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***The General Theory* After 80 Years: Time for the Methodological Revolution¹**

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I believe myself to be writing a book on economic theory which will largely revolutionize – not, I suppose, at once but in the course of the next ten years – the way the world thinks about economic problems. (John Maynard Keynes to George Bernard Shaw, January 1, 1935, in Keynes, 1973, p 492)

Very likely Keynes chose the wrong battleground. Equilibrium analysis and comparative statics were the tools to which he naturally turned to express his ideas, but they were probably not the best tools for his purpose... Keynes's comparative statics were an awkward analytical language unequal to the shrewd observations and intuitions he was trying to embody. (James Tobin, 1975)

Keynes intended *The General Theory of Employment, Interest and Money* to revolutionize economics in three ways: policy, theory, and methodology. The first goal was to provide a framework for fiscal policy. The second was to provide a theory in which a capitalist economy left to its own devices might, indeed likely would, settle at an equilibrium short of full employment. The third goal was to change economic method from one relying on static notions of demand and supply to one based on

¹ Preliminary versions were presented at the annual meeting of the History of Economics Society, Duke University, June 18, 2016, and at a seminar at the University of Paris-XIII, June 24, 2016. I thank participants for comments. I draw here on my forthcoming book, *Raising Keynes: A General Theory for the 21st Century*, especially Chapters I and VI.

dynamic adjustment in which equilibrium, if it exists, is the consequence of the adjustment process.

Raising Keynes, from which this essay is adapted, argues that Keynes failed in the third of these goals, and that the methodological failure compromised the theoretical goal of demonstrating the short-comings of the supposedly self-regulating market. Paradoxically, these two failures had less effect on the policy goal. When a repeat of the Great Depression threatened after the financial crash of 2008, Keynes's policy framework was revived. "Well I guess everyone is a Keynesian in a foxhole," said Robert Lucas in October 2008 (<http://www.time.com/time/magazine/article/0,9171,1853302,00.html>, accessed January 10, 2011).²

Well before the US stock market crash in October of 1929 and the ensuing collapse, Keynes had advocated public works to stimulate the British economy (Keynes and H D Henderson, 1929). But this policy lacked a framework in which such an initiative made sense, either to the public or to the vast majority of economists, who as part of their initiation rites had subordinated intuition to the reigning dogma of sound finance. *The General Theory* provided a framework in which counter-cyclical fiscal policy made intellectual sense.

If providing a policy framework had been Keynes's only goal, he might have located the argument in the specifics of the economy of the 1920s and '30s, taking for granted the overwhelming importance in manufacturing and transportation of large scale monopolistic and oligopolistic industries with substantial control over prices and wages. Had he situated his argument in the realities of the economy of his day, Keynes could have appealed to the theory of monopoly or the new-fangled theories of monopolistic competition, to which his own protégée, Joan Robinson, along with Harvard's Edward Chamberlin, was a leading contributor.

But to do so would have avoided the central question of whether any such new theory was necessary, which brings us to the second goal of Keynes's revolutionary project. If the problem lay in monopoly or other departures from the ideal of perfect competition, perhaps the solution lay in making the world resemble more closely the perfectly competitive

² Lucas quickly added, "But I don't think we are there yet." (<http://curiouscapitalist.blogs.time.com/2008/10/28/bob-lucas-on-the-comeback-of-keynesianism/#ixzz1AfQ4lkta>, accessed January 10, 2011.)

model. This is the enduring mantra of mainstream economics, as central to Adam Smith's attack on mercantilism in the late 18th century as it has been to the neo-liberal project of dismantling government "interference" and unleashing capitalism that emerged in the late 20th century.

In the 1930s, almost to a man (precious few economists were women, albeit Keynes's immediate circle of apostles included Joan Robinson) economists believed that slumps were limited in duration and severity by a self-correcting market mechanism; that slumps were, if not necessary, salutary in purging the economy of excesses that inevitably accompanied booms; and – most importantly – that anything the government might do in the way of positive action would most likely make matters worse. The minority of economists who believed in activist government as the counterweight to a flailing private sector had no coherent framework in which to express their analysis and conclusions. By situating the argument of *The General Theory* in a competitive economy, Keynes sought to convince his fellow economists that the problem of unemployment had deeper causes than frictions and imperfections, and that attempts to address unemployment by making the economy more like the textbook were doomed to fail.

The basis of the idea that a market system has a built-in mechanism for avoiding lengthy, deep slumps is that the very existence of involuntary unemployment will induce an adjustment of wages, an adjustment that ends only when the demand for labor on the part of profit maximizing firms is equated with the supply of labor provided by utility maximizing households. Frictions apart, the only obstacle to full employment recognized by orthodoxy is the undermining of competition by the market power of some actors (trade unions have long been a favorite bogeyman of economic orthodoxy) or the intervention of the state (unemployment insurance is another bogeyman). Imperfectly competitive labor markets may permanently prevent the wage rate from settling at a point where there is a job for every willing worker, but the cure is implicit in the diagnosis. More and better (read more competitive) markets were – then as now – the cure for market failure. It was literally unthinkable for an orthodox economist that there could be a systemic failure of a *competitive* market system, one which could lead to prolonged, profound, and painful unemployment. Any economist who thought so branded himself as a Marxist or some other stripe of heretic.

By contrast, frictions and imperfections, just like today, were the stuff of normal economics. So much so that by 1936, when *The General Theory* was published, there was little need and equally little appetite for a new theory of unemployment based on frictions or other market imperfections. Only three years earlier, Keynes's Cambridge colleague, Arthur Cecil Pigou, had laid out the argument in a well-received book called *The Theory of Unemployment*. Nor was there any lack of policy recommendations for government intervention to fight frictional unemployment, including public works – though clearly a minority in the profession, there were prominent mainstream economists who joined Keynes in his call for deficit spending to prime the pump of economic activity.

In short, Keynes recognized that any argument for government intervention to steer the economic ship had to be grounded in a convincing argument as to why the ship could not steer itself. *The General Theory* thus had to do more than show how unemployment might persist in the workings of the actual economy, 1930s capitalism-warts-and-all. As long as no one could be sure whether the problem was capitalism or the warts, it was impossible to counter the reigning orthodoxy, which held that it would be enough for the government to remove the warts.

