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# Stagflation and the Rejection of Keynesian Economics: A Case of Naïve Falsification

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## Abstract

In this paper I employ Imre Lakatos's methodology of scientific research programs to scrutinize the idea that stagflation in the 1970s falsified the Keynesian research program. I point out that Keynesian models were able to account for stagflation once they included inflation expectations, so the essential tenets of the Keynesian research program are consistent with the would-be anomaly of stagflation. Furthermore, Keynesian economics exhibited both theoretical and empirical progress by evolving in a way that rendered stagflation a logical consequence of Keynesian assumptions. The transition to new classical economics did not yield such progress. Also, as Keynesian economics tends to adopt novel findings and research methods, new classical economics does not have excess theoretical or empirical content relative to the Keynesian research program. In summary, I find that the falsification of the Keynesian program is unwarranted.

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# 1 Introduction

Conventional wisdom holds that the occurrence of stagflation, the coincidence of high inflation and unemployment, posed a serious problem to Keynesian economics.<sup>1</sup> Some insist the problem resulted in its complete falsification,<sup>2</sup> that stagflation represents what Kuhn (1962) calls a scientific anomaly, in that it provided the impetus for a scientific revolution or paradigm change in macroeconomics.<sup>3</sup> According to this line of reasoning (since Keynesian economics could account for cost-push stagflation<sup>4</sup>), it was particularly problematic that Keynesian economics had not at that time been able to account for stagflation due to a central bank engaging in expansionary policies in the short run that lead to increases in inflation expectations.<sup>5</sup>

In this paper, I utilize the *methodology of scientific research programs* (Lakatos, 1970) to examine this episode in the history of macroeconomic thought. The two reasons Lakatos's framework is used are (i) it involves demarcating between assumptions that are essential and non-essential to any particular school of thought and (ii) it offers a way of evaluating scientific progress when there is a paradigm change. This method of evaluation is linked to Lakatos's rejection of the notion that a hypothesis should be automatically falsified whenever contrary empirical evidence is discovered. Lakatos dubbed this *naïve falsification*, and proposed that

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<sup>1</sup>Throughout this work I lump together the various schools of Keynesian economics because those who rejected Keynesian economics did so in a way that glosses over the subtle details that distinguish one school from another. It is the rejection of Keynesian economics, in all of its guises, that is the subject of this paper.

<sup>2</sup>An example of this comes from observing that the title of Lucas and Sargent (1979) is "After Keynesian Macroeconomics".

<sup>3</sup>To name but a few works evoking the notion that stagflation provided the catalyst for a Kuhnian scientific revolution in macroeconomics, we have Brunner (1970), Friedman (1970), Johnson (1971), Tobin (1981), and Willes (1981).

<sup>4</sup>That is, when the aggregate supply curve shifts left.

<sup>5</sup>From this point on, all references to stagflation are to stagflation that is due to expansionary monetary policy influencing inflation expectations.

instead a hypothesis should only be falsified if there is another hypothesis that can account for everything that the first hypothesis could and more, and that the additional explained phenomena are corroborated by empirical evidence. The methodology of scientific research programs is given a more thorough, but still brief, introduction in Section 2 of the paper.

The central finding from this work is that the stagflation-induced falsification of Keynesian economics is unwarranted, as it is a case of naïve falsification. This finding stems from the fact that new classical economics, which supplanted Keynesian economics as the dominant school of macroeconomic thought, was not able to explain phenomena associated with the Great Depression. In this way, the transition from Keynesian to new classical economics did not encompass the progress Lakatos suggested was necessary for one research program to replace another. Moreover, Keynesian economics was able to evolve in a manner that allowed it to account for stagflation, so the transition from pre-stagflation Keynesian economics to post-stagflation Keynesian economics exhibited genuine scientific progress according to Lakatos's framework. The theoretical advance that allowed Keynesian economics to explain stagflation was the incorporation of inflation expectations. Changes in inflation expectations shift the Phillips curve, thereby allowing for stagflation within an otherwise unaltered Keynesian model.

As a stepping stone toward the main result, I show that the advent of stagflation does not necessarily imply the falsification of the tenets of Keynesian economics. The reasoning behind this is simple: just because a model is inconsistent with a piece of empirical evidence does not imply that *every* assumption (that distinguishes it from rivals) in the model is false. However, that the falsification of Keynesian economics is not a logical necessity of stagflation does not mean practitioners were mistaken to falsify it; it is *possible* that all of the assump-

tions that distinguish the Keynesian research program are false. This is where Lakatos's framework is particularly handy, as it allows one to evaluate the two main paths that economists took in regards to the problem of stagflation and Keynesian economics – rejecting only the assumption of no inflation expectations as Keynesians (and monetarists) did, or rejecting the entire Keynesian research program (including the assumption of no inflation expectations).

