

Keynes, the National Industrial Recovery Act and the Demise of Nascent Real Business Cycle Analysis

Bernard C. Beaudreau Department of Economics Université Laval,
Qu'bec, Canada G1K 7P4
bernard.beaudreau@ecn.ulaval.ca

Abstract

The National Industrial Recovery Act (NIRA) of 1933 called for a radical reorganization of U.S. industry, substantial wage increases, workers' right to bargain collectively as well as unprecedented government works projects. In a letter to President Roosevelt, British economist John Maynard Keynes denounced the NIRA on a number of grounds, not the least of which was the fact that, in his view, it would hinder economic recovery. This paper offers an alternative interpretation of this crucial episode in New Deal history. More specifically, it will be argued that despite his openmindedness, Keynes failed to understand, let alone appreciate both the underlying structural issues in the U.S., as well as the underlying logic behind the NIRA as an instrument of economic recovery. This owed, in part if not in whole, to what appears to be his inability to appreciate and/or understand structural/technological issues and their role in economic downturns, including Great Britain's post-WWI depression.

Keywords: John Maynard Keynes, The National Industrial Recovery Act, Real Business Cycle Theory.

JEL Codes: N12, N42, N62.

1. Introduction

The National Industrial Recovery Act of 1933 (NIRA) was a radical approach to policy, so much so that it attracted the attention of leading economists both in the U.S. and abroad. One such figure was renowned British economist John Maynard Keynes, who in a letter addressed to President Roosevelt provided a critique of all three Titles of the Act.

AN OPEN LETTER TO PRESIDENT ROOSEVELT

By John Maynard Keynes.

Dear Mr. President,

You have made yourself the Trustee for those in every country who seek to mend the evils of our condition by reasoned experiment within the framework of the existing social system. If you fail, rational change will be gravely prejudiced throughout the world, leaving orthodoxy and revolution to fight it out. But if you succeed, new and bolder methods will be tried everywhere, and we may date the first chapter of a new economic era from your accession to office. This is a sufficient reason why I should venture to lay my reflections before you, though under the disadvantages of distance and partial knowledge.

At the moment your sympathisers in England are nervous and sometimes despondent. We wonder whether the order of different urgencies is rightly understood, whether there is a confusion of aim, and whether some of the advice you get is not crack-brained and queer. If we are disconcerted when we defend you, this may be partly due to the influence of our environment in London. For almost everyone here has a wildly distorted view of what is happening in the United States. The average City man believes that you are engaged on a hare-brained expedition in face of competent advice, that the best hope lies in your ridding yourself of your present advisers to return to the old ways, and that otherwise the United States is heading for some ghastly breakdown. That is what they say they smell. There is a recrudescence of wise head-waging by those who believe that the nose is a nobler organ than the brain. London is convinced that we only have to sit back and wait, in order to see what we shall see. May I crave your attention, whilst I put my own view?

You are engaged on a double task, Recovery and Reform;—recovery from the slump and the passage of those business and social reforms which are long overdue. For the first, speed and quick results are essential. The second may be urgent too; but haste will be injurious, and wisdom of long-range purpose is more necessary than immediate achievement. It will be through raising high the prestige of your administration by success in short-range Recovery, that you will have the driving force to accomplish long-range Reform. On the other hand, even wise and necessary Reform may, in some respects, impede and complicate Recovery. For it will upset the confidence of the business world and weaken their existing motives to action, before you have had time to put other motives in their place. It may over-task your bureaucratic machine, which the traditional individualism of the United States and the old "spoils system" have left none too strong. And it will confuse the thought and aim of yourself and your administration by giving you too much to think about all at once.

Now I am not clear, looking back over the last nine months, that the order of urgency between measures of Recovery and measures of Reform has been duly

observed, or that the latter has not sometimes been mistaken for the former. In particular, I can- not detect any material aid to recovery in N.I.R.A., though its social gains have been large. The driving force which has been put behind the vast administrative task set by this Act has seemed to represent a wrong choice in the order of urgencies. The Act is on the Statute Book; a considerable amount has been done towards implementing it; but it might be better for the present to allow experience to accumulate before trying to force through all its details. That is my first reflection—that N.I.R.A., which is essentially Reform and probably impedes Recovery, has been put across too hastily, in the false guise of being part of the technique of Recovery.

My second reflection relates to the technique of Recovery itself. The object of recovery is to increase the national output and put more men to work. In the economic system of the modern world, output is primarily produced for sale; and the volume of output depends on the amount of purchasing power, compared with the prime cost of production, which is expected to come on the market. Broadly speaking, therefore, an increase of output depends on the amount of purchasing power, compared with the prime cost of production, which is expected to come on the market. Broadly speaking, therefore, an increase of output cannot occur unless by the operation of one or other of three factors. Individuals must be induced to spend more out of their existing incomes; or the business world must be induced, either by increased confidence in the prospects or by a lower rate of interest, to create additional current incomes in the hands of their employees, which is what happens when either the working or the fixed capital of the country is being increased; or public authority must be called in aid to create additional current incomes through the expenditure of borrowed or printed money. In bad times the first factor cannot be expected to work on a sufficient scale. The second factor will come in as the second wave of attack on the slump after the tide has been turned by the expenditures of public authority. It is, therefore, only from the third factor that we can expect the initial major impulse.

Now there are indications that two technical fallacies may have affected the policy of your administration. The first relates to the part played in recovery by rising prices. Rising prices are to be welcomed because they are usually a symptom of rising output and employment. When more purchasing power is spent, one expects rising output at rising prices. Since there cannot be rising output without rising prices, it is essential to ensure that the recovery shall not be held back by the insufficiency of the supply of money to support the increased monetary turnover. But there is much less to be said in favour of rising prices, if they are brought about at the expense of rising output. Some debtors may be helped, but the national recovery as a whole will be retarded. Thus rising prices caused by deliberately increasing prime costs or by restricting output have a vastly inferior value to rising prices which are the natural result of an increase in the nation's purchasing power.

I do not mean to impugn the social justice and social expediency of the redistribution of incomes aimed at by N.I.R.A. and by the various schemes for

agricultural restriction. The latter, in particular, I should strongly support in principle. But too much emphasis on the remedial value of a higher price-level as an object in itself may lead to serious misapprehension as to the part which prices can play in the technique of recovery. The stimulation of output by increasing aggregate purchasing power is the right way to get prices up; and not the other way round.

Thus as the prime mover in the first stage of the technique of recovery I lay overwhelming emphasis on the increase of national purchasing power resulting from governmental expenditure which is financed by Loans and not by taxing present incomes. Nothing else counts in comparison with this. In a boom inflation can be caused by allowing unlimited credit to support the excited enthusiasm of business speculators. But in a slump governmental Loan expenditure is the only sure means of securing quickly a rising output at rising prices. That is why a war has always caused intense industrial activity. In the past orthodox finance has regarded a war as the only legitimate excuse for creating employment by governmental expenditure. You, Mr President, having cast off such fetters, are free to engage in the interests of peace and prosperity the technique which hitherto has only been allowed to serve the purposes of war and destruction.