For Keynes nothing less than an all-out attack on the received doctrine, one that went well beyond the superficialities of frictions and market structure, would do. Given the hegemony of the belief in the fundamental resilience and beneficence of markets, it had to be shown that even competitive markets were defective when it came to providing jobs.

Writing in *The New Republic* when he was less than a year away from finishing *The General Theory*, Keynes pinpointed the fundamental difference between an approach to the Depression based on frictions and imperfections and an approach based on more fundamental defects in the market system:

On the one side were those who believed that the existing economic system is in the long run self-adjusting, though with creaks and groans and jerks, and interrupted by time-lags, outside interference and mistakes...

The strength of the self-adjusting school depends on its having behind it almost the whole body of organized economic thinking and doctrine of the last hundred years...

If the heretics on the other side of the gulf [among whom Keynes included himself] are to demolish the forces of nineteenth century orthodoxy... they must attack them in their citadel (p 35).³

The heretical view did not for a moment deny the existence of imperfections, but in this view the role of monopoly and its attendant frictions was, to say the least, exaggerated. The problem of capitalism lay much deeper.

In short, to accomplish the constructive goal of providing a framework for economic policy, Keynes had first to achieve the critical goal of showing that a capitalism resembling the idealized version of the textbooks could still fall short of providing jobs for willing workers, could carry on for years with idle men and idle plant. His very title, emphasizing the greater generality of his theory compared to the reigning orthodoxy, precluded the appeal to the kinds of imperfection that the orthodox readily recognized and just as readily deplored.

Keynes saw himself, then, as faced with a two-fold task, persuading his fellow economists to abandon old ways of thinking about how markets work and laying out the framework for a new way of approaching the policy problem of maintaining full employment. Keynes had no doubt which part was more challenging. As the preface to *The General Theory* put it

The composition of this book has been for the author a long struggle of escape, and so must the reading of it be for most readers if the author's assault upon them is to be successful, – a struggle of escape from habitual modes of thought and expression. The ideas which are here expressed so laboriously are extremely simple and should be obvious. The difficulty lies, not in the new ideas, but in escaping from the old ones, which ramify, for those brought up as most of us have been, into every corner of our minds. (p viii)

To compound the difficulties which *The General Theory* presented, Keynes had in mind a revolution not only in economic policy, not only in economic theory, but also in economic method. This third revolution involved nothing less than changing the analytic framework from a static

³ The *New Republic* article was virtually identical to a piece published in *The Listener* in November, 1934, which was itself an edited version of a talk given by Keynes on the BBC.

conception of equilibrium based on equality of demand and supply to a dynamic framework based on how the economy adjusts when not in equilibrium. This was not so much a rejection of equilibrium but a reconceptualization of its meaning and role.

At the very outset of *The General Theory*, in the preface, he writes

My so-called “fundamental equations” [in Keynes’s earlier book, *A Treatise on Money*] were an instantaneous picture taken on the assumption of a given output. They attempted to show how, assuming the given output, forces could develop which involved a profit-dis-equilibrium, and thus required a change in the level of output. But the dynamic development, as distinct from the instantaneous picture, was left incomplete and extremely confused. This book, on the other hand has evolved into what is primarily a study of the forces which determine changes in the scale of output and employment as a whole. (p vii)

However, the methodological content of that revolution was never well understood by the economics profession. Perhaps not by Keynes himself; he had the intuition, but lacked the tools to carry through this part of his program.

The economics profession, as it has evolved over the 80+ years since the publication of *The General Theory*, has long since come to possess the tools, but has never developed the intuition. My book, *Raising Keynes*, attempts, among other things, to fill that gap, to marry formal models to Keynes’s intuition, to deploy the tools necessary to understand what Keynes was about.

In a word, *The General Theory* is methodologically based on differences between three concepts: the price mechanism, equilibrium, and market clearing. The price mechanism is the process that is supposed to bring about equilibrium, to adjust intentions of agents so that at the end of the day (or week or year or whatever time period might be posited) these intentions are in balance with one another.

Equilibrium describes the balance. It characterizes a situation where forces tending to move the economy in one direction are just counter-balanced by opposing forces.

Market clearing describes a situation where demands and supplies just equal. It is neither a necessary nor a sufficient condition for equilibrium.

Mainstream economics, viewed in the lens of Keynes, makes two mistakes. First it uncritically identifies market clearing with equilibrium, when market clearing is just one of many possible ways in which opposing forces might be in balance. Second, the profession emphasizes equilibrium and treats the price mechanism, the adjustment process, as simply an adjunct to equilibrium. Elementary texts dismiss the price mechanism with a paragraph of hand-waving, with a just-so story of how excess demand or excess supply are eliminated. Graduate texts are hardly any better. A leading text devotes fewer than 10 pages (out of 1000) to the price mechanism, justifying this imbalance with a frank admission:

We have, so far, carried out an extensive analysis of equilibrium equations. A characteristic feature that distinguishes economics from other scientific fields is that, for us, the equations of equilibrium constitute the center of our discipline. Other sciences, such as physics or even ecology, put comparatively more emphasis on the determination of dynamic laws of change. In contrast, up to now, we have hardly mentioned dynamics. The reason, informally speaking, is that economists are good (or so we hope) at recognizing a state of equilibrium but are poor at predicting precisely how an economy in disequilibrium will evolve. (Andreu Mas-Colell, Michael Whinston, and Jerry Green, 1995, p 620.)

The stakes are high: as we shall see, Keynes's contention that a capitalist economy left to its own devices will not gravitate to full employment cannot be demonstrated on the basis of static equilibrium. Nor can anything more than a partial case be made for the limits of monetary policy as a tool of economic management – though this case is particularly relevant for severe downturns like the Depression or the present malaise. To deliver the knock-out blow to the complacent theory of a self-adjusting economy or an economy steered by monetary policy alone, it is necessary, as Keynes intuited but failed to make clear, that we focus on the process of adjustment, and this is necessary whether the goal be to understand the limits of laissez-faire or the limits of central banks.

An example, which *Raising Keynes* explores in detail: early on in *The General Theory*, Keynes introduces a fixed money wage as a simplifying assumption intended to facilitate telling his story. Franco Modigliani, a Nobel Laureate known all his life as a Keynesian, took this feature of Keynes's exposition and made it central to the analysis. In Modigliani's words,

It is usually considered as one of the most important achievements of the Keynesian theory that it explains the consistency of economic equilibrium with the presence of involuntary unemployment. It is, however, not sufficiently recognized that, except in a limiting case to be considered later, this result is due entirely to the assumption of “rigid wages.” (Modigliani, 1944, p 65.)

