictable nonergodic stochastic processes. Thus, they are characterized by *systemic* risk or uncertainty. For example, no one can guarantee that a depression, hyperinflation, or collapse of financial asset prices will not take place at some *future* date. No agent can credibly provide insurance against fundamental economic uncertainty because no potential insurer can guarantee its own solvency in the event of crisis. Uncertainty may be thought to be reduced through asset diversification by borrowers and lenders, but it cannot be eliminated. Uncertainty reduction is further limited by the process of conventional expectations formation, which tends in "normal times" to center the expectations of a majority of agents around a consensus forecast, thereby creating a high degree of expected covariance among assets: most assets are expected to do well in the boom and conversely. Finally, since disappointed expectations are a virtual certainty in Post Keynesian models, what may appear to the agent ex ante as a highly diversified (and therefore relatively risk free) portfolio may in fact experience significant ex post losses when the boom comes to an end.

The wedge and the link between finance and investment

According to Fazzari and Variato, "symmetric uncertainty does not seem to provide a basis for the link between investment and finance" (p. 364). Yet, consider the case, stressed by Keynes, of the investment decision of a public corporation controlled by management. Investment would be necessary to achieve key managerial objectives such as the reproduction of the firm in a dynamic competitive environment, sufficient growth to ensure the loyalty of low- and mid-level management, and high pay and high status for top managers. But investment would also be risky because capital is long-lived and significantly illiquid while profit flows are fundamentally uncertain. As explained in Crotty (1990a), top managers will be risk-averse because poor performance could jeopardize their jobs as well as their control over corporate decision making. Most important, the mode of finance will strongly influence the likelihood that any particular poor performance will in fact lead to loss of autonomy or to managerial unemployment. If internal funds dominate the capital structure, a period of low profits may not prove dangerous. But if the debt-equity ratio is high, even a brief period of low profits or losses could prove disastrous to top management.

Two results follow. First, there is a wedge between internal and external funds; ceteris paribus, management will prefer the former to the latter. Second, ceteris paribus, the lower the firm's debt-equity ratio the greater its desired level of investment. A highly leveraged firm will not be willing to absorb the additional risk inherent in the investment process. Finance and investment are indeed linked.[26]

However, the relation between finance and investment is more complex in the endogenous dynamics of Post Keynesian theory than in the comparative statics of New Keynesian theory. During a vigorous expansion, a firm may want to accumulate capital at a pace that will raise its debt-equity ratio. Of course, it will not want to increase this ratio

[26] Thus, Post Keynesianism theorizes loan demand as well as loan supply effects of information inadequacy.

above a level it considers safe or prudent, nor will its creditors want to see the firm's interest coverage ratio decline to the point where they do not have a margin of safety they consider adequate. But in a Post Keynesian model, safe debt-equity ratios and safety margins acceptable to creditors are conventionally determined, partly endogenous variables that change as the economy moves through time. During the expansion, as noted, the maximum safe debt-equity ratio may rise by as much as or more than the actual debt-equity ratio. Since it is the difference between the two that affects the firm's desire to invest, the correlation between investment and the actual debt-equity ratio will be complex and contingent, and, therefore, the construction of robust econometric tests of this relation may prove to be quite challenging.[27]

FU, bankruptcy, insolvency, and instability

Fazzari and Variato argue (p. 362) that the lemons problem associated with AI is required to explain why the physical assets of the firm suffer significant loss in value under bankruptcy. They add (p. 362, n. 13) that this loss is magnified by the irreversibility of capital assets. This puts the cart before the horse: the irreversibility of investment is likely to cause more extensive capital losses in bankruptcy than insider-outsider information asymmetries.

