

The Missing Measure A Contribution to the Revival of Political Economy

Muhammad Adel Zaky

Alexandria University

Egypt

muhammadadel1972@gmail.com

ORCID: 0009-0001-7294-8605

Reçu le : 01/05/2026

Accepté le : 25/07/2026

Publié le : 31/07/2026

Abstract:

This article highlights the shortcomings of value theory as it developed throughout the history of political economy, particularly in the works of Karl Marx, with special emphasis on rectifying the measure of value. In this context, the article seeks to restore the significance of political economy as a social science, after its demise was proclaimed when value theory lost its capacity to produce objective scientific laws capable of explaining phenomena associated with economic activity independently of market fluctuations and oscillations in prices.

Keywords: Political Economy; Karl Marx; Measure of Value; Value Theory

JEL Classification: B14, B24, D46, E11, J22, O17

ملخص:

يسلط هذا المقال الضوء على أوجه القصور التي شابت نظرية القيمة عبر تطورها التاريخي في إطار الاقتصاد السياسي، مع التركيز بصفة خاصة على الصياغة التي انتهت إليها في أعمال كارل ماركس، وذلك من خلال إعادة النظر في مقياس القيمة وتصحيحه. وفي هذا السياق، يسعى المقال إلى استعادة مكانة الاقتصاد السياسي بوصفه علما اجتماعيا قادرا على إنتاج قوانين علمية موضوعية، وذلك بعد أن أعلن عن أفوله نتيجة فقدان نظرية القيمة قدرتها على تفسير الظواهر المرتبطة بالنشاط الاقتصادي تفسيراً علمياً مستقلاً عن تقلبات السوق وتذبذبات الأسعار.

الكلمات المفتاحية: الاقتصاد السياسي؛ كارل ماركس؛ مقياس القيمة؛ نظرية القيمة.

تصنيف JEL : B14، B24، D46، E11، J22، O17.

I. Introduction:

Marx's Capital is grounded in a theory of value—the same theory upon which the entire theoretical structure of political economy is built. Scientifically speaking, no theory—any theory—can be regarded as capable of explaining reality if it depends on elements external to itself, or if its fundamental premises are derived from outside its own conceptual framework.

Proceeding from this premise, the present article examines the validity of Marx's measure of value, and, by extension, that of political economy as a whole. If the measure proves to be flawed, or if it derives its existence from outside the theory and seeks its foundations elsewhere, then it becomes necessary to acknowledge that value theory, upon which the edifice of political economy rests, remains incomplete. Consequently, one must also recognize that Marx's Capital, and political economy in its entirety, suffers from a fundamental problem which—unless this measure is corrected—may lead to its marginalization or neutralization.

Such a development has indeed already occurred with the ascendancy of managerial theories within mainstream economic thought. These theories are essentially justificatory in character, and historical experience has demonstrated their failure not only to provide solutions to the persistent crises of the economic system, but even to offer a convincing explanation of those crises.

II. Value Theory in Its Present State:

Value theory emerges as the theoretical framework that reveals the objective laws governing production and distribution within economic activity at the social level, regardless of the prevailing form of political organization. The more scientifically sound the intellectual tools used to uncover these objective laws, the more effectively and intelligently reality can be understood and addressed. From this perspective arises the necessity of developing a critical awareness of value theory in its present form. Such awareness can only take shape through a careful examination of its conceptual instruments—above all, the measure of value—and by tracing the course of its historical formation ⁽¹⁾ in the works of the founding figures of political economy, beginning with Adam Smith, continuing with David Ricardo, and culminating in Karl Marx.

(1) From Labor to Money and Back to Labor Again

Smith was convinced that labor constitutes the real measure of value ⁽²⁾, yet he did not succeed in formulating a coherent general theory on this basis. When he asked himself the question—how is value to be measured?—he initially concluded that value is “measured” by the time expended in producing a commodity. Soon afterward, however, he realized that time alone cannot “estimate” value with the precision required for comparing commodities, owing to differences among kinds of labor in terms of hardship and degree of ingenuity ⁽³⁾.

He was therefore compelled to acknowledge that time by itself was insufficient, and that the labor expended in producing a commodity could not serve as a precise standard of valuation. At a third stage of reflection, he arrived at the conclusion that value is not estimated by the labor embodied in the commodity itself, but rather by a quantity of another commodity, that is, by the quantity of labor embodied in the commodity for which it is exchanged. Yet Smith himself remained dissatisfied with this solution, admitting that it lacked both clarity and objectivity. He therefore abandoned it in favor of money ⁽⁴⁾ as the universal medium of exchange.

Even here, however, he encountered another difficulty: the value of money itself fluctuates, rising and falling over time. Consequently, he once again returned to labor—but this time to the

labor required to produce the commodity received in exchange—on the grounds that labor is the only thing whose “intrinsic value” does not change.

Thus, Smith ultimately concluded—without ever being fully convinced—that the value of a commodity is measured by the quantity of labor embodied in the other commodity for which it is exchanged, and that the market plays the decisive role in equalizing different kinds of labor in terms of hardship and ingenuity. Through social bargaining in the market, the differences among various kinds of labor are effectively leveled ⁽⁵⁾, not in accordance with a strict scientific law, but rather through practical conventions that suffice—barely—to keep everyday economic life functioning. Smith therefore failed to establish an independent objective law governing exchange.

This entire line of thought, together with all its problems, would pass to Ricardo, who would attempt to move beyond it.

(2) An Escape Through Relative Value

David Ricardo approached the problem from the very opening chapters of his *Principles of Political Economy and Taxation*, seeking to resolve the duality that had affected Adam Smith’s analysis when the latter argued that a commodity’s value is determined by the value of the other commodity for which it is exchanged. Ricardo rejected Smith’s reasoning on the grounds that it would imply that a commodity possesses two different values, depending on the two commodities involved in the exchange. ⁽⁶⁾

Accordingly, Ricardo maintained that value should not be understood as an absolute magnitude, but rather as a relative relation determined by the quantity of necessary labor required to produce one commodity in comparison with the quantity of necessary labor required to produce the other commodity for which it is exchanged. Yet this shift did not arise, in its essence, from a direct critique of Smith. Rather, it stemmed from a question that political economy had been unable to answer: why are wages lower than the value created by labor?