Thus Keynes becomes a theorist of sand in the wheels: get rid of the friction of rigid money wages and all will be well in the economy.

Modigliani relies on the existence of a full-employment equilibrium in a model based on Keynes’s theoretical apparatus – without the assumption of a fixed money wage. In effect, his analysis says that if we start from a particular level of the money wage and the outcome involves involuntary unemployment, reduce the money wage and recalibrate the equilibrium. Run the movie again, or more accurately, take another snapshot. His contention is that if we do this repeatedly, we will find a money wage for which the equilibrium is consistent with full employment.

The important distinction is that Modigliani’s approach doesn’t literally imply changing the wage: it is not about change in the sense of the wage first being at one level, say \$20 per hour, and then being reduced to \$15 per hour. Modigliani’s logic of “change” rather invites us to imagine a series of parallel universes which are identical in all but one respect: the level of the money wage. The literal contention is that if we go down the list of these parallel universes, comparing the static equilibria, we will find one in which the wage meets Goldilocks, neither too high nor too low, but just right for full employment. No change, in the sense of movement in real time, is involved. In the Goldilocks universe, the money wage is now, always has been, and always will be at the level necessary for a full-employment equilibrium.

Contrast Keynes’s own approach. When he finally drops the assumption of a fixed money wage (Chapter 19 of *The General Theory*), the discussion is all about what happens when the wage starts out at one level and then falls, perhaps but not necessarily under the pressure of the unemployed competing for jobs. It is all about *change* in the sense of adjustment. To be sure, the discussion is not very satisfying, especially to the 21st century reader. Lacking the tools for a formal mathematical argument, Keynes falls back on an informal but highly informative catalog of the advantages and disadvantages for employment of reducing money wages.

The difference is between comparative statics, the study of equilibria in parallel universes, and dynamics, the study of adjustment when the economy starts from a disequilibrium position. Why has the mainstream has paid so little attention to dynamics? As Mas-Colell, Whinston, and Green argue, dynamics is much harder, but economists do not always shy away from difficult problems.

One reason for avoiding these issues is that such theorizing as has been done tends to undercut rather than reinforce the basic arguments of mainstream theory. All theory is by its very nature unrealistic if for no other reason than that it must be a map which simplifies the territory. But the theoretical assumptions about dynamics that make static equilibrium a plausible way of characterizing an economy render the assumptions required for the existence of equilibrium the very essence of realism. It is no wonder that the study that has addressed the problem most comprehensively (Frank Fisher, 1983) has sunk like a stone in the sea of economic theory.

A second reason is the nature of the difficulties that economists would encounter were they to take dynamics seriously. The very multiplicity of plausible adjustment mechanisms would make it necessary for economists to dirty their hands in the messy complexities of how agents actually behave in real life, an investigation of distinctly lower status that blurs the line between economics, a discipline that aspires to the status of science, and, say, anthropology, forever tainted in the eyes of most economists by its reliance on interpretation. Indeed, you can count on one hand the serious studies during my conscious lifetime of how agents actually set wages and prices. (Examples: Truman Bewley, 1999; Alan Blinder, 1998.)

A third reason for the neglect of dynamics is, and I must be more tentative here, is the comfort that economists may have drawn from Paul Samuelson's "correspondence principle." As developed by Samuelson in the 1940s, the correspondence principle establishes a relationship between static properties of equilibrium and the dynamics of adjustment if equilibrium is disturbed. Specifically, the correspondence principle relates these static properties to the question of whether the equilibrium is stable or unstable, stability characterizing the situation where disequilibrium adjustment will lead back to the original equilibrium and instability the situation in which the trajectory leads ever further away. The analysis provides legitimacy, at least under certain circumstances, for

analyzing change without ever addressing the adjustment process, instead simply comparing static equilibria as if they were a set of observations from parallel universes (Samuelson, 1947, part II).

The relationship between static equilibrium and dynamic adjustment has not gone completely unnoticed in the attempt to figure out Keynes's message. Samuelson's own attempt (1947, pp 276-283) represents one such effort, not one, I should add, which appears to have advanced our understanding. More promising was Don Patinkin's magisterial *Money, Interest, and Prices*, the leading text for graduate students in the heyday of Keynesian macroeconomics. Indeed, Patinkin makes disequilibrium the key to Keynes's argument that laissez-faire, even bolstered by monetary policy, cannot be relied upon to propel the economy to full employment.

But Patinkin frames the argument against laissez-faire in terms of the political unacceptability of the wage (and price) adjustments that might be necessary to achieve full employment, not the difference between the existence of a full employment equilibrium and the non-existence of a path to full employment. (See Patinkin, 1965, Sections XIII:3 and XIV:1.) When it comes to the efficacy of monetary policy, Patinkin does distinguish between the existence of a full-employment equilibrium and the dynamic process of getting to full employment, but the argument is that it might be a slow and bumpy ride. Only by stepping outside the models he constructs to formalize *The General Theory* does Patinkin find reasons – perverse behavior of expectations and redistribution of income accompanying changes in the price level – for arguing that the problem is worse than a slow and bumpy ride: as the Maine farmer, after reflecting on the matter for some time, told the tourist asking directions to another town, “you can't get there from here.” Says Patinkin, in summary:

Keynesian economics is the economics of unemployment *disequilibrium*. It argues that as a result of interest-inelasticity, on the one hand, and distribution and expectation effects, on the other, the dynamic process of [a capitalist economy left to its own devices] – even when aided by monetary policy – is unlikely to converge either smoothly or rapidly to the full-employment equilibrium position. Indeed, if these influences are sufficiently strong, they may even render this process unstable. In such a case the return to full employment would have to await the fortunate advent of some exogenous force that would expand aggregate demand sufficiently (1965, pp 337-338).

By the time the tools for analyzing disequilibrium were adequately developed, the profession had moved on. As Milton Friedman, another Nobel Laureate, who became the personification of the anti-Keynes, put it in 1970,

Keynes's basic challenge to the reigning theory can be summarized... As a purely *theoretical* matter, there need not exist, even if all prices are flexible, a *long-run equilibrium* position characterized by "full employment" of resources...