An important question for this analysis is whether the absence of inflation expectations is an essential tenet of Keynesian economics. I point out several pieces of evidence suggesting that it is not, the most convincing of which, in my opinion, is the observation that Keynesian economics successfully incorporated inflation expectations without much issue, to the point where the assumption of inflation expectations seems now to actually be essential to Keynesian economics.

A predecessor of this paper is Tobin (1977), who argued that stagflation provided scant evidence to suggest that the essential tenets of Keynesian economics were false. A related vein of research in the history of economic thought argues that most economists who were labelled “Keynesian” did not accept the static Phillips curve, even before stagflation.<sup>6</sup> If this is true, then it represents another avenue by which to critique the supposed falsification of Keynesian economics. In this work it is argued that even if the static Phillips curve is identified with Keynesian economics (which, correctly or not, it typically is nowadays) it was still a mistake to reason that stagflation falsified the Keynesian school of thought.

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<sup>6</sup>See Forder (2010).

## 2 Scientific Research Programs

The notion of a research program is developed in Lakatos (1970). Any particular research program consists of a *hard core*, a sequence of *protective belts*, a *negative heuristic*, and a *positive heuristic*. The hard core of a research program contains essential assumptions, propositions, and axioms that characterize the program.<sup>7</sup> Protective belts consist of auxiliary theories, hypotheses, and the various methods (theoretical and empirical) employed by scientists who follow the research program. The protective belt represents the part of a research program that changes over time, as new developments (e.g. empirical methods, notions of equilibrium) that are consistent with the core are implemented by the research program's adherents. The positive and negative heuristics are the rules of thumb scientists within a research program follow in order to for it to “progress”. Specifically, the negative heuristic forbids scientists working within a specific research programs from rejecting any part of the hard core in the light of a scientific anomaly. Instead such scientists suggest new auxiliary hypotheses to add to the protective belt, making the new version of the research program consistent with the formerly anomalous phenomenon. The manner in which this is done is specified by the positive heuristic – which, most importantly, dictates that auxiliary hypotheses are logically consistent with the hard core of the research program.

Within the Lakatosian framework, a research program is evaluated by considering how the protective belt evolves over time. If we take a series of chronologically ordered theories from a given research program, then that series exhibits *theoretical progress* if from each transition to a subsequent theory there is excess empirical content, that is, if the new theory predicts or explains some novel phenomenon

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<sup>7</sup>For example, a part of the hard core of classical economics may be that *firms behave so as to maximize profits*.

without sacrificing any of the non-conflicting empirical content from before. A series of theories produces *empirical progress* if any of the excess empirical content is corroborated by scientific evidence.

### 3 The Keynesian Core

For this analysis it is not necessary to specify the hard core of Keynesian economics, whatever it may be.<sup>8</sup> Rather, it is only necessary to state the following claim regarding something that is *not* an element of the hard core of Keynesian economics.

**Claim.** The hard core of the Keynesian research program does not include the assumption that economic agents do not form expectations regarding future inflation.

There is plenty of evidence to support this claim. The most important and probably least controversial evidence comes from the fact that Keynesians have shown a willingness to utilize models that involve inflation expectations. This would not be possible if complete myopia with respect to future inflation were a part of the hard core of Keynesian economics, because to utilize an assumption that is logically inconsistent with a part of the core would be to abandon the research program in favor of another, rival program. In fact, augmenting a

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<sup>8</sup>If you ask any pair of economists what constitutes the hard core of the Keynesian macroeconomics it is likely that you will not get matching answers. Some will say that advocacy of government intervention in the economy is the hard core. Others may say sticky prices, particularly downward rigidity in nominal wages, makes up the core of Keynesian economics. Still others, including myself, will say that the essence of Keynesian economics is a set of assumptions, where economic agents exhibit various heuristics and biases, and do not generally have perfect information. For evidence of the latter view, see, in particular, Pech and Milan (2009). Other literature on the theme of Keynes as a behavioral economist includes Akerlof (2002), Akerlof (2007), and Akerlof and Shiller (2009).

traditional Keynesian model (of any sort) with inflation expectations could be considered an example of the positive heuristic at work, since such an assumption is consistent with the hard core of Keynesian economics.

