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A Veblenian Critique of Nelson and Winter's Evolutionary Theory[†]

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Abstract

It is often argued that Richard Nelson and Sydney Winter's evolutionary theory is an alternative to neoclassical economics and is compatible with or complementary to Veblenian evolutionary economics. This paper subjects such arguments to critical examination. I argue that while Nelson and Winter's theory provides a more realistic account of the firm behavior than Marshallian-neoclassical theory does, it is a neoclassical evolutionary theory in much the same sense as Marshall's economics is quasi-evolutionary, 'neo-classical' economics according to Veblen. Therefore, Nelson and Winter's evolutionary theory is in fact a protective modification of the neoclassical economics and is antithetical to Veblen's evolutionary economics.

Key words: Thorstein Veblen, Richard Nelson, Sydney Winter, Evolutionary Theory, Institution

JEL Classifications: B15, B25, B52

1. Introduction

Since the publication of Richard Nelson and Sydney Winter's (1982), *An Evolutionary Theory of Economic Change*, evolutionary economics has been given new attention from economists. Within heterodox economics,¹ however, the reception of Nelson and Winter's (hereafter NW) evolutionary theory is divided. Proponents think that NW's theory is a revival of the long-neglected evolutionary tradition in economics. Geoffrey Hodgson (2019, p. 111), for example, considers NW's theory 'heterodox' in the sense that it resembles Veblen's evolutionary economics and that it emphasizes the "complexity, uncertainty, and ongoing [quantitative and qualitative] change in the real world." Hodgson (2007, p. 311)

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¹The meaning and boundary of heterodox economics is not fixed but evolving. From my own viewpoint heterodox economics is a group of schools of thought in economics, which provides a scientific analysis of how real-world capitalist economy works and evolves in the historical and social context or, in short, of the social provisioning process under capitalism. This view is consistent with, just to mention a few recent studies, Lawson (2006), Lee (2008), Jo *et al.* (2018), and Jo and Todorova (2018).

also holds that NW (1982) “has inspired an entire new generation of evolutionary economists and played a major role in the development of an evolutionary alternative to neoclassical theory.” In a similar vein, Becker and Knudsen (2012) extol that “Nelson and Winter provided the foundation for evolutionary economics and the evolutionary theory of the firm ... [which] has been decisive in advancing our knowledge about the origins and evolution of firm structure and boundaries” (pp. 243, 252). Other ‘heterodox’ proponents of NW also argue that the NW’s theory is either compatible with or complementary to ‘original’ institutional-evolutionary economics (hereafter, institutional economics),² and hence conducive to the development of institutional economics and heterodox economics in general (see, for example, Foss, 1998; Nightingale and Potts, 2003; Hodgson and Knudsen, 2004; Hodgson, 2013a). Such a favorable reception of NW’s theory within heterodox economics is exemplified by the fact that the Association for Evolutionary Economics granted Richard Nelson the Veblen-Commons Award in 2007.

Yet, there are other heterodox economists—institutionalists, in particular—who are critical of NW’s theory. Critics in the main argue that NW do not offer a novel theoretical framework grounded in the actual socio-historical context and hence that their theory does not transcend the standard neoclassical framework³ (Mirowski, [1983] 1998; Boulding, 1984; Ramstad, 1994; Vromen, 1995, 2001; Mayhew, 2000; Watkins, 2010; Frigato and Santos-Arteaga, 2012). Expanding upon this line of critiques, I shall argue in this paper that NW’s theory is not compatible with or complementary to Veblenian evolutionary-institutional economics; rather, it runs counter to the latter. It is an anti-Veblenian project, which is akin to neoclassical economics. This argument is predicated on the examination of evolution, rationality, equilibrium, institution, and uncertainty in NW’s theory. This examination leads us to conclude that NW’s theory is a neoclassical alternative to Veblenian evolutionary theory.

This paper is organized in the following manner. In the second section I briefly discuss the basic characteristics of evolutionary approaches in classical political economy and Veblen’s economics. In the next section I contrast Veblen’s evolutionary economics to Marshall’s economics which is inspired by Spencer’s evolutionism. Against this background, the fourth

²In this paper, ‘institutional economics’ refers to ‘institutional-evolutionary’ economics in the tradition of Veblen, Commons, and Ayres, whose main concern is the evolution of institutions. Either ‘old’ or ‘original’ is more often than not attached to institutional economics in order to distinguish it from ‘new’ institutional economics. It is an odd label, which denigrates a currently active research program as if it were old or obsolete. Classical economics is not called ‘old’ or ‘original’ classical economics even though neoclassical and new classical economics emerged later. Keynesian economics co-exists with new Keynesian economics. New institutional economics, the name coined by Williamson (1975), has little to do with Veblen’s, Commons’s, or Ayres’s institutional-evolutionary economics—it is “new but not institutionalist” (Dugger, 1990). Its origin is Ronald Coase (1937) and it is a variant of neoclassical economics, although new institutional economists maintain that their economics is an alternative to neoclassical economics. The latter position resembles how Nelson and Winter consider their evolutionary economics. This paper subjects this position to critical analysis.

³The meaning of neoclassical economics is, like that of heterodox economics, not fixed or universal (see, Morgan, 2016). In this paper, neoclassical economics refers to a system of inquiry informed by deductivist-individualist methodology and built on a set of utilitarian-marginalist assumptions on the real world. Mainstream economics refers to a currently dominant group of schools of thought in economics that share neoclassical assumptions and methodology, although a specific mainstream theory, model, or policy may deviate from some core neoclassical assumptions.

section examines theoretical and methodological aspects of NW's theory with a focus on rationality, optimization, equilibrium, and evolution. The following section discusses how institutions (markets and firms) are treated in NW's theory and in Veblen's theory. The last section concludes the paper.