[This] proposition can be treated summarily because it has been demonstrated to be false. Keynes's error consisted in neglecting the role of wealth in the consumption function or, stated differently, in neglecting the existence of a desired stock of wealth as a goal motivating savings. All sorts of frictions and rigidities may interfere with the attainment of a hypothetical long-run equilibrium position at full employment; dynamic changes in technology, resources, and social and economic institutions may continually change the characteristics of that equilibrium position; but there is no fundamental "flaw in the price system" that makes unemployment the natural outcome of a fully operative market mechanism.⁴

Friedman notwithstanding, Keynes was right: there *is* a flaw in the price system. A major purpose of *Raising Keynes* is to lay it bare.

⁴ Friedman adds a telling footnote after the sentence that ends in the assertion that Keynes's error lay in "neglecting the existence of a desired stock of wealth as a goal motivating savings":

Keynes, of course, verbally recognized this point, but it was not incorporated in his formal model of the economy. Its key role was pointed out first by Haberler (1941, pp. 242, 389, 403, 491-503) and subsequently by Pigou (1947), Tobin (1947), Patinkin (1951), and Johnson (1961).

All these references are to the so-called real balance effect, which makes some sense in a static context but which in a dynamic context is a very peculiar application, to say the least, of the idea that Friedman did so much to promote, namely that wealth rather than income drives consumption. See *Raising Keynes*, Chapters IV and VII.

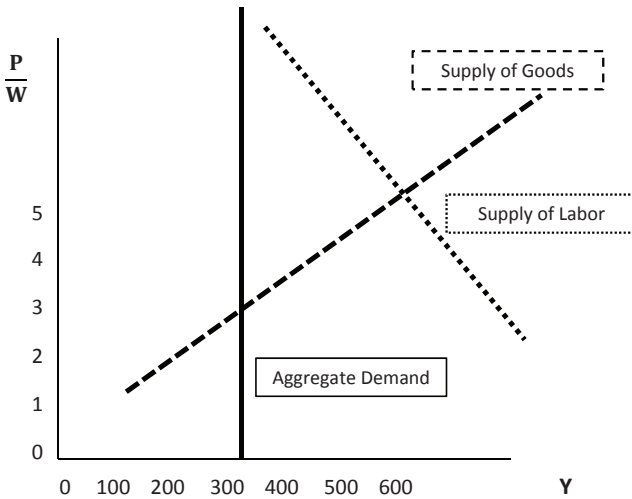
A Simple Model of the Adjustment Process

One can see why it is inherently hard to lay out a static model in which aggregate demand matters, goods supply is determined by profit maximization, *and* the money wage varies in response to the level of unemployment. If we relate aggregate demand (AD), goods supply (GS), and labor supply (LS), all measured in terms of (real) income and output, Y , to the (real) price level, P/W , we have an overdetermined system, as in Figure 1. The three schedules of Figure 1 are given respectively by the equality of expenditure and income, which is to say the equality of desired investment and desired saving

$$I(\rho_h) = sY \quad (\text{aggregate demand})$$

where ρ_h is the hurdle rate of interest – the rate to which the rate of return on prospective investment projects is compared – assumed for the moment to be given, and s is a uniform marginal propensity to save;

Figure 1: Aggregate Demand, Goods Supply, and Labor Supply



by profit maximization, which dictates the equality of real price and marginal cost

$$\frac{P}{W} = (MP_L)^{-1} \text{ (goods supply)}$$

where MP_L is the marginal productivity of labor;⁵

and by the utility-maximizing choices of individual workers, as transmitted through the production function (which, in the short run – with the capital stock fixed – depends only on labor supply)

$$Y = F(K, L\left(\frac{P}{W}\right)) \text{ (labor supply)}$$

Keynes's provisional solution to the overdetermination in Figure 1 is to suppress the labor-supply schedule, $L\left(\frac{P}{W}\right)$, leaving equilibrium to be determined by the aggregate-demand and goods-supply schedules. Pigou suppresses the aggregate-demand schedule in the long run; his New-Keynesian heirs explain its short-run role by market imperfections of one sort or another.

At the level of comparative statics, Modigliani's 1944 paper showed that Keynes's solution does not work once we drop the feature of a rigid money wage. Here the dynamic methodology that Keynes announced in the preface to *The General Theory* becomes essential if one is to go beyond listing the many factors that complicate price and wage adjustment.

Anyone in doubt about the difficulties of constructing a formal model without rigidities while preserving the idea of an unemployment equilibrium might start with Lawrence Klein's *Keynesian Revolution* (1947). A revision of Klein's PhD thesis, written under the direction of Paul Samuelson, *The Keynesian Revolution* was a pioneering attempt to sort out, in Klein's own words, the essential from the unessential in *The General Theory*. Klein insisted, rightly in my view, that Keynes's argument does not rely on rigidities (p 83ff), but when he came to explain how equilibrium coexists with unemployment, he invoked an

⁵ If we invert the left- and right-hand sides of the goods-supply equation, we have the equality of the real wage and the marginal productivity of labor. This condition defines a labor-demand schedule, but this schedule is conceptually different from the aggregate-demand schedule: it implicitly assumes Say's Law, namely, that whatever is produced will be sold, and provides the condition for maximizing profit for a producer operating in competitive goods and labor markets.

inevitable element of monopsony in the relationship between employers and workers:

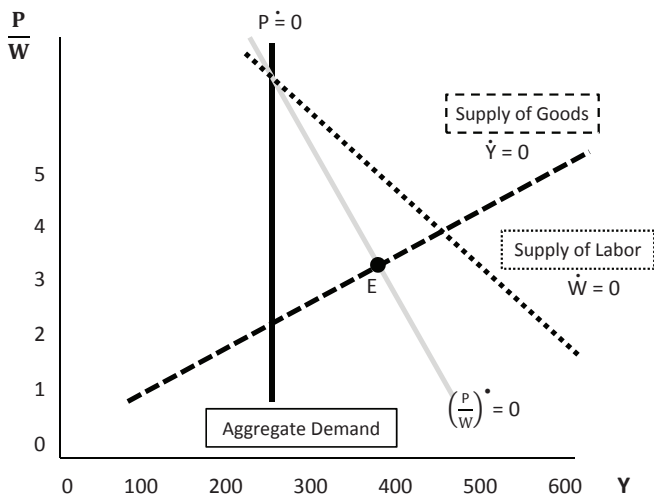
The superior bargaining power of the employer over the employee explains easily why the supply-demand relation for labor is the one relationship of the system which can have a solution that is not an intersection point (p 87).