The set-back which American recovery experienced this autumn was the predictable consequence of the failure of your administration to organise any material increase in new Loan expenditure during your first six months of office. The position six months hence will entirely depend on whether you have been laying the foundations for larger expenditures in the near future.

I am not surprised that so little has been spent up-to-date. Our own experience has shown how difficult it is to improvise useful Loan-expenditures at short notice. There are many obstacles to be patiently overcome, if waste, inefficiency and corruption are to be avoided. There are many factors, which I need not stop to enumerate, which render especially difficult in the United States the rapid improvisation of a vast programme of public works. I do not blame Mr Lckes for being cautious and careful. But the risks of less speed must be weighed against those of more haste. He must get across the crevasses before it is dark.

The other set of fallacies, of which I fear the influence, arises out of a crude economic doctrine commonly known as the Quantity Theory of Money. Rising output and rising incomes will suffer a set-back sooner or later if the quantity of money is rigidly fixed. Some people seem to infer from this that output and income can be raised by increasing the quantity of money. But this is like trying to get fat by buying a larger belt. In the United States to-day your belt is plenty big enough for your belly. It is a most misleading thing to stress the quantity of money, which is only a limiting factor, rather than the volume of expenditure, which is the operative factor.

It is an even more foolish application of the same ideas to believe that there is a mathematical relation between the price of gold and the prices of other things. It is

true that the value of the dollar in terms of foreign currencies will affect the prices of those goods which enter into international trade. In so far as an over-valuation of the dollar was impeding the freedom of domestic price-raising policies or disturbing the balance of payments with foreign countries, it was advisable to depreciate it. But exchange depreciation should follow the success of your domestic price-raising policy as its natural consequence, and should not be allowed to disturb the whole world by preceding its justification at an entirely arbitrary pace. This is another example of trying to put on flesh by letting out the belt.

These criticisms do not mean that I have weakened in my advocacy of a managed currency or in preferring stable prices to stable exchanges. The currency and exchange policy of a country should be entirely subservient to the aim of raising output and employment to the right level. But the recent gyrations of the dollar have looked to me more like a gold standard on the booze than the ideal managed currency of my dreams.

You may be feeling by now, Mr President, that my criticism is more obvious than my sympathy. Yet truly that is not so. You remain for me the ruler whose general outlook and attitude to the tasks of government are the most sympathetic in the world. You are the only one who sees the necessity of a profound change of methods and is attempting it without intolerance, tyranny or destruction. You are feeling your way by trial and error, and are felt to be, as you should be, entirely uncommitted in your own person to the details of a particular technique. In my country, as in your own, your position remains singularly untouched by criticism of this or the other detail. Our hope and our faith are based on broader considerations.

If you were to ask me what I would suggest in concrete terms for the immediate future, I would reply thus.

In the field of gold-devaluation and exchange policy the time has come when uncertainty should be ended. This game of blind man's bluff with exchange speculators serves no useful purpose and is extremely undignified. It upsets confidence, hinders business decisions, occupies the public attention in a measure far exceeding its real importance, and is responsible both for the irritation and for a certain lack of respect which exists abroad. You have three alternatives. You can devalue the dollar in terms of gold, returning to the gold standard at a new fixed ratio. This would be inconsistent with your declarations in favour of a long-range policy of stable prices, and I hope you will reject it. You can seek some common policy of exchange stabilisation with Great Britain aimed at stable price-levels. This would be the best ultimate solution; but it is not practical politics at the moment unless you are prepared to talk in terms of an initial value of sterling well below \$5 pending the realisation of a marked rise in your domestic price-level. Lastly you can announce that you will definitely control the dollar exchange by buying and selling gold and foreign currencies so as to avoid wide or meaningless fluctuations, with a right to shift the parities at any time but with a declared

intention only so to do either to correct a serious want of balance in America's international receipts and payments or to meet a shift in your domestic price level relatively to price-levels abroad. This appears to me to be your best policy during the transitional period. In other respects you would regain your liberty to make your exchange policy subservient to the needs of your domestic policy—free to let out your belt in proportion as you put on flesh.

In the field of domestic policy, I put in the forefront, for the reasons given above, a large volume of Loan-expenditures under Government auspices. It is beyond my province to choose particular objects of expenditure. But preference should be given to those which can be made to mature quickly on a large scale, as for example the rehabilitation of the physical condition of the railroads. The object is to start the ball rolling. The United States is ready to roll towards prosperity, if a good hard shove can be given in the next six months. Could not the energy and enthusiasm, which launched the N.I.R.A. in its early days, be put behind a campaign for accelerating capital expenditures, as wisely chosen as the pressure of circumstances permits? You can at least feel sure that the country will be better enriched by such projects than by the involuntary idleness of millions.

I put in the second place the maintenance of cheap and abundant credit and in particular the reduction of the long-term rates of interest. The turn of the tide in great Britain is largely attributable to the reduction in the long-term rate of interest which ensued on the success of the conversion of the War Loan. This was deliberately engineered by means of the open-market policy of the Bank of England. I see no reason why you should not reduce the rate of interest on your long-term Government Bonds to 2 per cent or less with favourable repercussions on the whole bond market, if only the Federal Reserve System would replace its present holdings of short-dated Treasury issues by purchasing long-dated issues in exchange. Such a policy might become effective in the course of a few months, and I attach great importance to it.

With these adaptations or enlargements of your existing policies, I should expect a successful outcome with great confidence. How much that would mean, not only to the material prosperity of the United States and the whole World, but in comfort to men's minds through a restoration of their faith in the wisdom and the power of Government!

*With great respect,
Your obedient
servant J M Keynes*

To summarize, Keynes distinguished between two basic objectives, namely reform and recovery. Titles I and III of the Act were referred to as reform. For example, all the wage provisions were deemed to be motivated by considerations other than recovery. Of these, he was extremely critical, going as far as to label the associated policy advice as “quack-brained and queer.” Consistent with this view is his advice to Roosevelt to “rid yourself of your present advisors” On the more

substantive side, all non expenditure-related measures in the NIRA (everything other than Title II) were summarily dismissed.

This paper reexamines Keynes' position on the NIRA, arguing that (i) he was largely unaware of the science behind the NIRA, (ii) his failure to appreciate the role of technology shocks in the business cycle went beyond the NIRA and in fact played a key role in the debate over the U.K.'s plight in the 1920s, and (iii) as the result of the combination of this shortcoming and later successes, especially with regard to the General Theory of Output, Money and Employment, he single-handedly bud-nipped what at the time was nascent real business cycle analysis. As pointed out by Beaudreau (1996, 2005, 2015), the NIRA was a response to a technology shock in the form of electrification. In short, productive capacity increased without a commensurate increase in purchasing power, resulting in stagnation and ultimately depression. Ironically, the same shock (i.e. electrification) had been identified by a number of governmental and non- governmental committees in the U.K. as the root cause of England's post-WWI economic and financial woes. Keynes, however, appeared to be oblivious these arguments. The subsequent success of the General Theory dealt the final blow to what I refer to as nascent real business cycle analysis—that is, a literature that attributes the business cycle to real factors.

