

*To what extent did the so-called marginalist revolution
influence the development of economic
thought?*

Political and Economic thought

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Introduction

The late 19th century's Marginalist Revolution is a key moment in economic history. The revolution fundamentally reshaped economic thought and marked the beginning of the economics we practice today. It was a shift from a traditional labor-based view of economics to a more individual-oriented approach where markets were analyzed by individual consumers and producers. This paper will examine the marginalist revolution's key concepts, themes, and ideas in order to describe the extent of the revolution's influence on the development of economic thought. The paper will introduce three main thinkers chronologically, presenting the time leading up to the shift, the revolution itself, and its lasting effects. Adam Smith (1723-1790), William Stanley Jevons (1835-1852), and Carl Menger (1840-1921) are important figures whose frameworks will be used to guide this paper through the events of the revolution. These three are brought up due to their historical importance, their different views on the major drivers in economies, and their influence on economic thought. The marginalist revolution involved more important economists than Jevons and Menger, one such is Auguste Walras (1801-1866). He will not be brought up in this paper because his contributions to the marginal revolution are similar to Jevons but gained less following (R. E. Backhouse, 2002). Furthermore, due to the limited length of this paper, Walras was left out in order to provide a more profound examination of the marginalist's thoughts.

Adam Smith and the labor theory of value

The classical political economic school emerged in the late 18th and early 19th centuries and was highly motivated by Adam Smith (1723-1790). Smith was a Scottish economist, philosopher, and author who combined a moral philosophic perspective with a focus on the interdependence of different economic sectors. This concept of thought was already prevalent in the 16th century, but Smith's interpretation truly captivated the minds of those living in his era. Smith's ideas were firmly rooted in the Scottish enlightenment, which strongly emphasized history and the basis of civil society. One of Smith's main findings in his famous work, *An inquiry into the nature and causes of the Wealth of nations* (1766), was the *labor theory* of value which stated that labor determines the value (R. E. Backhouse, 2002, P 121).

The Labor theory of value suggested that the real price of a commodity to the man who wants to acquire it is the "*toil and trouble of acquiring it*". What anything is really worth for the man who has acquired it and now wants to exchange it is "*the toil and trouble it can save to himself, and which it can impose on other people*". Hence, a commodity's real price is the labor required to produce it (Smith, 2001, p. 50). Therefore, the money of those goods "*contain the value of a certain quantity of labor which we exchange for what is supposed at the time to contain the value of equal quantity*" (Smith, 2001, p.50). The more labor employed in production, the greater value of the item in exchange for other items on a relative basis(Smith, 2001, pp. 30-31). Considering this, Smith argued that labor should be seen as the "*ultimate real standard by which the value of all commodities can at all times and places be estimated and compared*" (Smith, 2001, p. 54). However, Smith found prices to be not only determined by labor, but by various other constituents such as wages, profits, rents, capital, and land required to produce a commodity. This he called *the nature of employment*. Smith argued that when a commodity is sold for exactly the price sufficient to pay the constituents such as land, wages, and those raising, preparing, and bringing it to market, it is sold for what precisely it is worth and hence the *natural price* (Smith, 2001, p. 83).

The *Theory of labor* suffers from many problems. The most prominent one is that it cannot explain the prices of items with little or no production cost. In *Wealth of nations*, Smith failed to resolve the issue of what would later be called the water-diamond paradox. Smith argued there to be two different values, value in use and value in exchange. Those things carrying the greatest value in use often tend to carry the least value in exchange, and vice versa. For example, water, a life necessity, carry very little value in exchange but a very high value of use. But diamonds, unessential to human life, carry very little value of use but very high value of exchange (Smith, 2001, p. 35). However, he had no explanation as to why this phenomenon arose. Instead, it revealed the flaws in his Theory of labor. For example, if a diamond were stumbled upon by a hiker in the woods, hence carrying no production costs, it would still be considered to have an extremely high value and price (Sean Ross, 2021).

Jevons and the utility theory of value

The British utilitarian William Stanley Jevons (1835-1852) approach to economics was distinct from that of political economy, viewing it as its own individual science in which factors such as morality played a minimal role in consumer decision-making. Jevons was a multi-faceted individual; he was a meteorologist, a chemist, and the author of *The Principles of Science*, a highly influential book on scientific methodology. Combining his utilitarian outlook together with his scientific expertise, Jevons formed the Theory of utility, published in his famous work *the Theory of political economy* (1888) (R. E. Backhouse, 2002.) Jevons argued that for economics to be put as science, it must be mathematical "*simply because it deals with quantities*" (Jevons, 2013, p. 3). In accordance with that, Jevons Theory of utility was formed through mathematical analysis.