Moreover, to my knowledge, no Keynesian (including John Maynard himself) ever *explicitly* assumed that agents are completely myopic with regard to inflation. That inflation expectations even matter to macroeconomic outcomes was not seriously considered until some twenty years after Keynes's death, when it was independently suggested by a pair of future Nobel laureates in Friedman (1968) and Phelps (1968). If some model (Keynesian or not) studied before this time happened to involve economic agents who do not have inflation expectations it was always an *implicit* assumption. As such, the non-existence of inflation expectations is an assumption that should not be considered part of the hard core of any version of the Keynesian program.

Also, the consideration of inflation expectations is entirely consistent with Keynes's mode of thought. Keynes was a realist when it came to human motivation; he genuinely seemed to try to make a complete account of what people consider in their economic decisions. For example, Keynes is (in)famous for his consumption function, which is a function of only one variable: current real income. Yet he expends a considerable amount of ink discussing other variables that may affect consumption, including both the rate of time discounting and expectations of future income.<sup>9</sup> If he had the foresight to consider inflation expectations in his analysis, then given his penchant for completeness we would expect that he would have at least discussed them, if not utilized them outright as a central component of his theory. Besides, it is understandable that Keynes did not

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<sup>9</sup>See (Keynes, 1936, pp. 91-96, 107-110). Also, in Keynes (1937) is a discussion of perceptions of expected future wealth.



consider inflation expectations, because “Keynes’s approach as to demonstrate the minimum changes to orthodox assumptions which would generate a result of persistent unemployment which would not be eradicated by market forces” (Dow, 1996). In other words, that Keynes neglected inflation expectations is justified by Occam’s razor, as it was not necessary to explain that which Keynes set out to explain.

It is strange that Keynesian economics has suffered so much criticism merely because it initially neglected to account for inflation expectations, when such neglect was simply an artefact of what it inherited from accepted practice in neo-classical economics when Keynes wrote the *General Theory*. Until 1968, other schools of thought had neglected inflation expectations as well. Why should Keynes suffer a downfall because of the myopia of the entire field of economics?

## 4 Dynamics of the Keynesian Research Program

In this section, we account for a short history of the Keynesian research program using symbolic logic. Through the rest of the paper, the symbol “ $\wedge$ ” represents conjunction (“and”), “ $\vee$ ” represents disjunction (“or”), and “ $\neg$ ” represents negation (“not”). We shall also use the usual symbols for logical implication ( $\Rightarrow$ , etc.).

Let  $K$  denote the hard core of the Keynesian research program, and  $B$  its pre-crisis (i.e. pre-stagflation) protective belt. Let  $P$  denote the conclusion “there is a stable, inverse relationship between inflation and unemployment.” In other words the truth of the statement  $P$  entails that there is a static Phillips curve.

We will operate under the assumption that before the crisis, the static Phillips

curve was an implication of the Keynesian research program.<sup>10</sup> Symbolically this can be stated

$$(K \wedge B) \implies P. \quad (1)$$

With the advent of stagflation, it was clear that if there was an inverse relationship between inflation and unemployment it was certainly not stable, so we had  $\neg P$ . Thus, the  $K \wedge B$  edition of the Keynesian research program was challenged by the following anomaly:

$$[(K \wedge B) \implies P] \wedge \neg P. \quad (2)$$

By *modus tollens*, expression (2) implies  $\neg(K \wedge B)$ . Applying DeMorgan's law to this yields  $(\neg K \vee \neg B)$ , so either the hard core of Keynesian economics or its protective belt (or both)<sup>11</sup> is falsified by (2). The question is: given the anomaly for the Keynesian research program expressed in (2), at what should an arrow of *modus tollens* be directed, the Keynesian hard core  $K$ , its protective belt  $B$ , or both?

As predicted by Lakatos's framework, economists who work within the Keynesian research program endeavoured to maintain the Keynesian hard core, so they proceeded to treat the pre-crisis protective belt  $B$  as falsified, rather than  $K$ , the hard-core of Keynesian economics. In order to produce work that would be taken seriously, they were in need of auxiliary hypotheses to revise the protective belt and thereby generate a new protective belt  $B'$  that was consistent with  $K$  and that their conjunction  $(K \wedge B')$  would be able to account for stagflation  $(\neg P)$ .