For this reason, Ricardo set aside the search for absolute value and concentrated instead on relative value, which he regarded as the only domain capable of explaining this gap. Thus, while retaining—like Smith—labor as the foundation of value, at least in the initial stage of his reasoning, Ricardo rejected the idea that value could be measured by the quantity of labor expended in producing a given commodity. Instead, he insisted that value is measured by the relative relation between the quantities of labor embodied in the two commodities involved in exchange. ⁽⁷⁾

At this stage of his analysis, Ricardo accorded gold a privileged status as a general measure, believing that it approximates the general technical average of commodity production. ⁽⁸⁾ Yet this confidence later began to erode when Ricardo himself acknowledged that neither gold, nor labor, nor any other commodity could serve as a fixed measure of value, and that political economy, in its existing form, was incapable of providing such an objective standard. ⁽⁹⁾

He nevertheless conceded that science might one day furnish the scientifically correct measure of value. Ricardo thus arrived at a theoretical impasse parallel to that of Smith: having abandoned the duality of values and shifted his focus to the relative, he remained unable to establish a stable objective law of value. We must therefore turn to Karl Marx to see how he received the ideas of his predecessors—and what he ultimately did with them: whether he transcended their difficulties, or reproduced, with equal precision, their errors.

(3) An Impossible Measurement and an Unresolved Crisis

Karl Marx began—perhaps unlike his predecessors—with a deeper analysis of the entire theoretical structure of political economy. ⁽¹⁰⁾ Yet on the question of the measure of value, he does not acknowledge the existence of a theoretical crisis arising from the differences among kinds of labor in terms of hardship and degree of ingenuity. Instead of reconsidering the measure itself and the unit of measurement, Marx maintains that labors differing in hardship and ingenuity can be reduced, within the market, to quantities of simple labor through a “social process” that takes place “behind the backs of the producers.” ⁽¹¹⁾

This position ultimately derives from Marx’s conception of the measure of value, which in essence does not depart from that of his predecessors. When Marx posed the question—how is the magnitude of value to be measured?—he arrived at the following sequence: value is measured by the quantity of labor; the quantity of labor is measured by labor-time; and labor-time finds its standards in definite portions of time such as the day or the hour. In other words, value ultimately comes to be measured by time. ⁽¹²⁾

At this point a methodological confusion becomes entrenched between the measure (quantity of labor) and the unit of measurement (the day, the hour, the minute). The quantity of labor is neither a measuring instrument nor a measure in the scientific sense; nor, in fact, is the quantity of labor itself measured by time, since time is measured by an independent instrument—the clock—using defined units such as the minute and the second.

Marx, however, overlooks these evident facts and proceeds—without reconsidering this conceptual flaw—to assert that gold is the measure of value, insofar as it constitutes a social embodiment of human labor, and that it serves to convert the values of commodities into prices, that is, into imaginary quantities of gold. He even goes so far as to argue that gold became the measure of value because “all commodities measure their values in it.” ⁽¹³⁾

However, this justification does not withstand scientific scrutiny. Gold, as a product, itself requires a measure of its value, and its value—as Karl Marx acknowledges elsewhere—is neither natural nor intrinsic, but rather socially embodied within it. Consequently, gold cannot serve as a measure of value, because it does not stand outside the phenomenon it is supposed to measure; rather, it constitutes one of its very elements.

To claim that gold became the measure of value because commodities have measured their values through it does not yield knowledge; it merely formulates an unsupported postulate. Scientifically speaking, the value of one commodity cannot be determined through the value of another commodity whose own value has not been measured by an independent standard. The value of gold must therefore be established prior to its use as a measure, not derived from its role in exchange.

It thus becomes evident that Marx’s shift from labor as the measure of value to gold—as had already been done by his predecessors—does not resolve the difficulty but rather deepens it. Instead of rectifying the measure and the unit of measurement, an incorrect measure is generalized, and the resulting conceptual flaw is then obscured through a dense and misleading terminology that distinguishes between gold as a “measure” of value and gold as a “standard” of prices. Yet this distinction offers no real solution, since the fundamental problem—the absence of a stable scientific measure of value—remains unresolved, whether the reference point is labor or gold. ⁽¹⁴⁾

Thus, with regard specifically to the question of the measure of value, Marx ultimately reproduces the same impasse: an acknowledgment of value as a social relation, combined with the retention of a measure that lacks scientific determination and a unit of measurement that remains

ambiguous—one that does not allow the magnitude of value to be established objectively—while entirely overlooking the reservations already expressed by his predecessors.

III. The Transformation of Theoretical Impotence into Distorted Interpretation:

Tracing the development of the measure of value from Adam Smith to David Ricardo and finally to Karl Marx reveals a fundamental fact: political economy has failed to establish a precise and objective unit for measuring value. Labor continued to be presented as the general theoretical measure, yet the diversity of labor in terms of hardship and ingenuity prevented its transformation into an actual standard of measurement that would allow accurate comparison between products. Confronted with this difficulty, the founders of political economy ultimately referred the matter to the market, where exchange relations are practically determined.

Once this referral was made, however, value theory lost its capacity for self-sufficiency, since the judgment concerning the phenomenon under investigation was now derived from outside the theory itself—from the forces of the market.

In subsequent economic literature, the hesitations and ambiguities of Marx's predecessors were generally treated as natural, as expressions of the rudimentary character of the early foundational attempts in political economy. The situation, however, changed when the analysis turned to Marx, given the ideological significance his work came to acquire.

As we have seen, Marx maintains that value is measured by socially necessary labor time. According to this definition, the value of a pen whose production required three hours of necessary labor would be equal to those three hours. Yet value, as we know, is the quantity of labor embodied in a product. When we say that the value of the pen equals three hours of necessary labor, we have not in fact defined its value; we have merely stated the time required for its production. The hour, as a unit of measurement, measures time and nothing else—it does not measure value.

Reducing value to hours of labor therefore does not amount to measuring it; rather, it amounts to substituting it with something else entirely. In such a case, what we measure is not value itself but the time expended in producing it. This is precisely analogous to attempting to measure length in gallons or height in newtons. It is not enough for one thing to be related to another in order for it to serve as its measure. Just as units of volume or force cannot measure length, so too units of time cannot measure value.

Consequently, the claim that labor measured by time constitutes the measure of value does not solve the problem of measurement in political economy; rather, it reveals the absence of any genuine measure in the first place.