2. Evolutionary approaches in economics

'Evolution' in its common sense means the process of change driven by internal and/or external factors. In economics literature evolution is often interchangeable with modification, dynamics, growth, development, progress, or transformation. These terms imply not only that evolution can be interpreted in many different ways, but that there are many evolutionary approaches in economics.

In respect of the general meaning of evolution, classical political economy in the eighteenth and nineteenth centuries, even before the emergence of evolutionary theories in biology, held an 'evolutionary' thinking when it comes to, *inter alia*, the process of (re)production, the accumulation of capital, and the changes in social institutions and relationships in historical time. For example, Marx's theoretical system entails both gradual and radical changes in the social structure, which are endogenously driven by class conflict and technical development. Evolution in Marx's system is not predetermined but unfolding in a complex socio-historical context (Sowell, 1985, p. 24; Henry, 1990, pp. 48-50; Dugger and Sherman, 2000, pp. 4-9).

Thorstein Veblen, influenced by Darwin's evolutionism and historicism of German historical school, addressed the importance of evolutionary thinking in economics and articulated it, if not fully developed, as a critique of and an alternative to the utilitarian version of 'classical' economics.⁴ Veblen's evolutionary economics is historical, social, cultural, institutional, endogenous, cumulative, and non-teleological (for detailed explication of Veblen's evolutionary approach see, in particular, Mayhew, 1998; Dugger and Sherman, 2000). For Veblen, evolution is "a cumulative unfolding process or an institutional adaptation to cumulatively unfolding exigencies" (Veblen, [1900] 1961b, p. 173), and, accordingly, evolutionary economics is "the theory of a process of cultural growth as determined by the economic interest, a theory of cumulative sequence of economic interactions stated in terms of the process itself" (Veblen, [1898] 1961a, p. 77). As such, central to Veblen's evolutionary economics is that nothing is natural or normal in socio-historical evolution, since a change is driven by purposeful (or 'teleologic') actions in social context without a predetermined end (the characteristics of Veblen's evolutionary theory will be discussed further in the following sections when we discuss Marshall's and NW's evolutionary approaches).

⁴By 'classical economics' Veblen meant pre-Darwinian, taxonomic economics whose primary concern is the normalization, naturalization, and universalization, and empirical generalization of the world in constant motion (Veblen, [1900] 1961b; Lawson, [2013] 2016, pp. 41-8.).

3. Herbert Spencer and Alfred Marshall: the origins of Nelson and Winter's evolutionary theory

Does Veblen's evolutionary approach have a bearing on NW's evolutionary theory? Or do NW incorporate Veblen's insights into their theory in any substantial manner? NW (1982) mention in a footnote that “[o]n questions of evolution in the larger system, we converge substantially with the older tradition of evolutionary thinking in economics that has had institutional evolution as its principal concern” (p. 404). This is the only place where NW (1982) mention the ‘older tradition,’ which supposedly refers to Veblen's economics. Not even Veblen or Commons is, however, referenced in the book. In their later works they occasionally refer to Veblen's or a few institutionalist works in the footnotes, but it appears that social evolution as understood and analyzed by Veblen and institutional economists is largely ignored and, thereby, a different conception of evolution takes its place. Moreover, in his Veblen-Commons Award address, Nelson (2007) highlights the importance of institution in the context of economic growth. However, his conception of institution—in particular, the market and the firm—can hardly be that of ‘original’ institutionalism; rather, it is close to the new institutionalist concept (I shall address this issue more fully in Section 5).

The origins of NW's evolutionary theory should be found in Spencer's evolutionism and Marshall's ‘neoclassical’ economics, rather than Darwin's evolutionism and Veblen's evolutionary economics.⁵ This has profound implications for understanding NW's theory—its methodological and theoretical foundations and its place in economics. Let us first examine Marshall's economics and its evolutionary features, which are largely influenced by Spencer.

Marshall's economics is multi-faceted. Its pre-analytical vision of economy is evolutionary. Its method is static and partial. Its theory is utilitarian and marginalist (Veblen, [1900] 1961b; Henry, 1990, pp. 211-8; Thomas, 1991; Pratten, 1998; Laurent, 2000; Hodgson, 2013a; Lawson, [2013] 2016). As for his pre-analytical vision, Marshall holds that “economics, like biology, deals with a matter, of which the inner nature and constitution, as well as the outer form, are constantly changing” ([1890] 1920, p. 772). If something is constantly in motion, nothing is pre-determined. This is the gist of evolutionary thinking that implies the open system in which interactions between agents and surrounding environment lead to change. Such an evolutionary open-system view is implied by Marshall (1898):

“Progress” or “evolution,” industrial and social, is not mere increase or decrease. It is organic growth chastened and confined and occasionally reversed by the decay of innumerable factors, each of which influences and is influenced by those

⁵Although it is commonly assumed that Joseph Schumpeter and Armen Alchian are the origins of NW's evolutionary economics, NW hold that “our evolutionary theory is closer to the original Marshallian doctrine than is contemporary orthodoxy” (Nelson and Winter, 1982, p. 45). Foss (1994) makes a similar argument that the ‘modern evolutionary economics’ begins with Marshall's evolutionary economics. Foss (1994) also argues that the neglect of Marshall's evolutionary thinking by later neoclassical economists is unfortunate. It was Nelson and Winter (1982) through Alchian that, according to Foss, revived the Marshall's evolutionism. However, this revival has not had a substantial impact on the neoclassical paradigm (see Dollimore and Hodgson, 2014).