Jevons's *Theory of utility* has its starting point in the utilitarian assertion that "*Pleasure and pain are undoubtedly the ultimate objects of the calculus of economics*" as humans' utmost desire is to maximize pleasure and minimize pain (Jevons, 2013, p.37). To denote to what extent a commodity serves our purposes, Jevons used the term *utility*, originally coined by the classical economist Jeremy Bentham (1748-1832) (Jevons, 2013, p. 38). Proceeding, Jevons stated that the utility of one person was not to be compared with the utility of another person, as the "*mind of an individual is the balance which makes its own comparison and is the final judge of*

quantities of feeling". As pleasure and pain are of individual character, it is hardly possible to conceptualize it into definitive units. However, when Jevons examined the conditions of utility, he found that humans rank their wants on a scale from most to least wanted. When we have satisfied our most needed wants, we immediately seek to satisfy the next want on our scale. By comparing the utility connected to different commodities on an individual's ranking scale, Jevons succeeded in finding a way to employ measurements in the relative values of the objects that we seek to obtain (Jevons, 2013, pp. 40-44).

After asserting that utility is only to be measured individually, Jevons turned to the question of utility's primary nature and conditions. Utility is "*no inherent quality*" but a "*circumstance of things arising* out of their relation to man's requirements". The want for an object may change; therefore, it shall not be claimed as having or not having utility. To exemplify this, Jevons wrote that "*The most wholesome and necessary kinds of food are useless unless there are hands to collect them and mouths to eat them sooner or later*" (Jevons, 2013, p. 43). Jevons also found that all quantities of the same commodity will not possess equal utility. For example, A small portion of water daily can be used for drinking, saving a man from dying, hence carrying great utility. An extra portion of water can then be used to satisfy less urgent needs such as washing, hence still carrying utility, but less than the first portion of water that could be used to stay alive. When satisfied with the amount of water, an even larger portion of water would then be of no use but rather be inconvenient and hence bring no extra utility. With this, Jevons aimed to explain that different portions of a commodity will bring us different amounts of pleasure. When a man is fully satisfied with the amount of a commodity, no extra amount of that commodity will contribute to a higher utility. Put in Jevons's words, "*utility is not proportional to commodity: the very same articles vary in utility according as we already possess more or less of the same article*" (Jevons, 2013, P44).

Using mathematics, Jevons formed a *law of the variation of utility*, a tool to examine utility. Firstly, Jevons discriminated between the total utility that arises from any commodity and the utility attached to any portion of that commodity. Then, Jevons made a graph where the total utility corresponded to the Y axis, and the total commodity corresponded to the X axis. On the graph, both total utility and commodity were divided into smaller fractions. Each fraction of commodity answered to a utility, and as the commodity portion increased, the extra utility decreased. Hence Jevons stated that "*each small portion would be less useful and necessary than the last*" (Jevons, 2013, p. 48). Finally, transferring the founding of the graph into mathematical variables, Jevons succeeded in showing that by taking ΔY corresponding to a value of utility, through ΔX corresponding to a quantity of a particular commodity, one could calculate the *final degree of utility* or what we today call the *marginal utility* (Jevons, 2013, pp. 46-50).

Jevons's theories of utility had him come to the conclusion that; value depends entirely upon the increment of utility when the quantity available of the commodity increase (Jevons, 2013, p. 1). This was in contrast to prevailing opinions stating that *labor*, rather than the *final degree of utility*, would be the origin of value or, even so, the *cause* of value. However, Jevons did not entirely disregard a correlation between labor and value but explained that "*Labor is found often to determine value, but only in an indirect manner, by varying the degree of utility of the commodity through an increase or limitation of the supply*" (Jevons, 2013, p. 2).

Carl Menger and the Subjective Theory of value

In 1871, an Austrian economist named Carl Menger (1840-1921) independently developed another concept of marginal utility, which he published in his work, the *principle of economics*. In contrast to Jevons, whose purpose was to make economics a science by putting it in mathematic terms, Menger favored an Aristotelian philosophy, aiming to explain the nature of economics by real-world actions of real-world people (Carl Menger, 1871, p. 7). Menger's main contribution to the marginal revolution was his 'subjective theory of value'. This Theory proposes the idea that the value of any commodity is determined by the individuals or entities buying or selling the object rather than by its utility value or the cumulative value of the components or labor used to create it (Carl Menger, 1871, p. 120).