I take a different tack. In *Raising Keynes* I assume perfect competition for the same reason that Keynes assumed away market imperfections: to forestall the argument that my results are not “general” because it is only imperfections that make aggregate demand matter at all.

The model in Figure 1 is overdetermined. Any two of the three schedules are sufficient to determine employment and the real price. All three together make the usual concept of equilibrium quite irrelevant. We can make sense of Figure 1 only if we shift the focus to the dynamics of adjustment.

With flexprice dynamics (John Hicks’s term, 1974), an imbalance between expenditure and income drives (nominal) price changes. The aggregate-demand schedule is a locus of stationary prices. The labor-supply schedule is a locus of stationary money wages, and the distance the economy is from this schedule drives (nominal) wage changes. Between these two loci lies stationary real-price locus along which the ratio of nominal price to nominal wage does not change, that is, $\left(\frac{P}{W}\right)^{\cdot} = 0$. In a flexprice regime the goods-supply schedule, along which price is equal to marginal cost, is a locus of stationary output. The picture is given in Figure 2. As Figure 2 is drawn, the flexprice equilibrium at E, where both output and the real price are stationary, is one with chronic excess capacity and underemployment, the result of which is price and wage deflation. Aggregate expenditure falls short of aggregate income, so prices fall. And because there is unemployment, there is constant downward pressure on wages. At E wages and prices fall at the same percentage rate, so that the real price remains stationary over time.

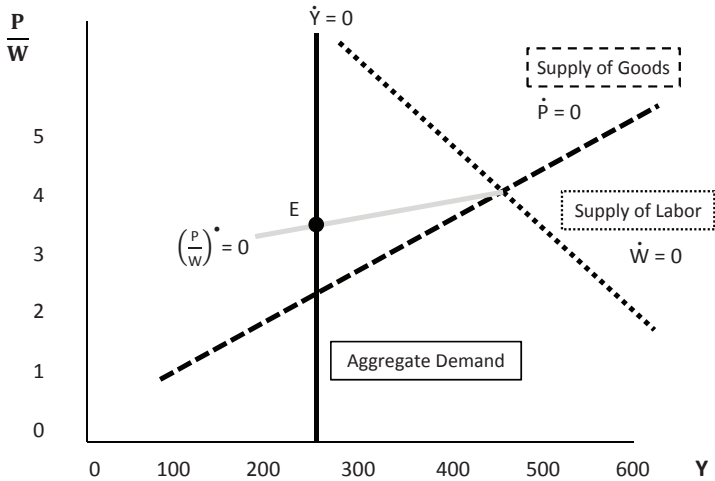
Figure 2: Equilibrium with Flexprice Dynamics



The alternative to flexprice adjustment is what Hicks (1974) called fixprice adjustment. This terminology is misleading since prices are not fixed; rather the *direct* impact of an excess or shortfall of expenditure relative to income is on output and employment; output falls when it is in excess of desired expenditure and rises when expenditure exceeds output. Prices (and wages) are affected indirectly. Prices are driven by the relationship between actual output and the profit-maximizing level of output, that is, by the horizontal distance between today's level of output and the goods-supply schedule. Money wages continue to be driven by the gap between the current level of output and the level of output workers would like to produce at the going real wage, $Y(t) - F(K, L(\frac{P(t)}{W(t)}))$.

This process defines the equilibrium in Figure 3. Since the GS schedule is now a locus of stationary prices and the LS schedule is the locus of stationary money wages, the stationary real price locus, $(\frac{P}{W})\dot{=} 0$, lies between them.

Figure 3: Equilibrium with Fixprice Dynamics



As Figure 3 is drawn, the equilibrium, like the equilibrium in Figure 2, is characterized by deflation: producers reduce prices because they are making money at the margin and wish to increase output and sales. Unemployment, as it does under a flexprice regime, puts downward pressure on money wages. At E the pressure on prices and pressure on wages just balance, so that, while both are falling, the real price remains stationary.⁶

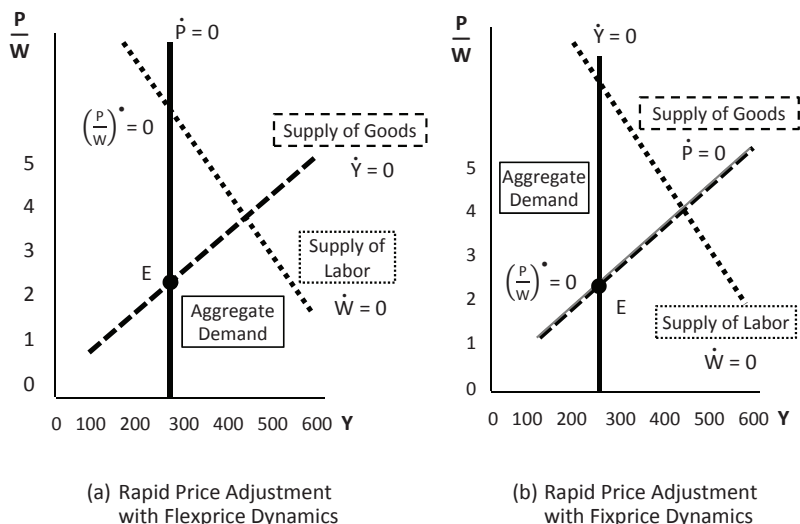
There is a fundamental similarity between fixprice and flexprice constructions of equilibrium: at equilibrium the real price is stationary over time even though both prices and wages continue to fall. But there is an important difference between the two adjustment processes: with fixprice adjustment, producers attempt to maximize profits, but – unlike flexprice producers – they are now frustrated by the market. Instead of simply expanding output in response to differences between price and

⁶ Equilibrium inflation is also possible; indeed I argue that the facts make this the likely outcome in the long run: most of the history of capitalism has been characterized by rising output and inflation. The Great Depression, the case that concerned Keynes, and the Great Recession, are exceptional in historical perspective.

marginal cost, producers now respond to supply conditions by changing prices. They attempt to sell more goods by reducing prices, expecting larger quantities of goods to be demanded at lower prices. But they do not succeed for the same reason that Keynes argues that workers cannot fix real wages: attempts to lower the real price of goods are frustrated because slack labor markets counter price reductions with wage reductions.