around it; and every such mutual influence varies with the stages which the respective factors have already reached in their growth. (pp. 42-43, original emphasis)

However, Marshall's static and partial analysis implies the closed system in which a law-like tendency towards the equilibrium state of the economy is the norm.⁶ Such a mechanical process within the mentally constructed closed system is predicated on the utilitarian-marginalist axioms, such as relative scarcity, optimizing behavior, and competition under the 'normal' conditions of life (Henry, 1990, p. 156; Thomas, 1991). Thus Marshall's economics bears an obvious contradiction between his vision and his theory-method. To put it another way, his theoretical system and method are inadequate to account for ever-changing reality (Pratten, 1998, p. 122; Mayhew, 2016, p. 132). This is Marshall's 'dilemma' (see, Hart, 2003, 2012). And this is precisely the reason Veblen called Marshall's economics 'neo-classical' in the sense that Marshall's economics both continues (in terms of taxonomic methods) and discontinues (in terms of the evolutionary vision) the utilitarian version of classical economics (Veblen, [1900] 1961b, pp. 171-3; Lawson, [2013] 2016).

Then how is it possible that two seemingly incompatible elements constitute Marshall's economics? As a way to escape this obvious contradiction between the evolutionary vision and the static theory-method, Marshall separates 'pure theory' from 'applied theory.' It is the pure theory from which Marshall's 'general theory' is derived: "the general theory of the equilibrium of demand and supply is a Fundamental Idea running through the frames of all the various parts of the central problem of Distribution and Exchange" (Marshall, [1890] 1920, p. viii). Marshall's timeless supply-demand engine results in a mechanical equilibrium, which is at odds with the evolutionary process (Thomas, 1991). Insofar as Marshall's *Principles of Economics* ([1890] 1920) is concerned, his applied-evolutionary view of economy is an add-on to the pure-general theory to the extent that change occurs within the fixed and closed system. Thus evolution is quantitative and adaptive, rather than being qualitative and transformative. Obviously, such a conception of evolution is not Darwinian or Veblenian.

Then what exactly is the evolutionary doctrine in Marshall's economics, which underlies NW's evolutionary economics? Consider the following passage:

The doctrine that those organisms which are the most highly developed ... are those which are most likely to survive in the struggle for existence, is itself in process of development The law of "survival of the fittest" states that those organisms tend to survive which are best fitted to utilize the environment for their own purposes. (Marshall, [1890] 1920, p. 241, original emphasis)

⁶This is not to say that Marshall's theoretical system assumes disequilibrium away. Conceptually, disequilibrium is not ruled out even though a process leads to an equilibrium state. A 'process' itself must entail disequilibria, since it does not take place at all if the equilibrium is permanent. That is, disequilibrium is not incompatible with equilibrium within the closed theoretical system. This point will be discussed again with regard to NW's evolutionary theory in Section 4.

Like the ‘trees in the forest,’ to use Marshall’s own analogy, individual firms struggle (or compete) for existence and only the best fitted in their environment (i.e., the ‘forest’) survive and grow (Marshall, [1890] 1920, pp. 315-6). This is the law of the survival of the fittest or the natural selection doctrine, which is applied to every living organism, as well as social organizations. It should be noticed that Marshall’s view of evolution presumes the ‘fixed’ environment—that is, the competitive market system, as if it is natural, normal, and universal; and, thereby, it is unalterable and unquestionable. The question as to how the environment emerged and has evolved into the present state is never taken into account. From Veblen’s perspective, such an evolutionary approach is pre-Darwinian (Spencerian) and taxonomic in the sense that it is predominantly of the ‘normal’ conditions (Veblen, [1898] 1961a, p. 67; Henry, 1990, pp. 211-8; Jennings and Waller, 1998, pp. 209-11; Lawson, [2013] 2016, p. 42). When evolution is looked through the lens of Spencerian evolutionism, society is an organic whole, its evolution is amount to progress, progress is gradual and unhurried, evolution brings about the harmonious equilibrium state (Spencer, [1862] 1890, pp. 524-5; see also, Laurent, 2000; Beck, 2013).⁷ Furthermore, the law of the survival of the fittest coupled with the natural selection doctrine implies that “nature determines the best competitors and this natural selection process leads to continuing improvement,” and nature, at the same time, punishes lazy, inefficient, incompetent individuals (Hofstadter, 1955, pp. 6-7, 11). If evolution is such a unidirectional progressive process, the present is the best outcome of the past processes and a better future is predetermined as a result of the natural selection process at work. Here it should be noted that the causality goes from nature (environment) to organisms (agents). On this Levins and Lewontin (1985) argue that “[t]he concept of adaptation [and natural selection] is that the external world sets certain ‘problems’ for organisms and that evolution consists in ‘solving’ these problems” (p. 25, original emphasis). That is to say, the Spencerian doctrine promotes a view that people have no power to change their social environment since it is the result of the “material process of inexorable evolution” (Noble, 1958, p. 61).