The paper is organized as follows. To begin with, we examine Keynes' role in influencing the debate over the NIRA. We show that his condemnation of the NIRA was oftentimes used as a segue into neo-classical-based critiques of the New Deal and of Roosevelt's policies in general. This is followed by an in-depth look at the science behind what Keynes referred to as "quack-brained and queer" economic policy. This then serves as a segue into our second hypothesis, namely that structural change (technological change) was Keynes' Achilles Heel, both in the case of the New Deal, as well as in terms of the debate in the U.K. over its post-WWI difficulties. It is argued that his failure to appreciate and understand the role of technology in macroeconomic phenomena, combined with the overwhelming success of Keynesian policy prescriptions altered the course of the history of macroeconomics, relegating "real" approaches to the business cycle to ignominy.

1. Keynes and the NIRA: The Legacy

Keynes' condemnation of the New Deal, specifically Titles I and III of the National Industrial Recovery Act, has been shared and continues to be shared by both neoclassical macroeconomists and post-Keynesians alike. For example, Cole and Ohanian (2004) invoke his critique of Roosevelt's NIRA in their condemnation of the high wage and price policies of the 1930s. In short, they maintain that the negative TFP shock in the early 1930s should have resulted in lower wages. The NIRA, with its call for higher wages, resulted in high unemployment and delayed recovery.

Post-Keynesians have echoed this view. For example, the Social Democracy for the 21st Century: A Post-Keynesian Perspective (2011) website opined that: "A reasonable modern progressive view of the New Deal is simply that some aspects of it were bad and unnecessary, while others wholly beneficial and, if anything, not done on a large enough scale." In short, not all of the measures contained in the NIRA were constructive. According to Skidelsky (1992):

"The NRA should be put into cold storage. It was a programme of reform, disguised

as recovery, which probably impeded recovery. But Keynes also attacked faults in Roosevelt's technique of recovery. Recovery meant increased output. Trying to raise prices by restricting output was exactly the wrong way round: it is like trying to get fat by buying a larger belt. This was a dig at Roosevelt's gold-buying policy: the gold standard on the booze Keynes called it. What Roosevelt should aim to do was to keep the dollar-sterling exchange as stable as was consistent with an accelerating programme of loan-financed public expenditure and open-market operations to reduce the long-term rate of interest" (Skidelsky 1992: 493).

2. Reform as Recovery

In this paper, we maintain that what Keynes' labeled as reform was in actual fact recovery in the eyes of the Brains Trust and the National Recovery Administration (agency established to oversee the implementation of the NIRA). We begin by examining the "science" behind the NIRA.

3.1 The Science behind "Quack-Brained and Queer"

In this section, we examine the science behind what Keynes referred to as the "reform" elements of the NIRA. It will be argued that these were based on the writings of Brain Trusters Rexford G. Tugwell and Harold Moulton, but were inspired by a school of thought in the U.S. best associated with the work of Thorstein Veblen, Paul Douglas and numerous others. In essence, it maintained that technological advances had increased America's ability to produce wealth without increasing commensurately the level of income and expenditure necessary to take these goods off of the market. It dovetailed with a populous literature which included the writings of Henry Ford that maintained that wages were too low and would have to rise to realize this new-found potential.

3.1.1 The "Brains Trust" and the Science Behind the NIRA

Today as in the late 1930s, the NIRA continues to be seen as a flawed piece of legislation lacking any theoretical or scientific validity. To many, it typified the mantra of the Roosevelt Administration which consisted of doing something, of taking risks, of doing anything to get the U.S. economy going again. It will be argued that the NIRA was a multifaceted piece of legislation that sought to address a number of issues, notably the perceived underlying structural weakness in the U.S. economy as well as the myriad cyclical issues that resulted from the downturn. The former includes the purported productivity-wage gap and the failure of the U.S. economy to make the transition to the higher growth path, while the latter includes unemployment, price deflation and cut-throat competition. In this section, we examine the structural underpinnings of the NIRA, focusing on the writings of members of the celebrated Brains Trust, paying particular attention to the writings of Rexford G. Tugwell. The core principles underlying the NIRA can be traced to two of his works, namely *Industry's Coming of Age* published in 1927 and *The Industrial Discipline and the Governmental Arts*, published in 1933.¹ Also, it will be argued that the contribution of the other members of the Brains Trust (e.g. Adolph Berle) consisted, for the most part, of establishing the

¹ In 1933, the Brookings Institution embarked on an exhaustive study of the problem of over- capacity / underincome / underconsumption entitled "The Distribution of Wealth and Income in Relation to Economic Progress," of which there were four divisions, namely "America's Capacity to Produce," "America's Capacity to Consume," "The Formation of Capital," and "Income and Economic Progress." Its findings corroborated the underlying premises of the NIRA and NRA, *ex-post*.

legal and institutional framework to execute the wage and price provisions of the Act. Lastly, we survey the existing literature, paying particular attention to the cited rationale for the Act. We find a significant disconnect between the objectives of the legislation as seen by its architects and those cited in the literature.

Contrary to the commonly-held view, we maintain that the NIRA was not a policy heuristic, the result of improvisation on the part of the born of New Dealers to fix a broken economy, but rather was based largely on an intellectual tradition that began in the early 20th century which focused on technological change and its impact on the U.S. economy. Among its contributors were Edward Bellamy, Thorstein Veblen, Simon Patten and his student Rexford G. Tugwell, the only economist in the Brains Trust.²

The core underlying principles of the National Industrial Recovery Act, we maintain, were based in large measure on the writings of Tugwell and Harold G. Moulton of the Institute of Economics (Brookings Institution). In 1927, Tugwell had examined the ramifications of electrification of U.S. industry in the 1910s and 1920s. America, he argued, was in the throes of a new industrial revolution. In *Industry's Coming of Age (1927)*, he described the “revolution underway in U.S. industry. Foremost among the “technical causes” of increased productivity, he argued, was “the bringing into use of new and better power resources more suited to our technique, more flexible and less wasteful; and continued progress in the technique of generating and applying power” (Tugwell 1927, 180)—in short, the electrification of U.S. industry.