The problem of the measure becomes even more evident when we attempt to apply this measure to the exchange of different kinds of labor varying in hardship and ingenuity. If the hour of labor is used as the unit of measurement, the theory leads to the conclusion that one hour of a bricklayer's labor is exchanged for one hour of a surgeon's labor, since both represent an hour of necessary labor. Such a conclusion places the theory in a clear dilemma, for it disregards the qualitative differences among kinds of labor.

At this point, three possible paths emerge. The first is to acknowledge the existence of a flaw in the measure of value, which calls for the search for a scientifically correct measure—something we shall undertake shortly in an hardship to revive the science of political economy. The second is to refer the matter to the market as the arena in which these differences are practically resolved. This was the course followed by Karl Marx and by his predecessors before him; in doing so, they effectively removed value theory from the domain of science and opened the door wide to currents of justification and empiricism.

The third path is to resort to distorted interpretations of Marx's texts in order to rescue the theory—particularly in its Marxist form—from its crisis. Such attempts have ultimately led to the formulation of a conception of value that departs from the traditional framework of political economy, relying on Marx's well-known statement that "In the production of each individual commodity, not an atom of matter enters into its value." (15)

This statement was employed to justify the ambiguity surrounding the issue of measuring value in Marx, rather than to acknowledge the problem with the aim of solving it. After the failure to reach a correct measure of value, the theory of value itself was effectively rendered obsolete, as we read:

"It is not necessary for us to search for a practical measure of value which would make possible the equalization of the products of labor on the market. The task of the theory of value is entirely different. It is a theoretical and not a practical task...The economists who sought a practical measure of value were mistaken in their understanding of the task of the theory of value...The theory of value does not search for an external measure of value. It seeks to explain the causes and the inner nature of value...Abstract labor is not physiological expenditure of human energy, but a social form of labor...Socially necessary labor time is not a directly given magnitude, but is established through the social process of equalization of labor on the market." (16)

In this passage, which serves as a model for the theoretical collapse of the labor theory of value following its distortion, the failure to establish a correct measure is cleverly circumvented for a single purpose: to avoid acknowledging the shortcomings of the theory of value in its current form—specifically, in its Marxian formulation—even if doing so would require reference to an alternative theory of value. The theory of value is declared to have no practical utility! It is a theory of value that economists have failed to understand! It is a theory of value that aims to explain the causes and inner nature of value intuitively rather than through measurement. It relies on vague concepts such as the "social form" of labor, which cannot be measured but only apprehended. And, ultimately, the discourse returns safely to the market: "*Socially necessary labor time is not a directly given magnitude, but is established through the social process of equalization of labor on the market.*"

Here we must ask about the passage above, and this question is crucial for understanding political economy itself: Who was it that, with such confidence, declared that value has no practical role? Who stripped it of its function in analyzing economic activity? And if it is merely a theoretical construct, how did Marx organize his entire theoretical system around it to analyze capitalist production relations? Moreover, what are we to make of Marx's explicit text: "*How, then, is the magnitude of this value to be measured? Plainly, by the quantity of the value-creating substance, the labour, contained in the article. The quantity of labour itself is measured by its duration, and labour-time in its turn finds its standard in weeks, days, and hours.*"

And how can we know, at the level of practical reality, that the capitalist exploits the worker—whether a miner or a university professor? Should we resort to economic poetry, discuss general ethics, rely on heightened emotions, and claim that we "feel" the exploitation, that our hearts sense the injustice imposed on the worker? Or do we need a concrete, numerical, and precise measurement of the surplus value that the capitalist appropriates?

Are not all of Marx's models—in rent, interest, wages, merchant profits, the reproduction of social labor, the calculation of the average rate of profit, and the transformation of commodity values into production prices—based on socially measurable values? The reality is that anyone who treats exploitation, for example, as a fluid moral concept that cannot be measured, is no different from one who claims that gravity is a cultural opinion or that electricity is a matter of feeling. Exploitation is neither an impression nor an emotion; it is a number that can be calculated—the difference between paid labor and unpaid labor. Those who reject measurement do not protect science; they strip it of its substance.

Even what is called “unequal exchange,” so widely discussed between a rich North and a poor South, remains mere rhetoric unless it is translated into concrete quantities: how many hours of labor were extracted? How much value was transferred? Without numbers, without measurement, there is no theory—only empty linguistic noise, social poetry, or academic jargon dressed in fancy terms, devoid of meaning.

In short, unless we possess a precise measuring tool, a stable unit of measurement, and an exact method of calculation, political economy theories will remain mere stories told by those with a heightened emotional sensitivity to injustice but incapable of actual observation. Value, understood as the quantity of human hardship embodied in a product, can be measured, its surplus calculated, and it can be determined who appropriates what—all with clear numbers, without empty philosophy or obscure “social processes.”

Scientific integrity requires, first and foremost, that those who have fought so fiercely to defend the outer shell of the theory—even at the expense of its substance—acknowledge its shortcomings, rather than engage in futile attempts to “patch up” its contradictions or resort to intellectual coercion that twists the facts in order to evade confronting the problem of measuring value, the very axis around which the laws governing all phenomena of production and distribution at the social level are articulated.

What is striking is that while science seeks to lift the veil from numbers in order to reveal the relations of social production they express, some—because of the theory’s shortcomings and the absence of a proper measure—seek to restore that very veil instead of correcting and completing the theory. If value cannot be measured, then Capital is no longer a work of political economy, but rather a volume of mournful poetry about the condition of workers.

The truth, however, is simpler and harsher: the capitalist does not appropriate the worker’s feelings, but surplus value. Surplus value is neither felt nor contemplated; it is counted and calculated, and in the end, it is transformed into bank balances that neither recognize nor tolerate ambiguity.

IV. Rectifying the Measure of Value:

The scientific truth that cannot be denied is that the human hardship exerted in the production of a commodity—its value—is nothing but energy embodied in the product. This energy can be measured precisely in terms of calories, as a unit of the energy required by the human body to function, generate, and expend during the performance of labor. The body accomplishes its productive activity only through the consumption of food, that is, by converting the chemical energy stored in nourishment into mechanical energy manifested in labor. When this energy becomes embodied in the product, it confers value upon it.

Based on this unit of measurement—a fixed unit—we can precisely determine the quantity of energy the human body receives and the quantity of energy it expends. In other words, we can measure exactly what the body requires under different conditions and while performing various tasks. We denote the necessary calories by the abbreviation (NC) ⁽¹⁷⁾. This quantity of energy corresponds exactly to what political economy failed to capture when it limited itself to measuring value in units of time, relying on labor hours as a standard for what cannot truly be measured by the hour.