Likewise, Marshall’s evolution presumes a change towards the equilibrium position at which inefficient and incompetent individuals are squeezed out. Provided that nature or socio-economic environment along with fixed preferences and behavioral patterns is a given datum, the selection of the fit is predetermined rather than open-ended. For both Spencer and Marshall, the leisure class, the rich, ruling elites, and the surviving or growing business enterprises and their owners and managers are, for example, the naturally selected groups of agents or organisms, because they are allegedly most efficient and competent. The fit as well as the given are, therefore, legitimated—that is to say, “the existing is normal and the

⁷Hodgson (2004, 2013b) argues that Spencerism should not be equated to social Darwinism, which is an ideological label used by leftist scholars and which should not be used to throw out the evolutionary accounts of society all together. Although Hodgson is right on this, it is hard to deny that Spencerism nourished the social Darwinian thinking in social sciences and political-public discourse, which lends support to the view that social evolution resembles natural evolution represented by the law of the survival of the fittest, that individuals are responsible for their own success or failure, that individuals must adapt to the present system which is assumed to be the ‘best of all the possible worlds,’ and thereby that any action aiming to change the present system and to curb individual freedom should be avoided (Hofstadter, 1955; Bannister, 1979; Beck, 2013). Due to a significant overlap or connection between Spencerism and social Darwinism, it is not completely misleading to substitute social Darwinism for Spencerism insofar as its meaning and implications, not the label, are concerned.

normal is right” (Hofstadter, 1955, p. 155; see also Henry, 1995, p. 81).

From the Veblen’s social evolutionary perspective the ‘fit’ in the Spencer and Marshall’s evolutionary framework are in effect the socially ‘unfit’ in the sense that they are the predatory who expropriate the surplus created by the working class and the community at large; that they are the wasteful who use the expropriated surplus or the accumulated wealth in a socially disserviceable manner (e.g., conspicuous consumption and military spending); that they are the irresponsible for social welfare who control the production of goods and services in the their own interest of pecuniary gain (e.g., business control of industry such as ‘sabotage of production’); and that they are the socially inefficient whose wasteful expenditure and irresponsible behavior generate social costs (Veblen, [1901] 1961c, p. 299, [1914] 1964a, pp. 123, 144; Edgell and Tilman, 1989, p. 1009; Frigato and Santos-Arteaga, 2012, p. 83).⁸ This is rendered possible since the system of institutions under capitalism is organized in such a way as to distribute the surplus in favor of the unfit who are least desirable and serviceable to the progress of the entire society. Veblen ([1896] 1973) puts it:

It is . . . only by injecting a wholly illegitimate teleological meaning to the term “fittest” as used by Darwin and the Darwinists that the expression “survival of the fittest” is made to mean a survival of the socially desirable individuals. . . the present competitive system does not by any means uniformly results in a working out of favorable results by a process of natural selection. (p. 451-2)

In order to legitimate the existing economic system, it is therefore necessary to hide the social foundations of the system (e.g., class differentiation and exploitation) *as if* the society were an organic whole (with individual organisms in it) which has naturally evolved into the most desirable state and in which there exists a common interest of all the members of the society (Henry, 2018). Marshall’s economics inspired by Spencer’s evolutionism is the case in point. Hiding the social foundation is done by equating human society to nature in which the natural selection mechanism is alleged to be the driver of the evolutionary process, by normalizing and naturalizing the given system, and by replacing deliberate human beings with the hypothetical, asocial ‘representative agent’ or the “lighting calculator of pleasures and pains” (Veblen, [1898] 1961a, p. 73).

By contrast, in Veblen’s evolutionary economics society is not an organic, harmonious whole. In a class-based capitalist system, there is no common interest. Therefore social evolution does not entail unidirectional progress or the equilibrium state (Henry, 2018).

Marshall’s economics coupled with Spencerian evolutionism forcefully lends support to the

⁸If the ‘surplus’ is defined as “the part of production that is not necessary for the reproduction of the existing social system” (Martins, 2018, p. 41), Veblen and his followers certainly provide an ‘evolutionary-institutional’ analysis of the production and distribution of the surplus (see, Edgell, 1975; Adams, 1991; Dugger, 2006). As well, various heterodox traditions in economics such as Post Keynesians and Sraffians have developed a surplus approach, which draws upon classical political economy, in particular Marx’s surplus approach (Lee and Jo, 2011; Martins, 2014, pp. 214-38).

view that any institution which serves vested interests should remain fixed. This is a theoretical and ideological defense of the existing social order and vested interests therein. For this and other reasons, Veblen was critical of Marshall's evolutionary economics.

Any sympathetic reader of Professor Marshall's great work — and that must mean every reader — comes away with a sense of swift and smooth movement and interaction of parts; but it is the movement of a consummately conceived and self-balanced mechanism, not that of a cumulatively unfolding process or an institutional adaptation to cumulatively unfolding exigencies. The taxonomic bearing is, after all, the dominant feature. (Veblen, [1900] 1961b, p. 173)

According to Veblen, Marshall's theory bears “an air of evolutionism,” which is nothing but a “quasi-evolutionary tone of neo-classical political economy,” since Marshall's law-like theories under the postulate of normality are not capable of explicating deliberate or transformative human agency and its reciprocal and cumulative relationship with institutional changes (Veblen, [1900] 1961b, pp. 175, 178). Essentially, a quasi-evolutionary theory anchored in the conception of normality and the doctrine of the survival of the fittest is incompatible with Veblen's evolutionism. As discussed in the following sections, it is Marshall's quasi-evolutionary thinking that is kept and revived by NW.⁹

4. Rationality, optimization, equilibrium, and evolution

Let us now turn to NW's evolutionary theory. It is commonly believed that NW's evolutionary theory is, as NW (1982, p. 94) themselves claim, an alternative to the Marshallian-neoclassical theory of the firm. This is due largely to the fact that NW modified the Marshall's (and neoclassical) assumption of profit maximization. However, it is not suffice to say that NW take an anti-Marshallian or anti-neoclassical position. Both Marshall's Spencerian evolutionary vision delineated above and most of principal neoclassical preconceptions and methods are kept intact in NW's theory. Let me elaborate on this starting with the theoretical background from which NW's theory emerged.