The electrification of industry has now progressed to the extent of between 55 and 60 per cent completion. So widespread an adoption of this new flexible means of moving things cannot have taken place without numerous secondary results in lowered costs, improvements in quality, and a heightened morale among workers. For the new power is not only cheaper to use; it is also cleaner, more silent and handier. On the whole, the electrification of industry must be set down as the greatest single cause of the new industrial revolution. (Tugwell 1927, 182)

His work was part of a growing literature on the electrification and the ensuing challenges, notably the relationship between wages and productivity growth, and the ensuing underincome and underexpenditure. Among the other notable contributions were the writings of Harold Moulton, as well as the populist writings of Henry Ford and Edward A. Filene (Ford 1922, 1926a,b, Filene 1931). Like Ford who advocated (and introduced) higher wages, Tugwell felt that wages had not kept pace with productivity, depressing consumption and output in general.³

But high wages are so necessary a condition of social progress that one, even,

² According to Romasco, the NIRA and NRA were created in the image and likeness of Roosevelt—in a word, eclectic. Describing Roosevelt's forays into policy making, he explains:

“Ideologically, Roosevelt and the New Deal were a no-man's land. Roosevelt's leadership and the New Deal had nothing to do with logic and consistency. Instead, he used his position of power to carry out what was essentially an exercise in political eclecticism; he drew freely from a wide and contradictory variety of ideological programs both home grown and imported, and more often than not, he used them simultaneously” (Romasco 1983, 5).

³ Besides the wage problem, Tugwell (1933) focuses on a number of issues, including the challenges of vertical integration—especially, the coordination problem—the role of skill in the serialization of production, and the role of competition, notably the theory of competition, in an era of rising concentration. *The Industrial Discipline and the Governmental Arts* published in 1933 should be seen as an ode to the second industrial revolution and its many challenges, organizational as well as macroeconomic.

who is not a wage-earner might well argue for the strengthening of the workers' cause. For wages, more than any other income, are spent for staple goods, goods which, in the best sense, strengthen the race by their use. These too are the goods which can be made in the most efficient ways. But quite as important, income which is distributed as wages becomes immediate purchasing power for consumers goods, and so completes that productive circuit of which we have spoken. A nation of well-paid workers, consuming most of the goods its produces, will be as near Utopia as we humans are ever likely to get. It is necessary to this result that not too much income shall go to profits; for if it does, this will either be spent for wasteful luxuries which have to be made in extravagant ways, or will, if it is not spent, be distributed by bankers to enterprises who will over expand their productive facilities, forgetting that the worker's buying power is not sufficient to create a demand for them. (Tugwell 1933, 183)

Harold G. Moulton was of a similar view. The failure of wage income to rise commensurately with productivity acted as a brake on economic growth.

"This diagnosis of the economic mechanism may then be summarized as follows. Our study of the productive process led us to a negative conclusion-no limiting factor or serious impediment to a full utilization of our productive capacity could be discovered. Our investigation of the distribution of income, on the other hand, revealed a maladjustment of basic significance. Our capacity to produce consumer goods has been chronically in excess of the amount which consumers are able, or willing, to take off the markets; and this situation is attributable to the increasing proportion of the total income which is diverted to the savings channels. The result is a chronic inability-despite such devices as high pressure salesmanship, installment credits, and loans to facilitate foreign purchases-to find market outlets adequate to absorb our full productive capacity" (Moulton 1935, 46).

Tugwell offered a solution: government-imposed wage increases. In *The Industrial Discipline and the Governmental Arts* (1933), Tugwell made the case for public control of wages and prices. In his view, wages and purchasing power had failed to keep up with productivity, a result he attributed to the changing face of the labor input as well as to the nature of the labor market, namely of being competitive. In short, technological change had lessened labor's bargaining power.

"Yet men have never been content with disorder. They have sought to plan and control. Often their institutions, to be sure, which were planned for one purpose, have prevented the achievement of another. Our Constitution is an illustration of this. It preserves certain rights, but it makes the preserving of others impossible. Then there is the inevitable lag of institutions behind changes in specific techniques. A social structure built slowly and piecemeal to provide for activities of one kind prevents, if the structure fails to change, activities of other kinds, and our institutions are so built into our regard that we award them the loyalty they have not deserved" (Tugwell 1933, 84).

Throughout the book, Tugwell referred repeatedly to the gap between what he referred to as "our possibilities and our performances." For example, in Chapter VIII entitled "Government and

Industry,” he remarked: “Evidently, what we have done is not enough. There has never been a more conspicuous disparity between our possibilities and our performances. The question whether we do not need something more than an enforcement of competition and a defining of its standards is being insistently raised. Do we need some kind of compulsion to efficiency, to adhere to common purpose. Tugwell (1933, 200).” Interestingly, Henry Ford and Edward A. Filene were of a similar view, but differed as to the appropriate “course of action.” While they too felt that wages had to rise, they “pleaded” with their fellow business to raise wages spontaneously (i.e. without third-party intervention), arguing that “business success” based on mass production “will be impossible except as it makes for both high wages and low prices. Low wages and high prices manifestly cut down the widespread and sustained buying power of the masses without which mass production sooner or later defeats itself. In other words, the business of the future must produce prosperous customers as well as saleable goods (Filene 1931, 201).”

Table 1: **NIRA: Underlying Structural Issues**

-
- I The presence of a paradigm technology shock in the form of electrification.
 - II The failure of wages to keep pace with productivity.
 - III The resulting underconsumption / underexpenditure.
 - IV The need to raise wages.
-

Analytically, their argument can be understood in terms of modern growth theory (e.g. the Solow-Swan growth model), namely of the presence of a paradigm technology shock (e.g. electrification), but of the inability of the economy to move to the new higher equilibrium growth path owing to the failure of wages to keep pace with productivity. By 1932, this view had entered popular culture with the writings of Thorstein Veblen, Henry Ford, Edward A. Filene, Howard Scott, Stuart Chase and numerous others.⁴ It can be reduced to a series of structural issues, summarized in Table 1.⁵ We maintain that these were the set of structural issues—long-term in nature—that underlie both the NIRA and the PRA, as well as the Wagner Act of 1935 (National Labor Relations Act). The Brains Trust, however, had to deal with another set of issues, brought about in large measure by the downturn, namely the extensive wage and price deflation and massive unemployment of the early 1930s. We shall refer to these as the cyclical issues. From 1929 onward, both wages and prices fell as unemployment increased which served to complicate matters, as not only would wages (real wages) have to rise, they would have to rise relative to their pre-downturn levels.

And to complicate matters further, it had to deal with the problem of firm/industry heterogeneity. Most agreed that the U.S. was in the throes of an industrial revolution, but not all firms nor all sectors were affected and those affected were not affected equally. Electrification affected some firms within sectors, and some sectors, but left others unchanged. While manufacturing productivity as a whole increased, many firms within industries and whole industries were unaffected.

⁴ It was also an integral part of the writings of the Edward Bellamy’s Progressive Movement, the Institutional Movement, and the Technocracy Movement.

⁵ Issue II is analogous to the current “compensation-productivity gap” according to which growth in inflation-adjusted hourly compensation has lagged behind real productivity growth, resulting in a declining share of labor income. For more on this, see Fleck, Glaser and Sprague (2011).