However, the worker, as the producer of value, can exert this hardship only if the necessary means of subsistence are available: food, clothing, shelter, and so on. Food is the direct source of energy that enables the worker to perform labor; more precisely, it is the medium through which chemical energy is converted into mechanical energy manifested in human hardship. Advances in nutrition science, physics, biochemistry, and physiology have allowed us to determine the quantity

of calories consumed by a human performing various types of work. These calories, in turn, become embodied in the product, thereby endowing it with value.

According to recent scientific research, ⁽¹⁸⁾ we now know that a construction worker, for example, consumes approximately 1,400 NC during an eight-hour workday, meaning that this quantity of energy becomes embodied in the product he creates. Similarly, a worker in an iron factory consumes around 1,900 NC over the same period, while a blacksmith consumes 2,400 NC, a factory worker 1,100 NC, and a teacher approximately 800 NC, which is embodied in the service she provides. This indicates that determining the value of a pencil—or, more generally, the value of any good or service—depends on knowing the quantity of energy expended in its production, rather than the time it took to produce it, as political economy had assumed for over two centuries.

However, this measurement does not rely on the caloric needs of an isolated individual, since people differ in height, weight, body composition, and other characteristics; one person may require more or fewer calories than another. Therefore, we consider the socially necessary quantity of calories, which is the quantity that enables the average worker to accomplish three things: to work, to live as a worker, and to reproduce their social class within society.

Hence, wages do not merely cover what is necessary for the worker to survive until the next working day; they also include what is necessary to maintain the reserve industrial army—i.e., the children of the working class who will later be pushed into the labor market.

On this basis, we can understand why an architect's wage exceeds that of a blacksmith, even though the blacksmith consumes 2,400 NC while the architect consumes only 1,100 NC. Wages do not simply compensate the energy necessary for the worker to perform labor and live as a worker; they also include the energy socially expended to form and prepare the worker for his profession—that is, the energy required for the architect to become an architect and the blacksmith a blacksmith capable of entering the labor market. In this way, the capitalist class, through the wages it pays, ensures that the worker reproduces someone like himself—that is, the working class itself is renewed generation after generation, and with it, the social existence of capitalism is perpetuated.

Just as the socially necessary quantity of energy is taken into account regarding the producing worker, it is also taken into account regarding the product itself. In exchange, and according to the law of value, two types of energy must be considered: the direct energy expended in producing the item, i.e., the living labor embodied in the product, and the energy stored in the tools and materials used in its production, i.e., the accumulated labor embodied in the means of production. Hence, the value of a coat is determined not only by the direct energy expended in producing it but also by the energy stored in its materials and production tools. If the coat required 100 NC of living energy and 50 NC of stored energy, it will exchange with a piece of cloth that required 80 NC of living energy and 70 NC of stored energy, because the total embodied energy in each is equal.

Finally, this energy is always taken into account on the basis of socially necessary energy according to the prevailing technique of production. If producing a given quantity of cloth requires 200 NC, and a new machine or modern technique later allows the same quantity to be produced with only 50 NC, the social value will ultimately be determined according to this new prevailing technique of production. Thus, 50 NC will be recognized for producing that quantity of cloth, while anyone continuing to use the old technique requiring 200 NC bears alone the cost of falling behind the prevailing technique. When such a producer brings his product to the market, he will not exchange it for a product that required 200 NC to produce, but for one that required only 50 NC, according to the prevailing social conditions.

In this way, exchange in capitalist society is not governed by the time individuals spend working, but by the socially necessary energy embodied in the commodities.

V. Testing the Validity of the Proposed Measure:

In order to test the validity of our hypothesis concerning the correction of the measure of value and the adoption of the necessary calorie, let us suppose that society enters the process of production with one billion necessary calories at its disposal. These are expressed in one billion units of colored paper, each sheet bearing the indication that it represents one calorie (NC). The holder of any one of these sheets can relinquish it in exchange for one unit of food whose production required the expenditure of one calorie.

The capitalist proceeds from this situation by converting 600 million colored notes, equivalent to 600 million calories, into means of production. He allocates 300 million notes to the purchase of materials of labor; he gives the producers of raw and auxiliary materials this quantity of colored notes and receives from them, in return, what he requires of those materials. He then allocates another 300 million notes to the purchase of instruments of labor, paying them to the producers of tools and obtaining from them the means of production he needs. After securing the necessary materials and instruments, he moves on to purchase labor power; he contracts with workers to transform the materials, by means of the instruments, into products, and pays them 400 million colored notes representing 400 million calories.

The workers then begin their work, so that the one billion colored notes return to the capitalist in the form of commodities whose value consists of the sum of the value of materials, the value of instruments, and the value of labor power, that is: $300 + 300 + 400$. However, if the process were to stop at this point, it would yield no benefit for the capitalist; he has expended one billion units in the form of colored notes, and the same billion returns to him in the form of commodities. Had he expected this result in advance, he would not have decided to undertake production in the first place. Therefore, the workers in his factory must produce a value greater than that which they received. They must generate surplus energy. The capitalist knows this from the outset; indeed, the labor contract itself rests upon this fact.

For example, a worker can use a single-colored note to purchase a food item whose production required the expenditure of one calorie. Yet this same food provides him with ten calories, enabling him to work for eight hours, and it may even supply him with enough energy for an entire day of twenty-four hours. If we assume that each colored note grants the worker ten calories, and also assume, for the sake of simplicity, that these ten calories represent the minimum required to keep the worker alive and capable of working, this means that the workers received 400 million calories from the capitalists, but returned these four hundred million to them in the form of products, and added to them 3,600 million calories in the form of a surplus product.

Here the surplus value becomes manifest. The capitalist gives the worker the colored note in exchange for eight hours of work, while during these hours the worker expends an amount of energy equal to ten times what he was paid. This difference between what the capitalist paid and what he obtained is precisely the surplus value; it is the condition without which the capitalist would cease to invest and the renewal of production in society would come to a halt. It should also be noted that the materials of labor and the instruments of labor enter the production process only to the extent that they are consumed; their value is thus transferred directly to the product, amounting here to 600 million units.

Let us consider another example. We know that a worker employed in a light-industry factory requires 1400 (NC). Suppose that this worker performs an eight-hour working day in a factory producing halva, and produces 1,400 pieces, each weighing 100 grams, with each piece providing approximately 500 (NC). This means that each piece of this product contains one (NC).