One of the building blocks of neoclassical economics is the rationality assumption. In its original form (as conveyed in economics textbooks), rationality is translated into optimizing behavior given scarce resources and complete or sufficient information as to economic environment. Firms maximize profits by equating marginal cost to marginal revenue. This marginalist principle was challenged by, in particular, Oxford Economists' Research Group (such as, P. W. S. Andrews) and Richard Lester in the 1940s and 1950s. They argue that real-world business enterprises do not calculate marginal cost and marginal revenue and,

⁹It is not quite right to say that the evolution of neoclassical economics—e.g., “institutionalization of the *ahistorical, fully adapted, uniform-equilibrium* firm”—has removed Marshall's evolutionary insights (Foss, 1994, p. 1125, original italics), since Marshall's Spencerian evolutionism as well as his supply-demand engine have been central to neoclassical-mainstream economics. NW's theory is a good example.

hence, that profit maximization is meaningless in the real world; nor do enterprises consider wage rates (or marginal costs of labor) a significant factor of employment decisions. This means that the Marshallian demand-supply framework and any neoclassical theory based upon the marginalist doctrine are flawed in light of real-world business activities (Lee, 1981, 1984, 1990-91; Vromen, 1995, ch. 2).¹⁰

In reaction against these challenges, neoclassical economists defended the profit maximization assumption. Most notable figures are Armen Alchian and Milton Friedman. Alchian (1950, 1953), on the one hand, responds to the critics of marginalism that under the uncertain market environment whether an individual firm maximizes profits or not is unimportant. Apparently, the strong rationality assumption is given up, but still firms are rational in the sense that firms seek profit, be it maximum or otherwise, in order to survive and grow. What matters is, according to Alchian, the market environment and firm's adjustment to it—that is, a rational firm searches for more profitable actions. Friedman (1953, p. 22), on the other hand, argues that a surviving or growing firm should be assumed to be maximizing profits, otherwise the natural (market) selection process drives non-optimizing firms out of the market. Alchian's and Friedman's arguments thus in effect saved the rationality assumption by extending the meaning of rationality—one by introducing uncertainty and search behavior and the other by adding the market selection mechanism to profit maximizing behavior, both of which are consonant with Marshallian-Spencerian principle of the survival of the fittest and natural selection. Furthermore, the 'extended' marginalist doctrine is made compatible with a range of flexible firm behaviors, such as rule-of-thumb behavior under uncertainty or with bounded rationality, opportunistic behavior, and transaction cost minimization (Lee, 1984; Ramstad, 1994, pp. 73-8; Vromen, 1995, ch. 2). Either in its original or extended form, the rationality assumption not only prioritizes the natural selection principle but also, thereby, divests human beings and acting organizations of power to change the institutional environment.

NW's evolutionary theory emerged out of this theoretical context. NW reject the standard, static profit maximization assumption, due to its lack of the market selection mechanism which takes place over time. Instead, inspired by Alchian, NW argue that a firm should be understood as a profit-seeking or profit-motivated organism. In facing competitive pressure and unpredictable external changes in the market environment, the firm has to alter its decisions and modify its behaviors to stay alive by making positive profits, if not maximum profits. In this 'evolutionary' context, optimizing firm behavior in the standard textbook model does not adequately explain the competitive process or the struggle for survival, such as learning by doing, trials and errors, feedback, and imitation (Nelson and Winter, 1982, pp. 31-3). Certainly, NW's position is 'more realistic' than that of orthodox neoclassical economists who stick to the standard rationality assumption.

¹⁰The 'empty boxes' debate in the 1920s, led by Piero Sraffa, challenged the theoretical validity of the Marshall's supply curve. In a nutshell, Sraffa (1926, 1930) argues that the supply curve removes the production process and other decision-making processes within the business enterprise and the inter-industrial connections. It should also be noted that before this debate it was Thorstein Veblen (1904) who offered a non-Marshallian, evolutionary theory of the business enterprise. NW have not paid any attention to both Sraffa and Veblen, even though they claim that they offer an evolutionary alternative to the Marshallian theory of the firm.

However, being more realistic does not mean that NW reject the entire neoclassical paradigm. Nor do NW envisage a completely alternative approach, which would overcome static and equilibrium-oriented analysis of neoclassical economics. Instead of taking a ‘radical’ route, NW endeavored to extend neoclassical economics by incorporating evolutionary reasoning and methods. This is because neoclassical economics is, from NW’s point of view, “flexible and ever-changing” and “more subtle and flexible than the image of it presented in the intermediate texts” (Nelson and Winter, 1982, pp. 6, 7, 362). NW’s theory thus demonstrates that neoclassical economics can accommodate evolutionary reasoning, if the latter is formulated in neoclassical terms. It means that “Nelson and Winter’s evolutionary theory is better viewed as an explication and extension of the basic belief of ‘orthodox’ theorists such as Alchian and Friedman” (Vromen, 1995, p. 66). It goes without saying that, as discussed earlier, Marshall already paved the way for combining marginalist doctrines with an evolutionary vision, although he was not successful to resolve the methodological contradiction between the two. This position that NW’s evolutionary theory is complementary to neoclassical economics is made clear by Winter (2014).