4. Technology Shocks: Keynes' Achilles Heel

Judging from the contents of his letter to Roosevelt, Keynes appeared to be oblivious to this literature and its arguments. The idea that higher wages (real wages) could precipitate a recovery was anathema to his understanding of the labor market and the economy as a whole. Missing was an understanding and appreciation of the role of technological change in business cycles. This raises another question, namely to what extent was Keynes aware of the role of technological change in economics in general and in the business cycle in particular? In this section, it will be argued that technology shocks and their effects on macroeconomics were his Achilles Heel. Specifically, it will be argued that Keynes appeared to be oblivious to the role of technology shocks both in his native Great Britain as well as in the United States. Specifically, drawing from Beaudreau (1998), it will be shown that Keynes' inability to understand, let alone appreciate the macroeconomic effects of technology shocks explains his inability to understand and appreciate the structural theory of Great Britain's decline according to which its failure to "electrify," and thus emulate the US and Germany, was at the root of its demise in the post-WWI period.

4.1 The Structural versus Financial Theory of Britain's Post-WWI Demise

The debate over the causes of Britain's post-WWI trade predicament consisted of two non mutually-exclusive points of view (Beaudreau 1998). The first, best associated with the Board of Trade and former prime minister, David Lloyd George, maintained that Britain's failure to exploit a technology that was largely developed in the U.K., namely electro-magnetic power, was the leading cause. By the 1920s, U.S. industry consumed substantially more electric power. and, as a result, was more productive; moreover, the U.S. had cornered the so-called 'new markets' for electric power-using products, such as household appliances, electric power generating, transmitting and transforming equipment. If Britain was to reclaim its share of the world market, it would have to "electrify," and fast. The second, best associated with the Treasury and the Bank of England, maintained that the demise of the gold standard and the ensuing instability in foreign-exchange markets lay at the heart of the problem. Uncertainty and under-valued currencies were responsible for the overall decrease in world trade in the post-WWI in general, and for Britain's trade predicament in particular.

4.1.1. The Structural Theory

Clearly in the 1910s and 1920s, the world was in the midst of a major productivity shock: electric power. The U.K., however, was slow to adapt. The U.S. was aggressively while the UK languished in the glory of steam power. Beginning in 1916, a number of committees were set up to study the problem. One such committee was the "Coal Conservation set up in 1916 under Viscount Haldane, which, in turn, appointed a sub-committee to investigate the question of electric power supply in the UK. Its report, issued in 1918, dealt in considerable detail with "the use of electric power in industry, and recommended reorganization of the generation and main transmission on a regional basis under the central supervision of a Board of Electricity Commissioners with wide powers" (Self and Watson 1952, 35). In the same year, the Board of Trade appointed an Electrical Trades Committee to consider the position of the electrical trades after the war. Sir Henry Self and Elizabeth Watson escribed its report as follows:

"Reference was made in strong terms to the crippling handicaps of the local and

political considerations which had prevented Great Britain from reaping the fruits of the outstanding pre-eminence which it had received in original constructive research and development of electricity generation at the hands of pioneers such as Faraday, Kelvin, Swan, Hopkinson, and many. The loss of that our outstanding lead, the history of industry in the intervening years, and the evidence taken during their examination of the position, led the Committee to the following conclusions.-

- (i) That Government should recognize the dependence of the State, both from military and industrial standpoints, upon the supply of electrical energy as a "key industry.
- (ii) the distribution of electrical energy should be regarded no longer as parochial but as a national question of urgent importance.
- (iii) that the present system of electrical generation and distribution is behind the times and is a serious handicap in international competition.
- (iv) That the present conditions are mainly due to faulty legislation and to divided and therefore weak executive control.
- (v) That the determination of questions concerning concentration of generating plant. With the resulting economy of coal and other savings requires immediate attention.
- (vi) That only by such steps can the electrical manufacturing industry of this country be fully developed, not only for the home trade but as a consequence Of the great industry now maturing overseas; that the gain to the State from a well-planned scheme of reconstruction will be inestimable; and that the items which are capable of reasonable calculation, such as saving in fuel, reduction in factory costs, and increased output will together represent not less than per annum" (Self and Watson 1952, 35).

What is particularly noteworthy is mention in point (vi) of the "great industry now maturing overseas." Clearly, the Electrical Trades Committee was aware, as early as 1916, of the threat posed by the electrification of U.S. industry. Similar conclusions were reached by the Williamson Committee, established by the Board of Trade in 1917:

- (1) That when British industry is to the test of keen international competition after the its success will depend upon the adoption of the efficient methods and machinery, so as to reduce manufacturing costs as much as possible.
- (2) a highly important element in reducing manufacturing costs will be the general extension of the use of electric power supplied at the lowest price and it is by largely increasing the amount of power used in the average output per head, and, as a the wages of the worker is raised.
- (3) That a comprehensive system for the generation of electricity, and, where necessary, reorganizing its supply should be established as soon as possible" (Self and Watson 1952, 37).

In 1924, David Lloyd George, then Liberal member of Parliament set up an informal committee, the purpose of which was to address the "inter-linked questions of coal and electricity." The results of the inquiry were published in a report entitled "Coal and Inquiry," which called for compulsory powers of acquisition, coordination and regulation to enable the "Electricity Commissioners" to grant

to approved bodies the right of supplying power within defined (Self and Watson 1952, 52). Ballin chose the following quote to summarize the Inquiry's findings:

“While our various competitors going ahead swiftly in the of the greater utilization of power, a policy or preventing power development in industry would leave our workers in the position of having to compete on unequal terms so that the incompetence of management would have to be made up by the toil of the workers. It ushers in a vista of endless strikes, industrial trouble and internal strain. The way out is to be found in the direction of scientific production and utilisation of power” (Lloyd George 1924, 99).

A number of British economic historians have alluded to the “problem of electrification” in the post-WWI period. For example, in his seminal study of British economic growth in the inter-war years, Derek Aldcroft refers to the constraint imposed upon British industry by the nation's failure to “electrify:”

“Before 1914, and even for a few years after, these constraints limited their All the goods could be produced but for one reason or another, the mass-production stage of manufacture was still not possible. In rayon, for example, the technical perfection of the process of manufacture had only just been completed by 1914, while manufac- ture of cheap mass-produced cars and electrical gods was impeded both by technical considerations and the prevailing methods of production. Similarly, the mass pro- duction and distribution of electricity was hindered by the multiplicity of electricity undertakings engaged in the industry together with the opposition of vested interest in gas”(Aldcroft 1970, 32).

Historian Sidney Pollard makes a similar point. Electrical engineering and the supply of electricity, argues was one of the most critically important industries to emerge in the early 20th century.

“One of most critically important of the new industries was electrical engineering, together with the supply of electricity. It could be taken as the symbol of the new industrial Britain, freeing other industries from dependence on coalfields of the north and west and setting in motion a vast migration to the Midlands and the south-east. Backward technically until 1918, and behind other countries in consumption per head in the 1920s, by the late 1930s the industry was close, if not equal, to its foreign rivals, while the British 'grid' constituted a method of distributing electric power which had no equal anywhere in the world” (Pollard 1970, 99).