When a construction worker, who requires 1400 (NC), purchases and consumes three pieces, he obtains 1,500 (NC), enabling him to work for an eight-hour day, which he expends during construction and which thus becomes embodied in the product.

However, the capitalist did not pay the worker the value of the builder's labor; the capitalist did not pay the 1,500 (NC) that the construction worker will expend. Rather, the capitalist merely paid the value of the 3 (NC) that were expended in producing the food item capable of providing the builder with 1,500 (NC). Accordingly, the capitalist pays 3 (NC), yet obtains from the builder 1,500 (NC). This difference, as we have noted, is appropriated by the capitalist as surplus value, which he accumulates in order to renew production on an expanded scale.

If we wish to bring the idea closer by using monetary units—represented in our example by the colored notes—we may say that a factory worker who consumes a few grams of halva (sesame confection) with a small piece of bread, whose value does not exceed a few pounds, is nevertheless able to work for a full eight hours and, during those hours, produce a social value hundreds of times greater than the value of the food he consumed; the difference accrues to the capitalist as surplus value.

Because the worker is usually paid at the subsistence level, he consistently chooses the cheapest commodities capable of providing the greatest amount of energy. For this reason, bread, fava beans, potatoes, eggplants, and inexpensive oils occupy a central place in the diet of the working class, as they combine low price with high caloric capacity. In this way, they enable the worker and his family to remain alive and thus continue producing surplus value embodied in a surplus product that flows into the capitalist's coffers to be accumulated once again.

If we delve into the depths of the capitalist production process and analyze the relations of production at the highest level of abstraction, we find that the commodity, according to the three examples above, is not only the result of living labor (which is embodied in labor power) and stored labor (which is embodied in materials and tools of production), but also the result of: the living labor expended by the workers + the stored labor in materials and tools, and even in the workers themselves + surplus labor (which is living labor unpaid). Consequently, the value of the commodity, as well as its composition according to the law of value, is the total necessary labor embodied in it—that is, social labor (living, stored, and surplus). Therefore, the greater this total necessary labor, the higher the value, and the lower this labor, the lower the value. The composition of value, and consequently its organization, does not change; it only evolves from (living labor) to (living labor + stored labor), and then to (living labor + stored labor + surplus labor).⁽¹⁹⁾

In the first example, we assumed the existence of a single capitalist who monopolizes the market and appropriates all the surplus value produced by the workers. Let us now assume that the market includes four capitalists, with three new entrants. With the total profit mass, determined by the size of social demand, remaining constant, these capitalists will divide it among themselves. If the total profit amounts to 3,600 million units, each would receive 900 million units, provided that the prevailing technique of production allows for a change in the composition of capital from the combination 400 + 300 + 300 to the combination 100 + 75 + 75⁽²⁰⁾; that is, 100 million for labor power, 75 million for materials, and 75 million for tools. In this case, the total value of the product for each capitalist consists of living labor (100) + stored labor (150) + surplus labor (900), so that the commodity leaves the factory with its social value of 1,150 units, after which it enters the market and its price fluctuates upward and downward around this value.

If a fifth capitalist enters the market with a new technique and a different combination—say 45 + 25 + 30—he would receive his share of the profit mass, i.e., 720 million units. However, he outperforms his competitors because he achieves this profit by spending less. He spends only 100 million units and obtains 720 million, whereas the others spend 250 million units to earn the same profit. In this way, the new enterprise earns an additional differential profit of 150 million

units. This situation, however, does not last long; as the new technique spreads among factories, the production combinations become equalized, and the new social value of the commodity becomes composed of 45 for labor power + 25 for tools + 30 for materials + 720 for surplus value, i.e., 820 million units. Consequently, the circulating social value decreases from 4,600 million units to 4,100 million units. From this, we observe that an increase in productivity leads to a decline in the social value of commodities, while the possibility of generating additional profits remains as long as a larger amount of money is injected into circulation.

And in everyday life, these calories take their material form in units of money. The worker does not receive calories directly from the employer; rather, they receive monetary units, each representing a specific number of these calories. Whoever holds these units can exchange them for food that provides the energy necessary for life and labor, or for the services of doctors, teachers, lawyers, and others. All of these, in turn, require a certain number of calories to sustain themselves and continue working. When they receive money representing this energy, they can use it to obtain food or other necessities of life, such as clothing, housing, and medical care, thereby renewing their own reproduction as well as the reproduction of their class within society.

And although our results are consistent with the findings of political economy regarding surplus labor, relying on calories as a unit of measurement offers benefits that go beyond merely comparing different types of work in terms of hardship and ingenuity, or establishing a fixed measure of value. It also allows for an expanded understanding of productive labor that generates surplus value. Measuring hardship in the service sector has posed a significant challenge to political economy, often excluding workers in this sector from the circle of surplus-value production. Here lies the practical—not merely theoretical—importance of using calories as a consistent unit of measurement: it enables us to determine the value of each type of work with scientific precision, whether in the service sector (such as a salaried physician) or in the production of material goods (such as a factory worker), and thus to estimate the annual amount of surplus value generated within the national economy.⁽²¹⁾

VI. Conclusion:

The crisis of political economy did not reside in the essence of the Value Theory itself, but rather in the failure of its analytical tools to establish an objective, independent measure. The historical reliance on time as a standard of value did more than just destabilize the theory; it produced a host of distorted interpretations and deficient theories—particularly those that attempted to explain international production relations or the mechanisms of exploitation through moralistic or impressionistic concepts, detached from the language of scientific quantifications.

By rectifying the measure of value through the Necessary Calorie (NC), we put an end to this theoretical disorientation. This new metric shifts value from the realm of ambiguous abstraction to the realm of embodied physical energy, allowing us to quantify Social Labor (Living, Stored, and Surplus) with absolute precision. This correction does not merely rebuild the edifice constructed by Marx on a more concrete foundation; it purges political economy of the erroneous theories born from a deficient metric. It further grants us the capacity to calculate surplus value as a precise numerical magnitude, whether in the industrial or service sectors. Returning to energy is a return to science; it is the only path for political economy to reclaim its status as a producer of objective scientific laws that explain social reality independently of market fluctuations or the rhetoric of injustice.

Footnotes

(1) We will here set aside the early historical treatments, particularly those of Aristotle and Ibn Khaldun.