The irreversibility of investment is a core axiom of Post Keynesian theory. "The assumption of substantial illiquidity of capital goods is a sine qua non of Keynesian investment theory" (Crotty, 1992, p. 489). Its centrality derives from the fact that fundamental uncertainty loses much of its analytical significance if coupled with the assumption of investment reversibility. With perfectly liquid capital, the firm may not need to know much about the future. If an investment turns unprofitable, the firm can recoup its financial investment (minus depreciation) simply by selling the capital goods involved. Most important, when investment is reversible, debt commitments are reversible as well; capital goods can be resold to payoff the debt used to finance them.[28]

The reason why capital accumulation is such a risky process is that the future is uncertain *and* most capital goods are substantially industry-,firm-, and use-specific as well as vulnerable to technical obsolescence. Plant and equipment designed for a specific purpose and a specific firm, perhaps integrated in a larger system of production, suffers a significant loss of market value when produced and again when installed (and again when sold, if it must be dismantled and transported to a new location). The assumption of investment irreversibility implies a substantial loss of asset value in the event of bankruptcy, while the assumption of a managerial firm implies that bankruptcy will be

[27] For one attempt to specify and test this relation econometrically, see Crotty and Jon Goldstein (1992).

[28] Of course, if the price of newly produced capital goods was subject to substantial and unpredictable instability, debt would not always be easily reversible. In this case, FU alone would be sufficient to generate the standard Post Keynesian results. However, most economic models, whether New Keynesian, Neoclassical or even Post Keynesian, do not assume significant instability of new capital goods prices. For example, see the "two price" model in Minsky *(*1986*).* For this reason, the irreversibility of investment is essential for Post Keynesian theory.

considered disastrous by firm decision makers--an event to be avoided at all cost.[29] In combination, these two assumptions imply that when expectations are badly disappointed, the most financially exposed firms will cut back on investment in order to minimize the possibility of bankruptcy or insolvency, while rentiers will shift out of highly uncertain, longer-term assets. These developments are mutually reinforcing: low investment reduces cash flows and thus increases the uncertainty of the future market value of financial assets, while rentiers' liquidity preference raises capital costs and thereby lowers investment. Financial markets are thus tightly linked in Post Keynesian theory to both the generation and the propagation of investment instability.

Post Keynesian theory and credit rationing

Fazzari and Variato ask whether FU can explain credit rationing without the assumption of AI? Abstracting from the asymmetries inherent in FU and simultaneously defining credit rationing as an AI-induced phenomena (as in New Keynesian theory), the answer obviously is no. But since, as Fazzari and Variato state, FU and AI are inevitably linked "in the real world," there is nothing inherently uncongenial to the concept of credit rationing in Post Keynesian theory. Indeed, Keynes discussed credit rationing on several occasions. *The Treatise on Money* argues that the price and the quantity of credit are, to some significant degree independent.

> The relaxation or contraction of credit by the banking system does not operate. ...merely through a change in the rate charged to borrowers; it also functions through a change in the abundance of credit. ...It is not in fact the case that anyone offering security can borrow as much as he likes from the British banking system merely by offering a rate of interest high enough to outbid other borrowers. There is ...a habitual system of rationing. ...Thus there is normally a fringe of unsatisfied borrowers ...to whom the bank would be quite ready to lend if it were to find itself in a position to lend more. [1971, pp. 326-327][30]

Post Keynesian insights can also be used to enrich our understanding of credit rationing and related phenomena. For example, New Keynesian theory argues that the extent of rationing depends on the extent to which borrowers are levered, but only Post Keynesian theory can explain *why* borrowers repeatedly end up burdened with *ex post* excessive leverage. Fazzari and Variato argue that Post Keynesian theory "begin[s] with an imbalance between ex ante expectations about cash flows and possibly disappointing ex post realization," but, in fact, the theory begins with FU and uses conventional expectation formation to *explain* the regular evolution of this imbalance.[31]

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[29] Even insolvency will jeopardize managerial objectives because, as Minsky stressed, insolvency entails creditor enforced constraints on managerial autonomy.

[30] Marty Wolfson brought this quote to my attention.

[31] Post Keynesian model is also susceptible to a "credit crunch," situation in which. In the aftermath of severely disappointed expectations, creditors find themselves so dangerously exposed to

Moreover, Post Keynesian dynamic theory can explain how financial market *price* rationing can also unduly restrict productive investment. In a speculative boom, expected yields will increase more for those assets most susceptible to speculative excess (such as long-term securities, real estate, art, precious metals, or corporate takeover targets) than they will for productive real capital.[32] As the experience of the 1980s demonstrates, speculators will rely heavily on credit for asset acquisition--corporate restructuring utilized more than $1 trillion in credit between 1984 and 1989.[33] Ceteris paribus, this speculative demand for credit will drive up real interest rates to levels that force borrowers whose capital investment projects promise only "normal" expected profitability out of the market. Keynes commented that "by the middle *of* 1929 'genuine borrowers '-if we may so designate borrowers for purposes of actual new investment...-were...already being squeezed out" of the credit market by "speculative borrowers" (1981b, p. 395).[34]