Another important difference between the two models is that equilibrium is now conceptually closer to the vision captured in Keynes's most elementary (and provisional) model, in which output is determined solely by the AD schedule, and real price by the relative speeds of adjustment of prices and wages.

Figure 4: Limiting Cases of Rapid Price Adjustment



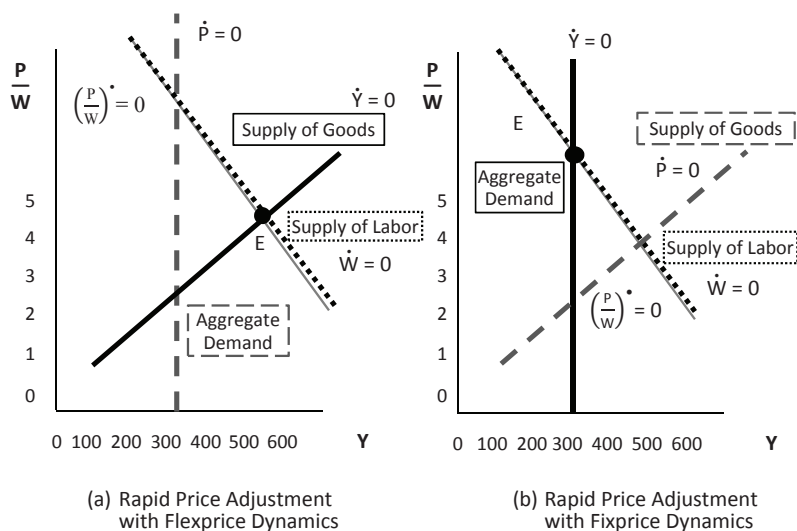
By comparing limiting cases, we gain a new perspective on the role of assumptions about the relative speed of adjustment of money wages and prices. With the relative speed of wage adjustment going to zero, depicted below in Figure 4, we are, not surprisingly, back to Keynes's

first model, in which money wages as well as the interest rate are fixed – a fixed money wage *is* the limiting case of rapid price adjustment. In the limiting case in which wages adjust at a snail's pace, it turns out not to matter for equilibrium whether the rest of the model is determined by flexprice or fixprice dynamics; we have the same equilibrium in both cases. The LS schedule becomes irrelevant and we can ignore dynamics, at least in the sense that the equilibrium does not itself depend on the dynamic specification.

The two limiting cases of rapid wage adjustment are also revealing. In the first panel of Figure 5 the mainstream model comes into its own. With prices responding relatively slowly to aggregate demand, money-wage adjustment becomes, in the limit, real-wage adjustment, which obviates Keynes's stricture that because the wage bargain is made in money terms "there may exist no expedient by which labour as a whole can reduce its real wage to a given figure by making revised money bargains with the entrepreneurs" (*The General Theory*, p 13). In the second panel, rapid wage adjustment makes the goods-supply schedule irrelevant: both producers and workers respond to the imbalance between the actual levels of output and employment and the desired levels by reducing prices and wages, producers' price reductions can keep pace with workers' wage reductions only if there is no daylight between the actual level of employment and the desired level. Thus the equilibrium in both panels is a full-employment equilibrium.

In the first, flexprice, case, aggregate demand plays no role in determining the real variables of the economy, output and the real price, its influence being limited to the absolute price level. In the second panel, aggregate demand and labor supply jointly determine equilibrium. In this case aggregate demand matters for the real side of the economy; it is the goods-supply equation which becomes ineffectual except for determining the absolute price level. Because wage adjustment is (by assumption) so rapid, producers' attempts to affect real prices by changing money prices are completely offset by wage adjustments. Real-wage adjustment effectively resists any attempt to dislodge employment from the labor-supply schedule.

Figure 5: Limiting Cases of Rapid Wage Adjustment



The table below summarizes the four limiting cases, two “Keynesian” cases of rapid price adjustment (Keynesian is in quotes because these two cases are Keynes *simpliciter*), and two cases of rapid wage adjustment, one corresponding to Modigliani’s 1944 version of the model and one a hybrid of Keynes and the mainstream, in which “real wage resistance” (Joan Robinson’s term, 1962) makes the goods-supply schedule irrelevant to the determination of the real side of the model.

Table 1: Typology of Limiting Case Equilibria

	Flexprice Dynamics	Fixprice Dynamics
Limiting Case: Rapid Price Adjustment	“Keynesian” (AD and GS Determine Real Equilibrium)	“Keynesian” (AD and GS Determine Real Equilibrium)
Limiting Case: Rapid Wage Adjustment	Mainstream (GS and LS Determine Real Equilibrium)	Real Wage Resistance (AD and LS Determine Real Equilibrium)

The mainstream may see vindication in the above table: both the “Keynesian” formulation (ignoring the LS schedule) and the mainstream formulation (ignoring the AD schedule) turn out to be limiting cases of a more general model. But there is really not much comfort for orthodoxy. Between the limiting cases is a vast middle ground, in which equilibrium is determined jointly by the adjustment of prices, wages, and output. *And this middle ground belongs to Keynes.* Every equilibrium, apart from the two limiting cases of rapid wage adjustment, is an equilibrium with unemployment, the main critical point of *The General Theory*.

The limiting cases reveal that Keynes’s rejection of the classical dichotomy takes place at two levels. Besides the complex argument in terms of monetary influences on the rate of interest, there is the simpler and more direct argument that the classical dichotomy is belied by the very fact that wage bargains are struck in money terms, with real wages emerging only as the price level is determined along with the level of output. Only in the limiting case in which money wages adjust infinitely faster than prices, is revising the money-wage bargain tantamount to revising the real-wage bargain. In this limiting case the classical

dichotomy holds its own; in all other cases, wage bargains are nominal variables with real consequences.

Conclusions

The conclusions are relatively simple and straightforward. Keynes had three purposes in mind for *The General Theory*. First, with respect to *policy*, to provide a theoretical basis for the innovation he and other dissidents from the reigning orthodoxy had been long recommending, namely to supplement monetary policy with fiscal policy in times of slack aggregate demand. Second, with respect to *theory*, to demonstrate that aggregate demand is indeed an independent determinant of the level of output and employment, so that when aggregate demand is insufficient, capitalism left to its own devices may generate persistent unemployment and under-utilization of capacity. Third, with respect to *methodology*, to shift the focus from static equilibrium to the adjustment process that not only determines the trajectory the economy follows outside of equilibrium, but the very equilibrium itself.