4.1.2. *The Financial Theory*

The Structural Theory was not the only theory purporting to explain Britain's deteriorating foreign trade position. In This section, I examine what I shall refer to as the Financial Theory which maintains that Britain's deteriorating foreign trade position was due to breakdown of the world trading system brought about by, among other things, WWI inflation and the resulting demise of the gold standard. No longer being tied to a fixed of gold, a number of Britain's trading partners and competitors had opportunistically devalued their currencies. For example, in 1920, the Belgian franc was at 33 percent of its pre-WWI parity, the Italian lira at 18 percent of its pre-WWI

parity (Brown 1940). Britain's troubles, it therefore follows, were financial in nature, not structural. Post WWI financial disorder wreaked havoc on its foreign accounts. Substantially lower current account surpluses implied larger capital account deficits. City of London was losing ground as the financial capital of the western world. A return to the pre- WWI gold standard would restore order, and, more importantly, would restore the U.K. to its rightful position atop the western world. both as the leading exporting nation and creditor to the world, argued its proponents.

Foremost among the latter was Treasury official (i.e. Controller of Finance) Sir Otto Niemeyer, who from very early on, saw the U.K.'s return to gold at pre-WWI parity as holding the key to recovery. Tomlinson (1981) described Niemeyer's reasoning as follows: "argument very briefly is that a major contribution to Britain's depressed export markets was the disorganization of world's currencies following the war and therefore that the stabilizing exchange rates would encourage world trade and thereby lessen unemployment" (Tomlinson 1981, 70).

This view was shared by Bank of England governor Montagu Norman. Accounts of his meetings in early 1925 with Federal Reserve Board chairman Benjamin Strong reveal a deeply- rooted intent on his part to return Britain to its pre-WWI position leading the western world. Consider, for example, the following passage from Montagu Norman biographer, Andrew Boyle: "Governor (Montagu Norman) could naturally relied on to glean enough inside information from his American friends to misjudge the moment and shackle Britain prematurely to the sovereign metal that could make the Old country rich and great again" (Boyle 1968, 168).

According to Boyle, Strong concurred With Norman; a return to gold was necessary. In Strong's own words: " ..violent fluctuations in the exchanges, with probably progressive deterioration of the values of foreign currencies vis-a`-vis the U.S. dollar; it would provide an incentive to all of those who were advancing novel ideas for nostrums and expedients other than the gold standard to sell their wares; and an incentive to governments at times to undertake various types of paper money expedients and inflation; it might even result in the United States draining the world of gold With the effect that, after some attempt at some other mechanism for the regulation of credit and prices, some kind of monetary crisis would finally result in ultimately restoring gold to its former position, only after a period of hardship and suffering, and possibly some social and political disorder (Boyle 1968, 185).

In the minds of Niemeyer, Bradbury, and Norman, nothing less than a complete return to gold at pre-WWI parities was acceptable. A modified gold standard based on managed currencies was as unacceptable as the status quo. Countries wanting to improve their foreign trade balances could simply devalue their currencies (e.g. France and Italy). Nothing short of a complete return to pre-WWI parities would be acceptable. To this end, Britain would have to act quickly and alone. if need be. Time was of the essence. Not acting expediently would only make matters worse.

4.1.3. *Enter Keynes*

In this section, I attempt to answer two questions: was Keynes aware of the Structural and Financial Theories of the U.K.'s deteriorating foreign trade position presented above, and, second, did he fully appreciate the underlying arguments? With the benefit of hindsight, the U.K. in the early 1920s found itself at an economic crossroad. A technology shock in the form of electrification had hit the U.S. with the results described above. The gold Standard had collapsed as the result

of WWI. World trade was in a state of disorder. The relevant policy question, it therefore follows, was: should the government fully informed about the state of economic affairs, focus on the short run or focus on the long run? Should it undertake public works programmes aimed at the unemployed and workers made redundant by foreign imports? Should the government manage the external value of the pound in the hope of restoring its former export position?

Clearly, to ask these questions is to answer them. For the first time in its history Britain was confronted with the very real specter of a becoming a second-rate industrial nation. Once dominant western industrial power which was the U.K. was clearly in decline. In this section, I shall argue that Keynes was either oblivious to the underlying structural problems facing British industry, or chose to ignore them. One could argue that, like millions of his fellow compatriots, Keynes could not fathom the thought that something fundamental was wrong. Instead, he focused his energies on defending the status quo. Highly inefficient coal miners were to be protected. Housing was to be provided by governments. With hindsight, Keynes failure to appreciate the weakened state of the U.K. economy in the early 1920s, especially its foreign trade position, was harmful.

Was Keynes aware of the Structural Theory? The evidence indicates that if he was, in fact, aware of the widening gap between U.S. and U.K. industrial electric power consumption levels and the failure on the part of the U.K. to move into the so-called new industries, he left little in the of a written account. Only once in his extensive writings in the 1920s does he allude to the problem of electric power.

On 12 April 1924, former prime minister David Lloyd George, writing in *The Nation and Atheneum* calling for wholesale changes in U.K. industry, especially with regard to electric power and the necessary investment to take advantage of this new technology. While not mentioning it by name, Lloyd George was particularly concerned by the phenomenal rise of US industry, and its implications for U.K. trade. U.K., he maintained, must follow the example set by the U.S. Lloyd George favored government involvement, especially in electric power generating and transmitting facilities. According to Keynes biographer Roy Harrod, Keynes followed the ensuing debate:

“On 12 April 1924 no less a person than Lloyd George wrote to *The Nation* calling for a large-scale programme of public works. Unemployment figures had been for some time in the neighbourhood of one million. Lloyd George was the type of Liberal Who was not averse to state intervention. ...There followed a stream of letters from such authorities as Mr. Walter Layton and Sir William Beveridge. Keynes allowed the correspondence to gather momentum, keeping his admirers in suspense about his own views, and finally intervening himself on May 24: *Does Unemployment Need A Drastic Remedy?* Yes it did. He proposed that the Treasury should use its sinking fund for up to say 100,000,000 pounds per year on the construction of capital works at home.... housing was clearly a much-needed form of capital development.. He also recommended the adaptation of our road system to the needs of modern transport and a large scheme for the transmission of electric power” (Harrod 1951, 407).

Further examination of the article in question shows an appreciation of the part of Keynes of the problems confronting the U.K. in the early 1920s:

The discussion on this subject in the columns of the *Nation* has not lacked a few optimists. Nevertheless, most of those who have taken part share in some degree the misgivings which Mr. Lloyd George voiced in opening the debate. If a country, with no new advantages of raw materials or competitive power, With a larger population, produces less and lives better, seems probable that it may be unstable and that something more drastic needed than merely hoping for the best. But what? It is lameness of the answers to this question—we must all admit—that The Nation discussion had proved weak” (Keynes 1924, 236)

Judging from this excerpt, it is clear that he was at least familiar with the Structural Theory. The relevant question, however, is whether Keynes had made the connection between “competitive power” and foreign trade, and consequently, the balance of payments? As it turns out, nowhere in his writings did he broach the topic. Not once in the debate over the merits of the \$4.86 pound is power mentioned. One can only surmise that his interest in Lloyd George’s calls for massive government involvement and investment in the British electric power industry was short-run in nature. Lloyd George saw both short—and long—run good coming from such a programme: increased industrial electric power consumption, increased competitiveness, and increased employment in the long run and greater employment in the short run. Keynes, however, appears to have focused on the latter.