(2) *“Labour was the first price, the original purchase-money that was paid for all things. It was not by gold or by silver, but by labour, that all the wealth of the world was originally purchased... Labour, therefore, is the real*

*measure of the exchangeable value of all commodities". Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations*, ed. R. H. Campbell and Andrew S. Skinner, 2 vols. (Oxford: Oxford University Press, 1976), 1:47–48, bk. 1, chap. 5.*

(3) *"But though labour be the real measure of the exchangeable value of all commodities, it is not that by which their value is commonly estimated. It is often difficult to ascertain the proportion between two different quantities of labour. The time spent in two different sorts of work will not always alone determine this proportion. The different degrees of hardship endured, and of ingenuity exercised, must likewise be taken into account". Smith, *Wealth of Nations*., 47.*

(4) Starting from) The Missing Measure), that is, the absence of a scientifically sound standard for value, this doctrine of measuring value by money has become widespread and well-established in political economy. It later seeped into formal theory, and students came to memorize by heart a principle entirely unrelated to science, which states: money is the measure of value! See how dominant this principle was in the history of political economy: Samuel Bailey, *Money and Its Vicissitudes in Value; as They Affect National Industry and Pecuniary Contracts: with a Postscript Join-Stock Banks* (London: Effingham Wilson, 1837), 3; David Buchanan, *Inquiry into the Taxation and Commercial Policy of Great Britain with Observations on the Principles of Currency, and of Exchangeable Value* (Edinburgh: William Tait, 1848), 231; Nicholas Barbon, *A Discourse of Trade*, ed. Jacob H. Hollander (Baltimore: The Johns Hopkins Press, 1905), 16; John Gray, *Lecture on the Nature and Use of Money* (Edinburgh: Adam and Charles Black, 1848), 79; W. Petty, *The Political Anatomy of Ireland*, in C. H. Hull, ed., *The Economic Writings of Sir William Petty* (Cambridge: Cambridge University Press, 1899), vol. 1, 183; J. H. Marcet, *Conversations on Political Economy, in which the elements of the science are familiarly explained* (London: Longman, 1816), 297; J. R. McCulloch, *Essays on Interest, Exchange, Coins, Paper Money, and Banks* (Philadelphia: A. Hart, Late Carey and Hart, 1851), 84; R. Cantillon, *Essay on the Nature of Trade in General*, trans., ed., and with an introduction by A. E. Murphy (Indiana: Liberty Fund, 2015), 53; Dudley North, *Discourses upon Trade; principally directed to the cases of the interest, coynage, clipping, increase of money*, ed. Jacob Harry Hollander (Montana: Kessinger Publishing, 2010), 10; Jacob Vanderlint, *Money Answers All Things. Or, An Essay to Make Money Sufficiently Plentiful* (Baltimore: The Johns Hopkins Press, 1914), 12.

(5) *"It is adjusted, however, not by any accurate measure, but by the higgling and bargaining of the market, according to that sort of rough equality which, though not exact, is sufficient for carrying on the business of common life... which, though it may be made sufficiently reasonable, is not founded upon any natural principle, and is not distinguished by any particular lustre." Smith, *Wealth of Nations*., 47-8.*

(6) David Ricardo, *On the Principles of Political Economy and Taxation*, ed. Piero Sraffa, vol. 1 of *The Works and Correspondence of David Ricardo* (Cambridge: Cambridge University Press, 2004), 6.

(7) *"It is necessary for me also to remark, that I have not said, because one set of labourers are employed for a year on producing one commodity, and another set of labourers are employed for the same time on producing another, that the values of the commodities should be one and two thousand pounds; but that they should be in the proportion of two to one; and that is the proportion in which they would be exchanged." Ricardo, *The Principles*., 12 .*

(8) *"May not gold be considered as a commodity produced with such proportions of the two kinds of capital as approach nearest to the average quantity employed in the production of most commodities? May not these proportions be so nearly an intermediate momentum between the two extremes, the one where little fixed capital is used, and the other where little labour is employed, as to form a just mean between them"? Ricardo, *The Principles*., 14.* Analyzing this proposition, one must realize that Ricardo himself explicitly declared his reliance on a (mental hypothesis) that defies objective reality; he assumed the stability of gold's value and the uniformity of its production conditions with all other commodities, in a forced attempt to domesticate it as a measure of value. When (Malthus)—who likewise favored money as the most convenient practical measure—tried to rid the Ricardian conception of this futile assumption, he offered nothing more than another (assumption). His proposal failed to resolve the dilemma of the measure, sufficing itself with a mere attempt to approach an illusory statistical precision. Malthus sought to reformulate the Ricardian construct by restricting the measure to the quantity of labor expended in the production of gold (money), while excluding profits due to their instability across different branches of production. He argued that as long as Ricardo had pre-assumed the stability of gold's value and overlooked its fluctuations as a commodity, it was—logically—more appropriate to overlook capital profits, which fluctuate from one branch to another, and rely solely on labor as a standard. (See: T. Malthus, *Principles of Political Economy*. London: John Murray, 1827. p.102). However, the fundamental dilemma remains without a true resolution; for Political Economy is unable to deconstruct it, neither through Ricardo's method nor Malthus's approach. The exclusion of capital—which is, in its essence, (stored labor)—represents an arbitrary truncation of the value structure, as does the exclusion of profits, which are in reality nothing but a manifestation of (surplus labor). Despite all these theoretical evasions, the issue remains at its starting point: we may know for certain that gold was produced in five hours of labor, yet we

remain in total ignorance regarding the essential magnitude of (value) produced and represented within those five hours.

(9) Ricardo, *The Principles*, 184.