Because the methodological revolution that eluded Keynes is a necessary basis for theoretical revolution (but ironically less necessary for the new policy framework), this essay has focused on the methodological aspect of Keynes's threefold project. Here Keynes's intuition outran his technical equipment, and he was obliged to settle for the unsatisfactory verbal substitute in Chapter 19 of *The General Theory*. This failure underlies the failure of his theoretical innovation to weather the attacks based on the inverse relationship between the real money supply and the rate of interest (the "Keynes effect") deployed by Modigliani (1944) or the real-balance effect deployed by Gottfried Haberler (1939 and 1941), Pigou (1943, 1947) and Don Patinkin (1951).

The starting point is to jettison the static framework in which the argument of *The General Theory* has been normally framed, at least since Alvin Hansen's restatement (1953) of Hicks's classic treatment (1937). By recasting the argument in dynamic terms and redefining equilibrium in terms of equal rates of price and wage changes, we can incorporate the elements that determine neoclassical equilibrium, a labor-supply schedule and a goods-supply schedule, and the new element that Keynes introduces, the aggregate-demand schedule. The problem is that with

only two state variables – P/W and Y – the three relationships – the AD schedule, the GS schedule, the LS schedule – overdetermine the model.

In an overdetermined system equilibrium does not exist until we specify an adjustment process. And the adjustment process determines the equilibrium, which is to say that for each adjustment process there is a different equilibrium!

This reformulation allows us to get away from the pervasive view that nominal rigidities are the essence of Keynes's theory. It is not my intention to deny nominal rigidities as an empirical matter, but rather to emphasize that eliminating these rigidities would not eliminate the importance of aggregate demand, which is the core takeaway of Keynes's *General Theory*. Rigidities stemming from monopolistic competition, trade unions, menu costs, to mention only a few of the usual suspects, exist, but these are ancillary factors.

The heart of the dynamic adjustment problem is reflected in two assumptions. First, relative adjustment speeds in the labor and goods markets, and, second, how agents respond to the dual signals they receive whenever they are not on the stationary loci of prices, wages, and output.

The crucial role of relative adjustment speeds of wages and prices becomes clear if we look again at the two limiting cases of the flexprice and fixprice models. In both models, when prices adjust rapidly and wages slowly, the equilibrium of the dynamic model approaches the equilibrium in Keynes's simplest static model. At the other extreme, when wages adjust more rapidly, the dynamic model approaches either the mainstream model in which aggregate demand doesn't matter, or a hybrid model of real-wage resistance, in which goods supply doesn't matter. The vast middle ground between these two extremes belongs to Keynes in exhibiting an unemployment equilibrium which reflects Keynes's key assumptions about how the economy works.

The second assumption, particularly how producers process the dual signals they receive from goods markets when they are not on the AD and GS schedules, is more complex. In contrast to behavior at a competitive equilibrium, producers cannot then be price takers who decide how much to bring to market at a price dictated by the market. They have two decisions to make, not one, and they receive two signals, not one. The first signal is the profitability of expanding or contracting output, measured either by the vertical distance from the supply curve, which reflects the difference between price and marginal cost, or the

horizontal distance, which reflects the amount by which producers would have to increase (or decrease) production in order to maximize profits. The second signal is whether it is easy or difficult to find buyers for a given level of output, whether inventory is accumulating on sellers' shelves or warehouses or flying out the door faster than it can be restocked.

By the same token, producers have two decisions to make, what to do about prices and what to do about output. The two dynamic systems, flexprice and fixprice, differ in the assumptions about how these signals are processed: does an accumulation of unwanted inventories trigger a reduction in prices (the flexprice reaction) or a reduction in output (the fixprice reaction)? Does a lack of profitability at the margin trigger a reduction in output (the flexprice reaction) or an increase in price (the fixprice reaction)?

Once dynamics become central – we ought to begin with dynamics, with process whether we are operating in a just-determined or an overdetermined system, but we are compelled to do so in the second case – it becomes essential to consider the institutional basis of dynamic systems instead of requiring merely that the dynamics exhibit a surface plausibility. The question of whether producers react to disequilibrium by changing price or quantity, or rather how changes in price and quantity interact, is hardly a new one, but it takes on a new importance once we commit ourselves to a dynamic view.

Appendix: A Brief History of Stationary Real-Price Equilibrium

The possibility of an equilibrium at which prices and wages are falling at the same rate was noted by perceptive readers of Keynes, but they didn't know what to make of it other than to reject the idea on empirical grounds. Gottfried Haberler seems to have been the first, at least the first to take notice in print, of this possibility:

A logical possibility would, of course, be that all money expressions (prices, wages, money values) fall continuously, while the real magnitudes including employment remain the same. That would be the implication of the assumption that the Keynesian relations remain unchanged in real terms in the face of such a situation. But this case is surely too unrealistic to be seriously contemplated.

This observation comes as a footnote to Haberler's discussion of the role of wage and price rigidity in Keynes and his predecessors:

According to a widely held view, which can be described as a sort of simplified, popular Keynesianism, the possibility of underemployment equilibrium has been denied by the "classical" school and demonstrated by Keynes. The matter is, however, not so simple as that. This becomes quite clear if we reflect upon the intricate and crucial question concerning the role of wage (and price) rigidity in the Keynesian system. Keynes assumes that (money) wages are rigid downward. If this assumption, which is certainly not unrealistic, is rigidly adhered to, most of his conclusions follow: Underemployment equilibrium is then possible; an increase in the propensity to consume will then reduce unemployment and a decrease in the propensity to consume will produce unemployment (except if, as many classical writers assumed, the demand for idle funds, the liquidity preference proper, is entirely inelastic with respect to the rate of interest). But all this is entirely in accord with pre-Keynesian theory, although these conclusions certainly had not been generally realized and sufficiently emphasized before the appearance of *The General Theory*.