I [Winter] believe that in the vast body of conclusions derived by the methods of neoclassical economics there are many pragmatically valid propositions. It is an important task for evolutionary economists to identify such propositions and to explain in evolutionary terms why the neoclassical theory ‘ever seems to work’ in these cases. ... neoclassical economic theory is ‘wrong’ in much the sense that Newton was ‘wrong’, per Kuhn. That does not mean that Newtonian engineers build failing bridges, or will do so in the future – but they might build pitifully poor supercomputers. If we seek to understand how and why the old paradigm can lead you astray, you cannot begin by accepting its flawed premises. (pp. 634-5, 636-7)

As noted above, NW’s critique of neoclassical economics is limited to the static profit-maximizing behavior of the firm, as it is at odds obviously with the concept of the evolutionary process. To be precise, the neoclassical concepts of rationality and optimization are not discarded completely in the NW’s theory; rather, rational-optimizing behavior is treated as a special case (and hence it is a ‘valid proposition’), while profit-seeking behavior under uncertainty and complexity is a general case. External complexity is translated into agent’s cognitive limitations, which bind rational-optimizing behavior. In this respect, firms may and could maximize profits “[i]n a sufficiently calm and repetitive decision context” (Nelson and Winter, 1982, p. 31). This implies that NW’s firm is both rational in the normal situation and ‘boundedly rational’ in the evolutionary context.

As such, bounded rationality (à la Herbert Simon) is one of core assumptions, which gives grounds for firm behavior in NW’s theory. It should be noted that the concept of bounded rationality is not contradictory to the neoclassical framework. If firms are boundedly rational, they cannot optimize profits in the standard neoclassical sense since optimization requires complete information about the future outcomes. But still firms can behave ‘rationally’ by seeking profits and following rules. Such a satisficing behavior (e.g., routine

or rule-following behavior) leads to a ‘sub-optimal’ equilibrium. Rules or routines take the place of optimization in NW’s theory. In this setting, uncertainty is taken into account, but it is not ‘fundamental’ uncertainty (à la Keynes). It is uncertainty that is reduced to calculable risks or a probability distribution, which is consistent with the notion of cognitive limitation or imperfect information (Dunn, 2001; Henry, 2003; Lee and Keen, 2004).¹¹ The point is that bounded rationality is a variant of rationality, which allows NW not only to sidestep the straitjacket of the static maximization and rationality assumptions but also to remain comfortably in the neoclassical framework. In Lawson’s ([2013] 2016, p. 61) words, “the primary purpose of any rationality axiom is just to fix individual behavior in some way to render it atomistic and so tractable.”

There are other similar self-contradictions (if seen from the Veblenian perspective) in NW’s theory. In their evolutionary process which is driven by the competition for survival and growth—i.e., dynamic technological changes (perceived as ‘disequilibrium’ and ‘stochastic’ processes) such as innovative and imitative behaviors undertaken by the firm in search for a more profitable routine or behavioral rule, there emerges a ‘stable equilibrium’ state at which competitive forces grow at a constant rate of change (Nelson and Winter, 1982, pp. 32, 203, 236, 282).¹² Indeed, greater emphasis is placed on ‘disequilibrium’ rather than on ‘equilibrium,’ as the latter is the essential feature of neoclassical orthodoxy with which NW contend. Like profit maximization, however, NW’s concern is not about the equilibrium concept *per se* but about the disequilibrium ‘process’ leading to an equilibrium state. This position is analogous to that of Schumpeter (1928) who criticized the Marshall’s static equilibrium analysis, while admitting its relevance in the limited environment (see Hart, 2012, pp. 172-6). In short, in NW’s evolutionary theory, the equilibrium concept is not rejected but extended by emphasizing the disequilibrium process. If one rejects equilibrium (or optimality) entirely, disequilibrium (or sub-optimality) cannot be defined since the latter refers to the former. The mix of ‘evolution’ and ‘equilibrium’ is certainly puzzling. In Veblen’s evolutionary approach, it is not possible to conceive of equilibrium along with evolution since Veblen’s evolution takes place in the socio-historical context over real time in which both equilibrium and disequilibrium have no meaning (Veblen, [1898] 1961a, 1909). Yet, ‘evolutionary equilibrium’ is conceivable and possible in NW’s approach as in Marshall’s economics since evolution is conceptualized as an ahistorical and asocial change within the closed and fixed system.

¹¹NW (1982, p. 272) in fact use the term ‘fundamental’ uncertainty. But it is uncertainty in the probabilistic sense—for example, in their evolutionary models technical development as a result of investment in capital stock is determined probabilistically.

¹²NW’s equilibrium is akin to the steady state equilibrium in the neoclassical growth theory. It is noteworthy that “the Steady State could be absorbed into full-blown equilibrium economics, in which one point of time is just like another. It was just as much as ‘out of time’ as the Stationary State itself” (Hicks, 1976, p. 142).

5. Institutions: markets and firms

The most baffling theoretical constituents of NW's theory that logically follow from the above discussed methodological and theoretical commitments are the notions of the market and the firm. These two 'institutions' deserve a detailed critical discussion as to how they are treated in NW's theory and to what extent we can say that they are neoclassical and anti-Veblenian.