(10) There is no doubt that Marx received the ideas of his predecessors with a critical consciousness, elevating them to a more profound analytical level, as he succeeded, after years of grappling with the same problem that had preoccupied his predecessors, in solving the riddle that baffled Ricardo regarding why wages consistently remain below the value created by labor, for while Ricardo bypassed this issue by focusing solely on the relative relations between commodities, Marx penetrated the heart of the matter, revealing that the worker does not sell his labor but rather his labor power, consequently making the value created by labor during the production process necessarily exceed the value the worker receives as a wage intended merely for his subsistence, and Marx further re-evaluated the division formulated by his predecessors regarding capital employed in production, where Smith and Ricardo argued that this capital is divided into essential capital and circulating capital, as Smith based the distinction on the transfer of ownership of the consumed part of capital while Ricardo attributed it to the degree of durability, yet Marx reconstructed this division on a deeper basis by starting from the analysis of value itself, distinguishing between constant capital and variable capital, where constant capital refers to the portion that enters and leaves the production process with its value unchanged while variable capital refers to the portion whose value changes within the process becoming the source of surplus value, and this analytical development was coupled with a reopening of the question of social reproduction on an expanded scale and a decisive critique of the theory of distribution where Marx's analysis reveals that capital generates surplus value distributed as profit, interest, and rent while the worker remains the creator of this value without receiving a share of it, contrary to the conception in Smith and Ricardo which assumed that the value added by labor resolves directly into social incomes such as wages, profit, and rent [I have opted to translate the term Fixed Capital (Fixes Kapital) as "essential capital" in contrast to "circulating capital" (Zirkulierendes oder Flüssiges Kapital), so as to distinguish it from the term Constant Capital (Konstante Kapital), which I translated as "constant" referring to capital with a constant value—as opposed to "variable", which refers to capital with a changing value] Nevertheless, the theoretical framework Marx inherited and refined remains vulnerable at its scientific core if tested against an improper measure of value, at which point the entire analytical framework becomes susceptible to total collapse.

(11) *"The different proportions in which different sorts of labour are reduced to unskilled labour as their standard, are established by a social process that goes on behind the backs of the producers."* Karl Marx, *Capital: A Critique of Political Economy*, trans. Samuel Moore and Edward Aveling, ed. Frederick Engels, vol. 1 (New York: International Publishers, 1967), 44. *"Die verschiedenen Proportionen, worin verschiedene Arbeitsarten auf einfache Arbeit als Maßeinheit reduziert werden, werden durch einen gesellschaftlichen Prozeß bestimmt, der sich hinter dem Rücken der Produzenten vollzieht"* Karl Marx, *Das Kapital: Kritik der politischen Ökonomie*, Bd. 1, in Marx-Engels-Werke (MEW), Bd.23 (Berlin: Dietz Verlag, 1962), 59. Following in Marx's footsteps, Garaudy wrote: *"When we recapitulate all the factors (quality of labor, length of apprenticeship, etc.), it can be seen that the spontaneous regulation of the market permits the establishment of new relationships: 1 hour of a fitter's labor will be equivalent to 1½ hours of a weaver's labor, etc."* Roger Garaudy, *Karl Marx: The Evolution of His Thought*, trans. Nan Apotheker (New York: International Publishers, 1967), 154.

(12) *"How, then, is the magnitude of this value to be measured? Plainly, by the quantity of the value-creating substance, the labour, contained in the article. The quantity of labour itself is measured by its duration, and labour-time in its turn finds its standard in weeks, days, and hours."* Marx, *Capital*, 1:38. *"Wie wird nun die Größe des Werts gemessen? Durch das Quantum der wertbildenden Arbeit. Die Quantität der Arbeit selbst mißt sich durch ihre Dauer, die Arbeitszeit, und die Arbeitszeit wiederum hat ihren Maßstab an bestimmten Zeitabschnitten, wie Stunde, Tag usw."* Marx, *Das Kapital*, Bd. 1 (MEW 23), 53.

(13) Marx, *Capital*, 1:94. *"Das Gold wird nur Maß der Werte, weil Waren ihre Werte in ihm messen."* Marx, *Das Kapital*, MEW 23:109.

(14) For further critique and analysis, see: M. Adel Zaky, "A Critique of the Functions of Money," *International Affairs Forum*, Washington, D.C., December 22, 2025; M. Adel Zaky, "Qu'est-ce que la monnaie?" *Industrial Economics Review* 15, no. 2 (2025): 377–402.

(15) Marx, *Capital*, 1:47. *"In der Wertgegenständlichkeit der Waren ist kein Atom Naturstoff enthalten"* (Marx, *Das Kapital*, MEW 23:62) However, the reality is that Marx never stated that 'value is not subject to measurement.' The distinction here is fundamental; Marx consistently distinguishes Value as something that is not a tangible physical entity—it can neither be seen, touched, nor weighed—yet it remains measurable, not through physical measurement, but through social measurement. In this sense, for Marx, as for William Petty, Cantillon, Smith, and Ricardo, value is measured by socially necessary labor-time. This is indeed a measurement, but it is not of the same nature as measuring

length, weight, or temperature. Thus, when Marx asserts: “In the value-objectivity of commodities, not an atom of matter enters,” (In der Wertgegenständlichkeit der Waren ist kein Atom Naturstoff enthalten), he is not announcing the “death of measurement.” On the contrary, he is merely declaring that value is neither wood, nor iron, nor atomic weight. Nevertheless, the school of ‘intellectual complacency’ received this sentence as if it were an eternal license to evade the issue; as long as no ‘natural atom’ exists, one must not ask about the measure! Thus, the negation of physics was transformed into a negation of calculation, and the phrase (kein Atom Naturstoff) became a talisman to suppress further inquiry. The stark paradox, however, lies in the fact that Marx, in almost the very next sentence, perceives nothing in value but: “certain masses of congealed labor-time.” “Als Werte sind die Waren nur bestimmte Massen geronnener Arbeitszeit.” Marx, *Das Kapital*, Band I, Kapitel I, MEW 23, S. 62.

(16) Isaak Illich Rubin, *Essays on Marx's Theory of Value*, trans. Miloš Samardžija and Fredy Perlman (Detroit: Black & Red, 1972), see esp. 131–36, 147–48, 153, 158, 167–172.

(17) As for the instrument that enables us to measure this energy, it is the calorimeter, a device used to measure the thermal energy released by the body while exerting effort. By means of it, the amount of energy expended by a human being during work can be determined—that is, the amount of value that becomes embodied in the product.

(18) For scientific discussions on measuring human effort in terms of calories, see:

Marion Bennion, *Introductory Foods*, 7th ed. (New York: Macmillan Publishing Co., 1974), 123 ff. Allan Camron and Yvonne Collymore, *The Science of Food and Cooking* (London: Edward Arnold, 1979), 6543–7654. Robert Weber, *Heat and Temperature Measurement* (New York: Prentice-Hall, 1950), chap. 10, “Calorimetry,” 171–189. D. Fenna, *Elsevier's Encyclopedic Dictionary of Measures* (Amsterdam: Elsevier Science B.V., 1998), 72. *Handbook on Human Nutritional Requirements* (Geneva: W.H.O., 1974). *Temperature: Its Measurement and Control in Science and Industry*, Papers presented at the Symposium held in New York City, November 1939, under the auspices of the American Institute of Physics (New York: Reinhold Publishing Corporation, 1941), chap. 6, “Temperature and its Regulation in Man,” 525–575.