If flexible wages – "thoroughgoing competition between wage earners" (in Pigou's words) – are assumed, the situation is radically changed. Obviously, underemployment equilibrium with flexible wages is impossible – wages and prices must then fall continuously, which can hardly occur without further consequences and cannot well be described as an equilibrium position. (Haberler, 1946, pp 190-191)

Klein made a similar observation in 1947:

Within the framework of Keynesian economics wage flexibility does not correct unemployment and leads merely to hyper-deflation if carried to its logical conclusion. But in the real world one observes neither hyper-deflation nor full employment. The explanation is that wages are sticky; they are not flexible...

When imperfections and rigid money wages are introduced into our model of the Keynesian system, the results of under-employment equilibrium follow quite easily, providing a more realistic picture of how the economic system looks. But it is not true, as many have said, that the Keynesian equations in conjunction with a perfect, frictionless system will always yield a full-employment solution. Unemployment is extremely likely even under perfect competition. (Klein, 1947, p 90)

As noted, Patinkin characterized Keynes's theory of unemployment as a process of slow disequilibrium adjustment, rather than as a stationary-price equilibrium. This is at least partly semantic: Patinkin refuses to treat a situation in which prices and wages are falling as a true equilibrium. In addition to the passages cited earlier in this paper, see Note K:3, pp 643-644. The crucial passage is

All, then, that Keynes means by the statement that the system may settle down to a position of "unemployment equilibrium" is that the automatic workings of the system will *not* restore the system to a position of *full-employment equilibrium*. He does not mean "equilibrium" in the usual sense of a term that nothing tends to change in the system. All that is strictly in equilibrium is the level – or, possibly, only the fact – of unemployment; but there is no equilibrium of the money wage rate.

In an unpublished paper written in 1958, Robert Clower echoes both Haberler and Patinkin:

Perhaps the most curious aspect of the matter is the fact that $if \tilde{w}$ and \tilde{p} [the money wage and the money price of goods] just happen to fall at the same rate over time then, starting from an initial position of Keynesian equilibrium (with excess supply in the labor market), the economy will remain "in equilibrium" indefinitely although prices and wages are constantly falling over time! Under these circumstances, it is perhaps natural to speak of the difference $\tilde{N}^s - \tilde{N}^d$ [labor supply less labor demand] as "involuntary unemployment"; but it is a curious use of language to refer to the situation as a whole as one of "equilibrium." (Clower, 1958, p 13, quoted in Plassard, in press)

In this paper Clower explores dynamics akin to the disequilibrium dynamics that characterize equilibrium in my models.⁷

⁷ A much shorter revision of this paper was published in the *Quarterly Journal of Economics* in 1960. The published version not only omits the paragraph quoted above, it also leaves out the dynamics that make Clower's 1958 paper an intellectual precursor of my own work. Thanks to Romain Plassard for his discussion of Clower's 1958 paper in his article "Clower's *Volte-Face* Regarding the 'Keynesian Revolution'" and for sharing the Clower paper with me.

Clower is better known in Keynesian circles for posing a contradiction between Walras and Keynes:

As to whether or not “this case is surely too unrealistic to be seriously contemplated,” as Haberler believed, see *Raising Keynes*, Chapter VIII. Klein, by the way, is inaccurate in assuming that the “logical conclusion” of an equilibrium with falling prices and wages is “hyper-deflation” if hyper-deflation means an increasing rate of deflation. My model leads rather to a constant rate of deflation in a depression equilibrium. What Klein presumably meant was that the equilibrium entails prices and wages that approach zero as time goes to infinity.

This is indeed a prediction of my model – unless there is a “regime change.” Keynes and any other practically minded observer would have expected fundamental change at some point, since the alternative was to allow falling prices to destroy the fabric of credit and the livelihoods of a large and growing percentage of households. In the US the face of regime change was Franklin Roosevelt: the New Deal, particularly the departure from the gold standard (one of the first acts of Roosevelt’s presidency), arrested the catastrophic fall in prices and wages that had taken place since 1929 and set the stage for the gradual recovery of output and employment.

Although I was ignorant of earlier models along the lines of my disequilibrium model when I developed my argument, in the process of research and writing I came to know not only of Clower’s 1958 model but also of two other attempts to model the dynamics of adjustment and the resulting equilibrium. The first was by Robert Solow and Joseph Stiglitz (1968). Though the details differ, the essence of the Solow-Stiglitz model is very similar to my own.

However the emphasis of their model was different; their purpose was to shed light on a controversy that raged in the 1960s, namely, the role of marginal productivity in determining the real wage, and the assumptions of their model are designed to this end. In particular the assumption of a uniform saving propensity is replaced by the assumption of class-based

Either Walras’ law is incompatible with Keynesian economics, or Keynes had nothing fundamentally new to add to orthodox economic theory (Clower, 1984, p 41)

The contradiction is easily resolved within the context of the present model: agents who are not on their AD, GS, and LS schedules act in terms of their distance from these schedules. Walras’s law is not compatible with the equilibria described in this chapter, but adjustment along Walrasian lines is perfectly compatible with the theory outlined here.

saving, the so-called Cambridge saving equation (see *Raising Keynes*, Chapter IX). In its attempt to influence the marginal-productivity debate the Solow-Stiglitz paper fails utterly: it miscasts neoclassical marginal-productivity theory as simply the equality of marginal products with factor prices, in particular, the equality of the marginal productivity of labor with the real wage. The problem for Solow and Stiglitz is that this equality is an immediate corollary of profit maximization and competitive markets and applies to static *General Theory* models (*Raising Keynes*, Chapters III and IV) as well as to the neoclassical alternative discussed in Chapter II. Marginal-productivity *theory* involves a stronger assumption, namely, that, in addition to profit maximization and competition, the real wage is endogenously determined by an exogenously given labor supply. The difference between endogenous and exogenous determination of the real wage is discussed in Chapter XIX.

Nevertheless, the Solow-Stiglitz model highlights the importance of the adjustment process. Given their specific adjustment assumptions, when the Cambridge saving equation is collapsed into a saving function with a uniform propensity to save, the resulting equilibrium is similar to the fixprice equilibrium of this paper.

James Tobin's 1975 article, from which I have taken an excerpt for the epigraph to this essay, is in some ways even more similar to my model. In particular, Tobin explores alternative disequilibrium processes. A major difference is that Tobin pays scant attention to the labor market. And he characterizes equilibrium by a constant price level, so that the possibility of a self-sustaining depression is tied to an unstable equilibrium.

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