It was not difficult to find such an auxiliary hypothesis in the idea that peo-

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<sup>10</sup>Here I will reiterate that this notion is controversial. See Forder (2010).

<sup>11</sup>Recall that logical disjunction used in DeMorgan's law is inclusive.

ple have expectations regarding future inflation and these expectations affect their decisions. This hypothesis was suggested a few years *before* this episode of stagflation by Friedman (1968) and Phelps (1968). So, whereas  $B$  included an implicit assumption that inflation expectations do not matter,  $B'$  explicitly assumed the opposite. The resulting form of  $\neg P$ , implied by  $K \wedge B'$ , was the *expectations-augmented Philips curve* which differed from  $P$  in that it was not static, as it could shift due to changes in inflation expectations.

Rival schools of thought, other than monetarism which largely maintained the Keynesian framework, took a different tack, effectively treating both  $K$  and  $B$  as falsified. For example and most notably, the new classical school typically hypothesizes that prices are not rigid in any way and that people are fully rational, in opposition with  $K$ . To be consistent with the assumption that preferences are rational, they also assumed that individuals hold rational expectations with regard to all variables that are characterized by uncertainty. As the variables that are covered by rational expectations include future rates of inflation, this amounted to a rejection of  $B$  as well.

Pure logic on its own cannot tell us what the arrow of *modus tollens* ought to have been directed towards,  $K$ ,  $B$ , or both. Each of those three possibilities is logically valid. To overcome this limitation, in the next two sections we apply Lakatos's framework to determine whether either of the two general reactions<sup>12</sup> to the anomaly of stagflation entailed theoretical or empirical progress.

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<sup>12</sup>It seems safe to ignore the case where  $K$  is falsified and  $B$  is maintained since economists now recognize the importance of inflation expectations.

## 5 Assessing the Keynesian Research Program

The transition from the static Philips curve to the expectations augmented Phillips curve provided an explanation for stagflation, resulting in additional theoretical content for the Keynesian research program. As such, the transition from  $K \wedge B$  to  $K \wedge B'$  represented a genuine case of theoretical progress according to the Lakatosian framework.

But did the transition generate empirical progress? There have been hundreds of studies designed to test the hypothesis that a shift in inflation expectations leads to a shift in the Phillips curve. Results are mixed and, besides, plagued by a number of econometric issues.<sup>13</sup> However, the recession of 1981-2 in the United States represents a corroborative case study and natural experiment based upon this hypothesis, as the Federal Reserve essentially engineered this recession in order to lower inflation expectations and shift the Phillips curve down to a pre-stagflation level. In sum, the academic community (with some notable exceptions) has come to accept the hypothesis, as witnessed by the fact that the inflation augmented Phillips curve is a staple in the study of macroeconomics, from the principles to the graduate level. So, it seems that we can tentatively say that the transition from  $K \wedge B$  to  $K \wedge B'$  embodies empirical progress as well.

## 6 From Keynesian to New Classical Economics

In the previous section, I argued that the Keynesian research program displayed both theoretical and empirical progress as a result of its confrontation with stagflation. However, under the Lakatosian framework this does not, on its own, imply

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<sup>13</sup>Mavroeidis, Plagborg-Møller, and Stock (2013) provides a literature review of some of the recent contributions, while highlighting some particular econometric issues and providing new results that corroborate (i.e. fail to reject) the hypothesis.

that the Keynesian research program should not have been replaced by some other research program. In order to determine whether this is the case, we need to ascertain the theoretical and empirical content of alternative research programs and compare them to the content of the Keynesian research program.

I will focus exclusively on the new classical school of thought, which includes the theory of real business cycles and is associated with the axioms of rational choice theory (including rational expectations) and assumes prices that automatically adjust to equilibrate supply and demand in all markets. I ignore the monetarist school of thought because it shares much of its core with Keynesian economics; its primary difference with the Keynesian research program was that monetarists assumed, as part of their hard core, that the velocity of money was constant over time. Note that constant money velocity was refuted in the early 1980's when the measure exhibited substantial fluctuations, which led many to abandon monetarism.