Post Keynesianism, New Keynesianism, and economic policy

There seem to be as many New Keynesian positions on government economic policy as there are New Keynesian economists. Mankiw and Romer tell us that "new Keynesian economists do not necessarily believe that active government policy is desirable. ...[W]hether the government should intervene ...is a ...difficult question that entails political as well as economic judgments" (1991, p. 3).[35] Thus, Fazzari and Variato's belief that New Keynesian financial theory provides analytical support for "effective macroeconomic stabilization policy" is refreshing. Fazzari and Variato do not believe, however, that their theory can justify government intervention in the credit allocation process because "it is not clear that the government can breach the barrier of asymmetric information any better than private sources of finance" (p. 367).[36] It is true that the government is in no position to identify specific informational asymmetries

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insolvency that they are forced to restrict lending, even for investment projects with positive net present value.

[32] Since the current value of long-term financial assets depends primarily on buyers' expectations of the future values of these assets--i.e. on their extremely elastic hopes and dreams--the potential for capital gains in a speculative boom can be very large indeed. In the case of long-lived real assets, potential capital gains in the boom are constrained by the short-run elasticity *of* supply of each asset. For example, ma- chine tools that take two or three months to produce are less susceptible to speculative excess than is commercial real estate.

[33] See Crotty and Goldstein (1993) for a description and analysis of financial aspects of the corporate restructuring wave of the 1980s.

[34] Ilene Grabel has elaborated a Keynesian theory of the processes through which speculation drives out productive investment. See, for example, Grabel (1995).

[35] I do not know if this general lack of support for interventionist policy is caused by the typical New Keynesian focus on aggregate supply (and acceptance of Say's Law); the standard belief that the imperfections and rigidities of short-run models do not carry over to the long run; a general belief in the inherent inefficiency of government programs; or the absence of any overall New Keynesian "Vision" of the economy which could integrate the disparate models into a coherent whole.

[36] Joseph Stiglitz, the quintessential New Keynesian, has argued that the inefficiencies inherent in a private market system require aggressive government economic intervention, including but not limited to macro stabilization and credit allocation policies. See Stiglitz (1993).

between agents, but this is not a prerequisite for an effective credit allocation policy. The government only needs to know the conditions under which various sectors of the economy are likely to be allocated more or less credit than seems consistent with long-term economic growth. In his econometric work on the link between finance and investment, Fazzari has consistently argued that credit-starved sectors exist and can be identified empirically. He suggested, for example, that "information gaps between firms and potential ;", lenders [are] widest for small firms in new industries," or for "relatively small fast-growing firms" (1994, p. 45). If he is right about this, should not the government create credit allocation programs for these firms that the market consistently underfinances?

In contrast with New Keynesian theory, Post Keynesian theory can be used to help identify sectors that tend, under boom conditions, to receive too much credit, sectors in which asset prices are particularly subject to speculation-induced inflation. Some of these assets--such as real estate, long-term securities, and precious metals-experience speculative inflation in almost all spirited expansions, while others--such as Third World debt (in the late 1970s) or corporate merger targets and foreign currencies (in the 1980s)-are period-specific objects of speculation. But even period-specific speculative assets can be identified while the boom is in progress. There was a general consensus by 1985 (among those not blinded by efficient markets theory) that the corporate restructuring movement had turned speculative and was absorbing far too much credit. Thus, it makes good sense from a Post Keynesian perspective to accept the theoretical possibility of efficient public credit allocation and debate the relative efficiency of concrete proposals for its implementation.[37]

Conclusion

New Keynesian theory has improved the analytical quality and empirical relevance of mainstream economic discourse. New Keynesians have forced the profession to take incomplete information seriously; made a strong case that finance affects investment; helped create at least some degree of mainstream appreciation of the Keynes-Minsky financial fragility thesis; created serious doubt about the ubiquity of market clearing; and helped erode belief in the beatific Walrasian "Vision" of the private-market economic system. Their criticism of some of the most hallowed tenets of Neoclassical theory is particularly telling because it is largely internal to the theory; New Keynesians accept Neoclassical methodology and have adopted almost all of its core axioms.