According to the subjective theory of value, people will exchange something they value less for something they value more. The theory, therefore, holds that the value of a good can be created simply by trading with someone who values the good higher, suggesting that value is subjective and cannot be consistently measured. Further, the theory states that value is not inherent in goods themselves but changes in their relationship to our individual needs. Depending on our current needs, the value of a good can either rise or decrease (Carl Menger, 1871, P.120). In the *principle of economics*, Menger several times returns to paradoxes of water supply, seeking to explain the relationship between value and human needs.

Summarizing these paradoxes, it can be broadly explained that; When inhabitants of a village are supplied with more water than needed to satisfy their needs fully, a concrete portion of this water will have no value to them. Indeed, they will let large parts of the water supply go to waste every day as they are in no need of more water than what satisfies them. If, on the other hand, the daily flow of water was to fall to such an extent that it could no longer fully satisfy the need for water of the village, they could not afford to lose any quantity of that water. Each quantity of water at their disposal would immediately attain value to them (Carl Menger, 1871, P. 98, 110, 117, 120).

With this, Menger sought to show that the perception of the quantitative relationship between goods and their availability "*makes us aware of the significance that command of each concrete unit of the available quantities of these goods has for our lives and wellbeing, thus causing it to attain value for us*" (Carl Menger, 1871, p. 115). Furthermore, Menger argued that this causes us to be more provident with our resources and learn how to make the best use of them. It develops a basis of economic thinking, which stimulates our economizing activity and makes the *good* an object of our economic activity (Carl Menger, 1871, p. 115).

Menger also managed to explain what Smith could not, the diamond-water paradox, also called the paradox of value. How come the price of diamonds is so much higher than that of water when water is a life necessity and diamonds a luxury good? Menger argued that, generally, the water supply to people is abundant, causing it to have a low marginal utility and carry a low value. On the contrary, diamonds are an extremely scarce commodity in which the low availability causes the marginal utility and value to be high. Clearly, water is more valuable as an essential resource than the luxury of owning a diamond. However, when choosing between having one extra diamond or one extra unit of water, the extra diamond will be valued higher than the quantity of water, as the need for water is already fully satisfied, but the need for a rare diamond is not. As demand increase, the consumer must choose between one extra unit of water or one extra diamond, the today-known concept of marginal utility (Carl Menger, 1871, p. 140).

While Smith sought to explain the value of a good to be decided by "*the toil and trouble it had acquired*", the marginalists Jevons and Menger rejected this Theory and proposed a different view on the issue (R. E. Backhouse, 2002). Although Jevons and Menger had different approaches to the question of value, they both found that individuals are guided by their subjective evaluations of the usefulness of various goods and services and that the price of a commodity is determined by the values individuals attach to the marginal units of these goods (Carl Menger, 1871; Jevons, 2013). Hence, Menger argued that trade is thus the result of individuals' attempts to increase their well-being and not, as Smith argued, an inborn "*Propensity to truck, barter, and exchange*" (Carl Menger, 1871, p. 8). Contrary to Smiths' labor theory, Menger also argued that as the value of a good is determined by its importance of the wants they satisfy, the value of different inputs of production, such as labor, was to be derived from their ability to produce these goods (Library Of Economics and Liberty, 2008). This Theory is still accepted by modern economists and is called the *Theory of derived demand*. ("Library Of Economics and Liberty, 2008).

The aftermath of the marginal revolution

The marginal revolution was a shift away from the classical economists' focus on producing goods and services and towards an analysis of the individual decision made by consumers and producers. While Smith argued that value is to be determined by labor or the cost of production, the marginalist thinkers proposed a theory where the value of a commodity is determined by the increment of utility when the quantity available of the commodity increases, hence the marginal utility. By the start of the 20th century, economics based on marginal utility and individual maximization had become firmly established and displaced the classical theory of the connection between labor and value (R. E. Backhouse, 2002).