That Keynes’ appreciation of the Structural Theory was, at best, embryonic. is best seen in his views on the coal industry in general, and on coal miners in particular. Clearly, were Keynes to have been on the same wave length as Lloyd George, he would have realized that a more efficient coal industry was as, if not more, important to electrification as was a national electric power transmission grid. As pointed out above, the U.K. coal industry was highly inefficient: wages were high and productivity was lowest among European countries. Clearly, either productivity had to rise, or wages had to fall. Keynes, however, felt otherwise: coal miners, ought not accept lower wages and longer hours. A return to the \$4.86 pound, he argued, would harm the coal industry.

What is particularly interesting is the fact that while Keynes did fully appreciate the nature and the extent of the “power problem,” his work on private versus public investment mimicked the ongoing debate over the role of the state in the electric power industry. To take advantage of important of scale and networks. Large undertakings were requiring large sums of money. In the U.S., ten large electric power companies supplied the market. In the U.K., hundreds of small companies, each relatively inefficient, supplied the market. Furthermore, in the 1920s, the U.S. Government began to invest heavily in hydro-electric power projects. U.K. lagged behind on both accounts. Private producers were inefficient; secondly government was not present.

5. Keynes and the Demise of Nascent Real Business Cycle Analysis

Interestingly, Keynes pulled no punches. In his mind, the NIRA was “quack brained and queer” and its architects were to be dismissed—literally and figuratively. American academics were less virulent in their attacks, preferring to give the policy a chance. In this section, we argue that a combination of factors, from Keynes good fortune in predicting that the U.K. would have to once again suspend the Gold standard, to the success of fiscal policy (WWII) in pulling the Western world out of the Great Depression, was responsible for budnipping what we see as nascent real

business cycle analysis.⁶ For roughly a half century, the idea that the business cycle could be the result of a technology shock was ignored, until Kydland and Prescott (Kydland and Prescott 1982) revived it.

It is our view that Keynes single-handedly altered the course of economic history. In Great Britain, he transformed what was a debate between real and financial theories of economic decline, into one opposing the Treasury View against his own according to which a \$4.86 pound was overvalued. Like the proponents of the Treasury View, he summarily dismissed Lloyd George's allegations of the presence of structural problems in the U.K. economy. On a personal note, there was little love lost between the two men, with Keynes oftentimes referring to Lloyd George as the Welsh witch.

By the late 1920s, the debate continued to center around the government's decision to restore pre-WWI parity. Keynes continued to insist that the Pound was overvalued and that, in the long run, the government would have to either devalue it, or suspend the gold standard. The latter event in 1932, while the result of the collapse of the global trading system, seemed to confirm Keynes' prognostics, with the result that Keynes' status among British economists increased markedly.

Add to this the success of the General Theory in which he provided a new set of policy instruments in the form of fiscal policies and you get his demi-god status, a status he enjoyed for the rest of his life. Fiscal policy was and continues to be synonymous with his work, despite the fact that Title II of the National Industrial Recovery Act consisted of government expenditure-based stimulus, a full three years before the General Theory. That is worked in the second half of the 1930s and in the WWII and post-WWII period only added to his legend.

The victims of his success were many and included the Treasury View in Great Britain.

⁶ De Vroey and Pensieroso (2006), in their discussion of the Great Depression and Real Business Cycle, ignore contributions to real business cycle-like analysis in the 1910s and 1920s, focusing instead on more recent work (e.g. Cole and Ohanian 2004).

Table 2: **U.K. and U.S. Real Business Cycle-Like Theorists**

Name	Real Shock
U.K.	
Frederick Soddy 1920	Energy Shock
David Lloyd George 1924	Electric Power
Clifford H. Douglas 1933	Technique
U.S.	
Simon Patten 1907	Technique
Paul Douglas 1927	Mass Production
Thorstein Veblen 1921	Electric Power
Rexford G. Tugwell 1927	Energy, Management
Harold G. Moulton 1935	Mass Production
Edward A. Filene 1923, 1924, 1929	Mass Production
Howard Scott 1933	Energy
Woodleif Thomas 1928	Energy
Stuart Chase 1934	Energy, Technique
Edwin Nourse 1934	Energy
Scott Nearing 1932	Energy

However, we maintain that the greatest victim was the nascent real business cycle-like literature described above. Real theories of the Great Depression, both in the U.K. and the U.S. (see Table 2) were ignored and/or outright dismissed. While the causes remained nebulous, a solution was at hand, namely government expenditure-based fiscal policy. The fallout went beyond macroeconomics, extending to growth theory in general. North American scholars had, from the early 1910s, focused on the underlying causes of economic growth. This literature was all but forgotten, only to be rekindled in the 1980s at the height of the productivity slowdown.

6. Conclusions

Despite his call for, and admiration of non-orthodox approaches to economic problems (Social Credit, Marxism), the evidence presented here has shown that Keynes failed to understand, let alone appreciate the origins of the large-scale economic experiment that was the NIRA. Among the chief obstacles was his poor understanding of the role of technology and technological change in the business cycle. Moreover, this weakness was apparent in his dealings with David Lloyd George and the members of the Electrical Power Commission.

This failure was not inconsequential. Combined with the failure of the NIRA and the mercurial rise of expenditure-based macroeconomic policies and instruments, it (i) aborted what was a promising research program, namely real business cycle-like theory (ii) altered the nature of the debate regarding the Great Depression, from technology and purchasing power-based

considerations to expenditure-based considerations (iii) bud-nipped promising forays into more compelling views of production processes, specifically of the role of energy in output and output and (iv) dealt a fatal blow to a nascent North American macroeconomics. Keynes and most of the economics profession were oblivious to the nature and role of electrification in early-20th century developments both in Europe and North American. Despite a groundswell of interest on the part of U.S. scholars, the role of technology shocks would be forgotten. As shown here, U.S. scholars, businessmen and government officials were in the process of laying the foundations for a new type of macroeconomics, one that put technology at the center of the business cycle. From 1935 onward, technology-based theories would be overshadowed by expenditure-based theories, especially with the rise of Keynesian economics.

Furthermore, it brought to an end, a promising line of research on economic fundamentals, notably on the role of energy in material processes. Technocratic principles were abandoned with the exception of W. King Hubbard's notion of peak oil, which today constitutes one of the cornerstones of energy economics. Ironically, peak oil was a relatively minor part of technocratic thought, yet it survived to the present. It was only with the two oil crises in the 1970s that energy made a comeback of sorts; however, never fully regaining the role it played in technocratic production theory. And lastly, it dealt a fatal blow to North American macroeconomics. Labeling Roosevelt's advisors as "quack-brained and queer," Keynes summarily dismissed a school of thought that was decades in the making, and one whose underlying principles he failed to grasp in general and in the case of both the U.S. and a case closer to his heart, that of the post-WWI United Kingdom.