Consider first the way the market and its functions are conceptualized and analyzed by NW. As discussed above, NW's evolutionary theory begins with the dissatisfaction with the standard neoclassical theory, which is, from the NW's viewpoint, too simple to explain how the equilibrium is reached and how the firms survive in the market over time. In this context NW (1982, pp. 266-8) define the market as the 'selection environment' composed of a set of routines or rules of the game, which determines whether a firm is profitable or not (see below and also Nelson, 2013, where the Hayekian notion of the 'market order' is used). Since only innovative and profitable firms survive, the market is crowded with efficient firms and hence is an institution of efficient resource allocation. NW's markets are thus redolent of the new institutionalist notion of institutions—that is, formal and informal constraints (or 'rules') defining individual choice sets and costs (North, 1991, p. 97).

In NW's theory boundedly rational individuals adjust themselves to the market. In an orderly market with the standard demand and supply curves,¹³ the competitive market equilibrium is achieved as a result of individual consumers' and seller's satisficing, rule-following behavior. This means that market transactions are made at the equilibrium, and the market price mechanism—i.e., Marshall's supply-demand engine—functions as the organizing principle of economic activities. In the long-run context, however, the market order is disturbed due largely to innovative firm behavior. In reaction to market disorder, individual firms search for new routines to stay alive and to grow. Consequently, either a new market order is established and stabilized or at least the market moves towards a new equilibrium. In either situation the market price mechanism rules the roost.¹⁴

A change in the market—that is, a shift from one equilibrium to another through the disequilibrium adjustment process or the probabilistic 'Markov' process—occurs due largely to rational agents' struggle for survival. In this evolutionary process actions taken by individual agents are passive and adaptive in the sense that it is the exogenous market order

¹³The assumption of the stable downward sloping demand curve implies that consumers are rational individuals who seek higher or maximum utility. NW (1982) do not provide a reason why such a demand curve is assumed. Moreover, "[i]f it [the demand curve] is derived from the constrained maximization of utility of individuals, subject to a market clearing condition, then they [NW] have undermined their entire manifesto against orthodox method" (Mirowski, [1983] 1998, p. 165).

¹⁴In his early work Hayek was supporting the concept of equilibrium, but later (after circa 1960s) he rejected the concept in favor of the notion of 'order,' which, "*unlike equilibrium, is not an alternative description of an end state but rather a continual process of reproduction and transformation. Moreover, it is a process with no (temporary or permanent) termination point*" (Fleetwood, 1995, p. 141, original italics). In this respect, NW's combination of equilibrium with the Hayekian market order is problematic even from the Hayekian evolutionary viewpoint.

that selects the fit (profitable firms) over the unfit (unprofitable firms) (Nelson and Winter, 1982, pp. 18-20, 266-8). Central to the market order is the price mechanism, the functional relationship between price and quantity. This is nothing but an extension of the neoclassical price theory. In other words, the neoclassical price theory in the short-run stable market is combined and, hence, made compatible with the evolutionary theory in the long-run dynamic market. As a result, the standard market price mechanism is legitimated. This is precisely what NW's evolutionary theory is designed to do: "[r]eformulating basic assumptions of price theory so as to make things like demand and supply more compatible intellectually with the perspective of evolutionary theory" (Nelson, 2013, p. 36). In short, the stated goal is achieved by incorporating the Marshallian supply-demand framework coupled with Spencerian evolutionism, the Hayekian notion of the market order, Schumpeterian innovation, and the new institutionalist notion of institution.

Then what exactly is the firm in NW's theory? The firm is portrayed as a set of "capabilities and decision rules" or a set of behavioral routines, whose only and explicit objective is making profits (Nelson and Winter, 1982, pp. 4, 30). Although NW's firm theory is conceptually broader and more realistic than the neoclassical firm theory, it is still too simple and abstract to explain the real-world business enterprise. Still unknown are firm's internal organizational and ownership structure, its decision-making process, and its place in and relation to the society beyond economy. Furthermore, firm behavior is directed by routines in a semi-automatic manner, as if genes determine the behavior of the living organism, and is subject to the market conditions (Nelson and Winter, 1982, pp. 134-46; see also, Schulz, 2016, p. 59). Like the Marshallian-neoclassical firm, NW's firm is nothing but a 'tree in the forest,' a 'bowl of capital-jello,' a black box, and a production function (Mirowski, [1983] 1998, p. 166; Vromen, 1995, p. 77; Mayhew, 2000, p. 58).

In a nutshell, NW's theory is about the evolution of the firm behavior in the given and relatively stable market environment or order. Such a relationship between the firm and the market is reversed in Veblen's theory, since Veblen was concerned primarily with the evolution of the system of institutions driven by the business enterprise (Anderson, 1933; Mayhew, 2000, p. 55; Jo, 2019). Veblen's institutions are not given or fixed; nor are they taken for granted; nor do they emerge and evolve naturally. In Veblen's theory, an inquiry into the business enterprise as a driving force of socio-economic change in a particular historical context—i.e., the industrial society of the late nineteenth and early twentieth centuries—thus requires the analysis of the prevailing 'institutions'—that is, social "arrangements and organizations" which are established, maintained, and modified by human agents (Henry, 2018, p. 163). The point of departure is the investigation of social institutions—that is, the way the "settled habits of thought" and action in the "community's scheme of life" is organized (Veblen, 1909, pp. 626-7). The industrial society Veblen was analyzing is 'credit economy,' the social institutions of which were organized in such a way as to make monetary profits in the interest of the business enterprise and its absentee owners and managers, as opposed to making serviceable goods in the interest of the underlying population. Credit economy thus runs counter to 'money economy' in which good-making activity ('industry') is given priority over money-making activity ('business'). Absent in both Marshallian theory and NW's theory is the Veblenian view that in the advanced economic system industry

depends upon business (Veblen, [1901] 1961c, pp. 298-9, 1904, pp. 50-1, 150-1; Mayhew, 2000, pp. 58-9; Frigato and Santos-Arteaga, 2012, pp. 73-4; Jo and Henry, 2015, pp. 24-8; Jo, 2018, p. 201).