But there is a down side to the evolution of New Keynesianism as well. New Keynesians' insistence that macro theory be "micro founded" using "formal optimization models derived from Neoclassical first principles" (Fazzari and Variato, p. 354) reinforces the dominance of Neoclassical methodology and core axioms within the profession, further delegitimizing the non-Neoclassical axiomatic and methodological foundations of critical theories such as Post Keynesianism, Institutionalism, and

[37] Robert Pollin (1993), for example, has presented an interesting proposal to use the Federal Reserve System to allocate credit toward nonspeculative, productive public and private investment.

Marxism. In addition, mainstream economists are likely to use the emergence of New Keynesian theory as another excuse to attempt to marginalize Post Keynesian theory and Keynes's *General Theory*. Both Neoclassical and radical economists have told me that there is no longer any legitimate reason to pay serious attention to the "ad hoc," "informal" arguments of Post Keynesian economics because New Keynesian theory has already integrated the assumption of incomplete and inadequate information into economic theory in a "rigorous," "formal," and "scientific" manner. For these reasons, I believe it is important for Post Keynesians to temper their appreciation of the theoretical contributions of New Keynesianism with thoughtful and respectful criticism of its more serious analytical shortcomings.

REFERENCES

Carvalho, Fernando. "Alternative Analyses of Short- and Long-Run in Post Keynesian Economics." *Journal Post Keynesian Economic,* Winter 1984-85.

_____ *Mr. Keynes and the Po.\"t Keyne.\"ians.* Brookfield, VT: Elgar, 1992.

Crotty, James. "Owner-Manager Conflict and Financial Theories of Investment Instability: A Critical Assessment of Keynes, Tobin, and *Minsky." Journal of Post Keynesian Economics,* Summer 1990a, *12* (4), 519-542.

_____"Keynes on the Stages of Development of the Capitalist Economy: The Institutionalist Foundation of Keynes's *Methodology." Journal of Economic Issues,* September 1990b, 24 (3),761-780.

_____"Neoclassical and Keynesian Approaches to the Theory of Investment." *Journal of Post Keynesian Economics,* Summer 1992, *14* (4), 425-444.

_____"Are Keynesian Uncertainty and Macropolicy Compatible? Conventional Decision Making, Institutional Structures, and Conditional Stability in Macromodels." In Gary Dymski and Robert Pollin (eds.), *New Perspectives in Monetary Macroeconomics: Explorations in the Tradition of Hyman P. Minsky*. Ann Arbor: University of Michigan Press, 1994, pp. 105-142.

Crotty, James, and Goldstein, Don. "Do U.S. Financial Markets Allocate Credit Efficiently? The Case of Corporate Restructuring in the 1980s." In Gary Dymski, Gerald Epstein, and Robert Pollin (eds.), *Transforming the U.S. Financial System: Equity and Effffficiency for the 21st Century.* Economic Policy Institute Series. Armonk, NY: M.E. Sharpe, 1993, pp. 253-286.

Crotty, James, and Goldstein, Jon. "A Marxian-Keynesian Theory of Investment Demand: Empirical Evidence" In Fred Moseley and Edward Wolff (eds.), *International Perspectives on Profitability and Accumulation.* Brookfield, VT: Edward Elgar, 1992, pp. 197-234.

Davidson, Paul. "Rational Expectations: A Fallacious Foundation for Studying Crucial Decision-Making Processes." *Journal of Post Keynesian Economics,* Winter 1982-83, 182-197.

_____"Sensible Expectations and the Long-Run Nonneutrality of Money." *Journal of Post Keynesian Economics,* Fall 1987, 146-153.

_____"Is Probability Theory Relevant for *Uncertainty?" Journal of Economic Perspectives,* Winter 1991,5 (I), 129-144.

_____"Comment on "Do Informational Frictions Justify Federal Credit Programs?" *Journal of Money, Credit, and Banking,* August 1994, 26 (3), (Part 2), 545-551.