(19) In completing the theory of value by incorporating time into the analysis, see: M. Adel Zaky, *Critique of Political Economy*, vol. 1 (Cairo: Hindawi Foundation, 2021), pt. 2, chap. 3; M. Adel Zaky, “Value / Time: An Essay on the Principles of Political Economy,” *African Journal of Economic Review* 13, no. 2 (June 2025): 90–103.

(20) It must be noted that the valuation is determined by the prevailing productive arts, rather than the arithmetic mean, as Marx erroneously applied in his model of the price of production. This is because the average surplus value—which the capitalist is compelled to accept when forced to compose his capital according to a given arithmetic average, and which results from dividing the individual surplus values of factories by the total social capital within a production branch—appears as if it has descended upon the cost price from the heavens. It was not a quantity of labor actually embodied in the product. This contradicts the Law of Value, which dictates that value, starting from the prevailing productive arts, is the quantity of labor (Living, Stored, and Surplus) actually embodied within the product itself.

(21) The role of using the necessary calorie as a unit of value measurement is not limited to providing an objective, scientific, and stable metric capable of measuring value in both the commodities and services sectors; rather, it extends to a fundamental reconsideration of all theories based on the Law of Value, exposing their inherent fragility from the outset due to their reliance on scientifically unsound measures. For a critique of this theory based on the correct measure of value, see: M. Adel Zaky, “Main Critical Comments Regarding A. Emmanuel's Theory of Unequal Exchange,” *Economic Consultant* 1, no. 1 (March 2026): 102–128, <https://doi.org/10.46224/ecoc.2026.1.6>.

Referrals and references :

1. Bailey, Samuel. *Money and Its Vicissitudes in Value; as They Affect National Industry and Pecuniary Contracts: with a Postscript Join-Stock Banks*. London: Effingham Wilson, 1837.

2. Barbon, Nicholas. *A Discourse of Trade*. Edited by Jacob H. Hollander. Baltimore: The Johns Hopkins Press, 1905.
3. Bennion, Marion. *Introductory Foods*. 7th ed. New York: Macmillan Publishing Co., 1974.
4. Buchanan, David. *Inquiry into the Taxation and Commercial Policy of Great Britain with Observations on the Principles of Currency, and of Exchangeable Value*. Edinburgh: William Tait, 1848.
5. Camron, Allan, and Yvonne Collymore. *The Science of Food and Cooking*. London: Edward Arnold, 1979.
6. Cantillon, Richard. *Essay on the Nature of Trade in General*. Translated and edited by A. E. Murphy. Indiana: Liberty Fund, 2015.
7. Fenna, Donald. *Elsevier's Encyclopedic Dictionary of Measures*. Amsterdam: Elsevier Science B.V., 1998.
8. Garaudy, Roger. *Karl Marx: The Evolution of His Thought*. Translated by Nan Apotheker. New York: International Publishers, 1967.
9. Gray, John. *Lecture on the Nature and Use of Money*. Edinburgh: Adam and Charles Black, 1848.
10. Malthus, Thomas. *Principles of Political Economy*. London: John Murray, 1827.
11. Marcet, Jane Haldimand. *Conversations on Political Economy, in which the elements of the science are familiarly explained*. London: Longman, 1816.
12. Marx, Karl. *Capital: A Critique of Political Economy*. Translated by Samuel Moore and Edward Aveling. Edited by Frederick Engels. Vol. 1. New York: International Publishers, 1967.
13. Marx, Karl. *Das Kapital: Kritik der politischen Ökonomie*. Bd. 1. In Marx-Engels-Werke (MEW), Bd. 23. Berlin: Dietz Verlag, 1962.
14. McCulloch, John Ramsay. *Essays on Interest, Exchange, Coins, Paper Money, and Banks*. Philadelphia: A. Hart, Late Carey and Hart, 1851.
15. North, Dudley. *Discourses upon Trade; principally directed to the cases of the interest, coynage, clipping, increase of money*. Edited by Jacob Harry Hollander. Montana: Kessinger Publishing, 2010.
16. Petty, William. *The Political Anatomy of Ireland*. In *The Economic Writings of Sir William Petty*, edited by C. H. Hull, vol. 1. Cambridge: Cambridge University Press, 1899.
17. Ricardo, David. *On the Principles of Political Economy and Taxation*. Edited by Piero Sraffa. Vol. 1 of *The Works and Correspondence of David Ricardo*. Cambridge: Cambridge University Press, 2004.
18. Rubin, Isaak Illich. *Essays on Marx's Theory of Value*. Translated by Miloš Samardžija and Fredy Perlman. Detroit: Black & Red, 1972.
19. Smith, Adam. *An Inquiry into the Nature and Causes of the Wealth of Nations*. Edited by R. H. Campbell and Andrew S. Skinner. 2 vols. Oxford: Oxford University Press, 1976.
20. Vanderlint, Jacob. *Money Answers All Things. Or, An Essay to Make Money Sufficiently Plentiful*. Baltimore: The Johns Hopkins Press, 1914.
21. Weber, Robert. *Heat and Temperature Measurement*. New York: Prentice-Hall, 1950.
22. World Health Organization. *Handbook on Human Nutritional Requirements*. Geneva: W.H.O., 1974.
23. Zaky, M. Adel. *Critique of Political Economy*. Vol. 1. Cairo: Hindawi Foundation, 2021.
24. Zaky, M. Adel. "A Critique of the Functions of Money." *International Affairs Forum*, December 22, 2025. https://www.iaforum.org/Content/ViewInternal_Document.cfm?contenttype_id=5&ContentID=21249.
25. Zaky, M. Adel. "Main Critical Comments Regarding A. Emmanuel's Theory of Unequal Exchange." *Economic Consultant* 1, no. 1 (March 2026): 102–128. <https://doi.org/10.46224/ecoc.2026.1.6>.
26. Zaky, M. Adel. "Qu'est-ce que la monnaie?" *Industrial Economics Review*, 15, no. 02 (2025): 377–402.
27. Zaky, M. Adel. "Value / Time: An Essay on the Principles of Political Economy." *African Journal of Economic Review* 13, no. 2 (June 2025): 90–103.