Then how does Veblen conceptualize and explain the business enterprise in a socio-historical context? In contrast to the narrowly-defined and ahistorical NW's firm, Veblen's business enterprise is a going concern whose objective is survival and growth in size and power. The business enterprise engages in strategic business (management) and industrial (production) activities under fundamental uncertainty in historical time. In this context business enterprise activities do not guarantee that goals are achieved even in a probabilistic sense. Investments or innovative activities, for example, do not necessarily lead to an increase in productive capital stock as expected. Strategic enterprise activities may lead to the demise of the business enterprise, not because decisions were made poorly but because consequences are not predetermined or known *a priori*. Therefore, uncertainty should be reduced in some way by, for example, making enduring working rules and decision-making structures within the enterprise, establishing 'goodwill' relationships with other actors in the economy and society, engaging in aggressive pecuniary activities (e.g., planned obsolescence and 'industrial sabotage'), and controlling the market environment including competition and the rules of the game. This implies that the business enterprise is created to reduce uncertainty and complexity in the real world in order for it to remain ongoing longer-period of time, rather than being a carrier of complexity which reacts passively to the external conditions as in NW's theory (Valentinov, 2013; Jo and Henry, 2015; Jo, 2019). Veblen's business enterprise is therefore incompatible with the view that the competitive market is the selector and controller of the firm, as the selection mechanism is in large part a creation of the business enterprise (Watkins, 2010).

Besides, a more fundamental difference between NW's firm and Veblen's business enterprise is found in their respective functions in society. NW's firm is perceived as a socially-desirable and socially-efficient institution whose survival and growth is in large part determined by the market and, consequently, whose normal productive activity provides necessary goods and services for society, whereas Veblen's business enterprise is a socially-predatory and socially-inefficient institution that survives and grows by making monetary profits at the expense of welfare of the common people—thus, its efficiency in money terms becomes disserviceable and wasteful from a community's point of view. Such irreconcilable views are, as discussed thus far, predicated on the different notions of and relationship between evolution and institution. Essentially, Veblen's business enterprise, in particular the corporation which became the dominant form of the business enterprise since the late nineteenth century, is the 'master institution' of the credit economy, which holds the capacity of making socio-economic conditions in favor of itself and of the corporate managers and absentee owners whose interests are vested in the business enterprise (Veblen, [1923] 1964b, pp. 86-9). Such socio-economic contradictions as manifest in the uncertain evolutionary process of institutions are what Veblen's theory of business enterprise explains. NW's theory of the firm, however, does not offer any significant insight as to how a socio-economic system actually evolves in history. Instead, it explains how the firm behavior evolves and is selected by the market; hence it conforms to the ceremonial adequacy of neoclassical economics

(Dugger, 2006; Frigato and Santos-Arteaga, 2012).

6. Conclusion

Nelson and Winter (1982) claim that their evolutionary theory is an alternative to neo-classical economics. Their proponents go even further to argue that NW's theory is either compatible with or complementary to original institutional-evolutionary economics. I have argued in the paper that these two claims can hardly be sustained. Although NW's evolutionary theory provides a more realistic account of the firm behavior than the Marshallian-neoclassical theory does, what their theory actually accomplishes is a modification and extension of the neoclassical theory. Essentially, profit maximizing firm behavior is superseded by boundedly-rational profit-seeking behavior. In other words, the strong rationality assumption or the marginalist principle is extended by introducing an uncertainty concept (following Alchian and Simon) and by incorporating the market selection mechanism (following Spencer, Marshall, and Friedman). As a result, static equilibrium analysis is generalized to evolutionary equilibrium analysis. Either 'static evolution' or 'evolutionary equilibrium' is not an oxymoron in NW's theory. This distinctive evolutionary approach demonstrates that the Spencerian principles of evolutionary change (that is, the survival of the fittest and natural selection) along with the Marshallian general theory (that is, the market price mechanism) have survived and well in NW's theory. Consequently, NW's claim is in contradiction to what their theory actually implies. This contradiction is either ignored or considered negligible by the proponents of NW. Moreover, NW's theory is not only incompatible with but also antithetical to Veblen's evolutionary economics, which cannot be formulated in taxonomic, hedonistic, and static terms. Like neoclassical economics and other variants in mainstream economics, NW's theory does not offer any significant insight into the socio-historical evolution of institutions for which Veblen and institutional-evolutionary economists have long accounted.

In conclusion, it would be reasonable to argue that NW's theory is a neoclassical evolutionary theory in much the same sense as Marshall's economics is quasi-evolutionary economics according to Veblen. In contrast to NW and their proponents' claim, Veblenian evolutionary economics cannot be an ally of NW's theory. These two evolutionary approaches share little common ground on methodology and theory. The support for and promotion of NW's evolutionary theory by some heterodox economists would only undermine Veblenian evolutionary economics.

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