The marginal revolution and the break with classical tradition were characterized by the views of the psychology of the human being and the aim to mathematize Economic Theory. Prior to the marginal revolution, French and German economists had utilized mathematics in their work, but the majority of economics was still nonmathematical (R. E. Backhouse, 2002). It wasn't until the marginalists, with Jevons at the forefront, that economics was properly paired with mathematics making it an independent science. This altered the perspective on political economy, differentiating it from moral sciences such as history or politics, and instead treating it as a hard science, with the goal of uncovering quantifiable links even in the realm of human sciences (Roncaglia, 2005). This sparked the trend of professionalizing economics, making it an academic discipline that meant that students could specialize in economics itself. In the 1930s, the mathematization of economics had been widely established, representing a major new department in the subject of economics. Economics was no longer organized around issues faced in the real world but instead revolved around a variety of techniques, such as theoretical and empirical methods, which had profound effects on the structure of the discipline. This resulted in the further development of economic theories, some of which laid the foundation for today's economic thought (R. E. Backhouse, 2002), P.238-239.

In 1890, 20 years after the marginal revolution had taken place, the British theorist Alfred Marshall (1842-1924) published the first neoclassical book, *the principle of economics*, with theories developed through mathematics and following the thoughts of marginal utility (R. E. Backhouse, 2002). However, unlike the marginalist thinkers, Marshall approached the superseded classical school with a somewhat conciliatory attitude arguing that the marginalist thinkers had been too quick to dismiss the labor theory of value entirely. Marshall argued that "*We might as reasonably dispute whether it is the upper or under blade of a pair of scissors that cut a piece of paper, as whether value is governed by utility or cost of production*" (Marshall, 1890, , Book V, chapter III, p. 164). Instead, Marshall introduced his idea of partial equilibrium analysis, asserting that price is derived from the point of intersection between the supply and demand curves, hence from both the cost of production and the marginal utility (Marshall, 1890). This became the sweetener that made the Marginalist Revolution more acceptable to modern economists (*Phases of the Marginal Revolution*, n.d.). Marshall imposed his views of economics on Cambridge, where his edition of the *principles of economics* was adopted as a university textbook, making it available to a larger audience. In English-speaking countries, Marshall's book of the *principles* remained the dominant text at least until the 1930s, and his famous demand-and-supply diagram developed into one of the standard disciplines of economics and set the groundwork for what is today known as *microeconomics*(R. E. Backhouse, 2002).

During the 1930's neoclassical general equilibriums theorists presented new economic tools building upon mathematic calculus and drawing upon the works of the marginalists(R. E. Backhouse, 2002). For example, in 1933, the theorist's John Hicks (1904-1989) and Joan Robinson (1903-1983) independently introduced the concept of elasticity of substitution building on the theories of marginal utility (Molina, 2005). Another of these theorists was Paul Samuelson, who, in *the foundation of economic analysis* (1947), introduced some of today's well-established concepts, such as the indifference curve and partial utility. Hicks, Robinson and Samuelson's founding's filled in some of the empirical plausibility that the marginalist's utility theory lacked. This amplified the importance of marginal utility within economic science, making it a crucial element in the study of *microeconomics* (*Phases of the Marginal Revolution*, n.d.).

Conclusion

This paper has examined *the extent to which the marginal revolutions influenced economic thought*. Initially, the paper examined the economic thought prior to the marginal revolution shining a light on Smith's labor theory of value. After that, it presents the theories of Jevons and Menger, who individually and through different approaches developed the concept of marginal utility. Jevons concerned himself with transforming political economy into a rigorous economic science by adapting mathematics to his assumptions about the psychology of humans. Mengers' explanation for the marginal utility was not reached through mathematics like Jevons, but instead, he found the evidence in paradoxes derived from the real world. One such paradox was the diamond-water paradox, where Menger successfully explained the workings behind humans' sometimes irrational value of exchangeable commodities in relation to useful commodities. Something that Smith had trouble explaining through his labor theory of value. In the 20th century, the Theory of marginal utility and individual maximization became widely accepted in economics and displaced Smith's labor theory of value. Towards the end of the paper, further adoptions of the marginalist's ideas were presented. Jevons's mathematization of economics widely influenced thinkers of the 20th century, which resulted in economics becoming an independent discipline. Moreover, thinkers such as Marshall, Hicks & Robinson, and Samuelson further developed theories where the marginal utility was of great importance. This laid the foundation for modern economic thought and disciplines such as *microeconomics*. The marginalist revolution has had a direct impact on economic thinking and has been crucial to our modern-day perception of economics.

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