The first fact to note is that decades after new classical macroeconomics came to prominence, it was still unable to account for certain phenomena that even the pre-stagflation renditions of the Keynesian research program could explain. This fact is candidly admitted by Professor Lucas, who may be the most celebrated member of the new classical school of thought:

The problem is that the new theories, the theories embedded in general equilibrium dynamics of the sort that we know how to use pretty well now – there's a residue of things they don't let us think about. They don't let us think about the U.S. experience in the 1930s or about financial crises and their real consequences in Asia and Latin America. They don't let us think, I don't think, very well about Japan in the

1990s. We may be disillusioned with the Keynesian apparatus for thinking about these things, but it doesn't mean that this replacement apparatus can do it either. It can't. (Lucas, 2004, p. 23)

And so, even the most advanced version of the new classical research program does not exhibit theoretical progress relative to the pre-stagflation Keynesian research program. The latter could explain phenomena such as liquidity traps and financial crises while the former never did.

I must note that even though the new classical research program failed to demonstrate such theoretical progress, this does not mean that it was a fruitless endeavor. Notable contributions from new classical scholars include the “Lucas critique” (Lucas, 1976) and the idea that optimal plans can be time-inconsistent (Kydland and Prescott, 1977). The Lucas critique provided the impetus for improvement in empirical methods by pointing out that macroeconomic models ought to account for the changes in behavior and beliefs individuals undertake in light of changes in policy. And the advocacy of rules over discretionary choice due to the time-inconsistency of optimal plans ushered in a revolution in monetary policy that coincided, and quite possibly contributed to, the “great moderation” enjoyed by developed economies from the early 1980s up to the recent financial crisis.

## **7 Concluding Remarks**

The Keynesian research program has overcome whatever problems it faced due to stagflation by evolving in a way that has progressed the program both theoretically and empirically. Relative to the Keynesian research program, new classical economics, its chief rival, has not enjoyed theoretical or empirical progress. The

fact that this statement has to be qualified with the phrase “relative to the Keynesian research program” points to a shortcoming in Lakatos’s framework. This shortcoming is that Lakatos ignores the theoretical and empirical content a research program enjoys in excess of that of its predecessor if the predecessor also has excess theoretical and empirical content relative to the successor. The example that is pertinent to the purposes of this paper is that Lakatos’s framework ignores the theoretical and empirical content the new classical research program may contain that Keynesian economics does not, merely because Keynesian economics pre-dates new classical economics. However, Keynesian economics has a history of absorbing advances made by its rivals,<sup>14</sup> so it seems that new classical economics does not contain excess, empirically corroborated theoretical content relative to Keynesian economics. If this is true then we can ignore this shortcoming of Lakatos’s framework.

That Keynesian economics benefited (in the sense that it is able to explain more) from an anomaly is not unprecedented within the history of science. For example, when the laws of classical physics resulted in erroneous forecasts of Uranus’s orbit, some began to doubt whether the inverse square law of gravity held at such great distances as those between the Sun and Uranus. Others never doubted the laws and used them to make predictions regarding the orbit and mass of an unknown planet whose gravity may have been perturbing Uranus’s motion. These predictions led to the discovery of Neptune, the gravitational pull of which was the chief cause of the perturbations. This episode provided a much-celebrated corroboration of the classical laws.<sup>15</sup>

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<sup>14</sup>Examples of such advances include the consideration of inflation expectations and the time-inconsistency of optimal policy. Keynesian economics also tends to absorb some of the research methods of its rivals, such as deeper micro-foundations and dynamic stochastic general equilibrium modelling.

<sup>15</sup>For more on the discover of Neptune see, for example, Standage (2000).

If there is a lesson to be learned from all this, I believe it is that we scientists must be careful to consider what needs to change in order to be able to explain phenomena that are inconsistent with our theories. We must aim the arrow of *modus tollens* carefully and avoid naïve falsification, so that we do not sacrifice hypotheses that have explanatory value. Sometimes full-fledged revolutions are warranted. But other times, as I have argued is the case with Keynesian economics's engagement with stagflation, all that is needed is a minor tweak of some non-essential aspect of the research program. If we had done this perhaps we would have avoided what Krugman (2011) calls a "Dark Age" of macroeconomics.

Economists in particular need to be especially careful, because there is much at stake when it comes to what is perceived as the economic truth. Private fortunes can be made, often to the detriment of society as a whole, due to changes in economic orthodoxy, so there is plenty of incentive to support certain ideas even when they are inconsistent with empirical reality. As Keynes himself warned,

The ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed the world is ruled by little else. Practical men, who believe themselves to be quite exempt from any intellectual influence, are usually the slaves of some defunct economist. Madmen in authority, who hear voices in the air, are distilling their frenzy from some academic scribbler of a few years back. (Keynes, 1936, p. 383)

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