References

- Aldcroft, D. 1970, *The Inter-War Economy: Britain 1919-1939* (London: B.T. Batsford).
- Beaudreau, Bernard C. 1996. *Mass Production, The Stock Market Crash, and The Great Depression: The Macroeconomics of Electrification*. Westport, CT: Greenwood Press.
- Beaudreau, Bernard C. 1996. *The National Industrial Recovery Act Redux: Technology and Transitions*, New York, NY: iUniverse.
- Beaudreau, Bernard C. 2015, "Why did the National Industrial Recovery Act Fail?" *European Review of Economic History*.
- Beaudreau, Bernard C. 1998 "Electric Power, the \$4.86 Pound and Keynes: A Reexamination of Britain's Return to the Gold Standard," *Journal of European Economic History*, 1998, 383-408.
- Bell, Spurgeon. 1940. *Productivity, Wages and National Income*. Washington, DC: Brookings Institution.
- Boyle, A. 1968, *Montagu Norman: A Biography* (New York: Weybight and Talley).
- Bresnahan, Timothy F. and Trajtenberg, M., 1995. "General purpose technologies 'Engines of growth'?" *Journal of Econometrics*, 65(1), 83-108.

Brown, W. A. 1940, *The International Gold Standard Reinterpreted, 1914-1934* (New York, NY: The National Bureau of Economic Research).

Chase, Stuart, 1934, *The Economics of Abundance*, New York: Macmillan Company.

Cole, H.L, and Ohanian L.E. 2004 "New Deal Policies and the Persistence of the Great Depression," *Journal of Political Economy* 112(3), 779–816.

David, Paul. 1990 "The Dynamo and the Computer: An Historical Perspective on the Modern Productivity Paradox," *American Economic Review Papers and Proceedings*, vol. 80 (May), 355-61.

Devine, Warren D., Jr. 1990. *Electrified Mechanical Drive: The Historical Power Distribution Revolution*. in Sam H. Schurr, Calin C. Burwell, Warren D. Devine, Jr., and Sidney Sonenblum, eds. *Electricity in the American Economy: Agent of Technological Progress*. Westport, CT: Greenwood Press.

De Vroey, Michel R. and Luca Pensieroso, 2006 "Real Business Cycle Theory and the Great Depression: The Abandonment of the Abstentionist Viewpoint," *Contributions to Macroeconomics* (6)1.

Douglas, Paul H. 1927, "The Modern Technique of Mass Production and Its Relation to Wages," *Proceedings of the Academy of Political Science in the City of New York*, 12 (3) 3, 17-42.

Douglas, Clifford H. 1933 *Social Credit* New York, NY: Norton and Company.

Filene, Edward A. 1923. *The Minimum Wage and Efficiency*. *American Economic Review* 13: 411-415.

Filene, Edward A. 1924. *The Way Out: A Forecast of Coming Changes in American Business and Industry*. New York: Doubleday, Page and Co.

Filene, Edward A. 1929. *Mass Production Makes a Better World*. *Atlantic Monthly* 143: 625-631.

Filene, Edward A. 1931. *Successful Living in This Machine Age*. New York: Simon and Schuster.

Fisher, Irving. 1930. *The Stock Market Crash and After*. New York, NY: Macmillan.

Ford, Henry. 1922. *My Life and Work*. Garden City, NY: Garden City Publishing Co.

Ford, Henry. 1926a. *Today and Tomorrow*. New York, NY: Doubleday.

Ford, Henry. 1926b. *Mass Production*. *Encyclopaedia Britannica* 13: 821-823.

Friedman, Milton and Anna J. Schwartz. *A Monetary History of the United States 1867- 1960*. New York: National Bureau of Economic Research, 1963.

Harrod, R. F. 1951 *The Life of John Maynard Keynes*, London: Penguin Books.

Helpman, Elhanan and Manuel Trajtenberg, 1996. "Diffusion of General Purpose Technologies," NBER Working Papers 5773, National Bureau of Economic Research, Inc.

Hounshell, David A. 1984. *From the American System to Mass Production 1800- 1932*. Baltimore, Md.: The Johns Hopkins University Press.

Keynes, John Maynard, 1924 "Does Unemployment Need a Drastic Remedy," *The Nation and the Atheneum*, 24, 235-236.

Kydland, F.E. and E.C. Prescott, 1982 "Time to Build and Aggregate Fluctuations," *Econometrica*, 6, 1345-1370.

Lacey, Robert. 1986. *Ford: The Men and the Machine*. Boston, MA: Little Brown and Company.

Lloyd George, David 1924, *Coal and Power Report*, London: Hodder and Stoughton.

Moulton, Harold G. 1935. *Income and Economic Progress*. Washington DC: The Brookings Institution.

Nearing, Scott, 1932 *The One Way Out*. New York: Vanguard Press.

Nourse, Edwin A., and Associates. 1934. *America's Capacity to Produce*. Washington DC: Brookings Institution.

Patten, Simon N. 1907 *The New Basis of Civilization*. Harvard University Press.

Rosenberg, Nathan, and L. E. Birdzell, Jr. 1986. *How the West Grew Rich: The Transformation of the Industrial World*. New York, NY: Basic Books.

Schurr, Sam H., Calvin C. Burwell, Warren D. Devine, Jr., and Sidney Sonenblum, eds. 1990. *Electricity in the American Economy: Agent of Technological Progress*. Westport, CT: Greenwood Press.

Scott, Howard et al. 1933. *Introduction to Technocracy*. New York, NY: The John Day Company.

Self, Sir Henry and Elizabeth M. Watson 1952, *Electricity Supply in Great Britain* (London: Allen and Unwin).

Social Democracy for the 21st Century: A Post Keynesian Perspective 2011, Keynes on the New Deal in 1933, (socialdemocracy21stcentury.blogspot.ca/2011/09/keynes-on-new-deal-in-1933.html).

Soddy, Frederick 1924, *Cartesian Economics, The Bearing of the Physical Sciences upon State Stewardship*. London: Hendersons, 1924.

Sonenblum, Sidney. 1990. Electrification and Productivity Growth in Manufacturing. in Sam H. Schurr, Calvin C. Burwell, Warren D. Devine, Jr., and Sidney Sonenblum, eds. *Electricity in the American Economy: Agent of Technological Progress*. Westport, CT: Greenwood Press.

Thomas, Woodlief 1928, "The Economic Significance of the Increased Efficiency of American Industry," *American Economic Review*, 18, 122-138.

Tomlinson, J. *Problems of British Economic Policy 1870-1945*, London: Methuen 1981.

Tugwell, Rexford G. 1927. *Industry's Coming of Age*. New York, NY: Columbia University Press.

Veblen, Thorstein 1921 *The Engineers and the Price System*, New York, NY: Augustus M. Kelley, 1921 (1965).