Dymski, Gary. "Asymmetric Information, Uncertainty, and Financial Structure: 'New' versus 'Post' Keynesian Microfoundations." In Gary Dymski and Robert Pollin (eds.), *New Perspectives in Monetary Macroeconomics: Explorations in Honor of Hyman Minsky.* Ann Arbor: University of Michigan Press, 1994, pp. 77- 104.

_____”Keynesian Uncertainty and Asymmetric Information: Complementary or Contradictory?” *Journal of Post Keynesian Economics,* Fall 1993, *16* (1), 49-54.

Fazzari, Steven. “Monetary Policy, Financial Structures, and Investment.” In Gary, Dymski, Gerald Epstein, and Robert Pollin (eds.), *Transforming the U.S. Financial System: Equity and Efficiency for the* 21*st Century*. Economic Policy Institute Series, Armonk, NY: M.E. Sharpe, 1993, pp. 35-64.

Fazzari, Steven; Hubbard, R. Glenn; and Petersen, Bruce. “Financial Constraints and Corporate Investment:’ *Brookings Papers on Economic Activity,* 1988, 144-195.

Fazzari, Steven, and Variato, Anna Maria. “Asymmetric Information and Keynesian Theories of Investment.” *Journal of Post Keynesian Economics,* Spring 1994, 6 (3), 351-370.

Fortune, Peter. “Stock Market Efficiency: An Autopsy?” *New England Economic Review,* March-April 1991, 17-40.

Glickman, Murray. “The Concept of Information, Intractable Uncertainty, and the Current State of the “Efficient Markets” Theory.” *Journal of Post Keynesian Economics,* Spring 1994, *16* (3), 325-350.

Grabel, Ilene. “Speculation-Led Economic Development: A Post Keynesian Interpretation of Financial Liberalization in the Third World.” *International Review of Applied Economics,* 1995,9(2), 127-149.

Jaffee, Dwight, and Stiglitz, Joseph. “Credit Rationing.” In Benjamin Friedman and Frank Hahn (eds.), *Handbook of Monetary Economics,* vol. 2. Amsterdam: North Holland, 1990, pp. 838-888.

Keynes, John Maynard. *The General Theory of Employment. Interest and Money. Cambridge: Cambridge University Press, 1972 [1936]*.

_____”The General Theory of Employment:’ *Quarterly Journal of Economics, February 1937, 51, 209-233.*

_____*The Collected Writings of John Maynard Keynes.* Vol. 6. *A Treatise on Money: The Applied Theory of Money.* London: Macmillan, 1971.

_____*The Collected Writings of John Maynard Keynes.* Vol. 14. *The General Theory and After: Part II.* London: Macmillan, 1973.

_____*The Collected Works of John Maynard Keynes.* Vol. 19. *Activities 1922-1929: The Return to Gold and Industrial Policy (Part II).* London: Macmillan, 1981a.

_____*The Collected Works of John Maynard Keynes.* Vol. 20. *Activities 1929- 1931: Rethinking Employment and Unemployment Policies.* London: Macmillan, 1981b.

Mankiw, N. Gregory, and Romer, David, eds. *New Keynesian Economics.* Cambridge, MA: MIT Press, 1991.

Minsky, Hyman. *Stabilizing an Unstable Economy*. New Haven, CT: Yale University Press 1986.

Pollin, Robert. “Public Credit Allocation through the Federal Reserve: Why It Is Needed; How It Should Be Done.” In Gary Dymski, Gerald Epstein, and Robert Pollin (eds.), *Transforming the U.S. Financial System: Equity and Efficiency for the 21st Century*. Economic Policy Institute Series. Armonk, NY: M.E. Sharpe, 1993, pp. 321-354.

Shackle, G.L.S. *Epistemics and Economics.* New Brunswick, NJ: Transaction Press, 1992.

Stiglitz, Joseph. “The Role of the State in Financial Markets.” 1993, mimeo.

Stiglitz, Joseph, and Weiss, Andrew. “Credit Rationing in Markets with Imperfect In- formation.” *American Economic Review*, December 1981, *71, 912-927.*

Vickers, Douglas. *Economics and the Antagonism of Time.* Ann Arbor: University of Michigan Press, 1994.

Wolfson, Martin. “A Post Keynesian Theory of Credit Rationing.” *Journal of Post Keynesian Economics*, 1996, 18 (3), 443-470.