

5 Soviet planning and the labor-time calculation model: implications for 21st-century socialism¹

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Introduction

The Marxian model of a communist economy, in its first phase, is characterized by “planning based on labor-time calculation” (hereafter abbreviated as PLTC). This chapter critically evaluates the history of Soviet experiences to explain why the Soviet economy of 1917–91 was not a labor-time planned economy. Although input-output tables were essential to the calculation of the total labor time needed to produce goods and services, and were available to Soviet planners, they never seriously considered using them and instead depended on material balances. This chapter explores the implications for Marxian PLTC for 21st-century socialism.

Marx’s planning based on labor-time calculation

Marx assumed that in communism, the market would be abolished and replaced by PLTC using labor certificates. This is the crux of Marx’s theory of an alternative society, repeated in his mature works, including *Grundrisse*, *Capital*, and *Critique of the Gotha Programme*. In *Grundrisse* Marx wrote:

On the basis of communal production, the determination of time remains, of course, essential. ... Economy of time, to this all economy ultimately reduces itself. ... Thus, economy of time, along with the planned distribution of labor time among the various branches of production, remains the first economic law on the basis of the communal production. However, this is essentially different from a measurement of exchange values (labor or products) by labor time.

(Marx, 1973 172–3)

In Marx’s communism, economic life, including production, distribution and consumption, is not operated under external compulsion but autonomously controlled by the free will of human beings. Unlike capitalism where the “regulation of total production by value” (Marx, 1981: 1020) is the rule, associated individuals control production. In the *Grundrisse* Marx made

it clear that a post-capitalist society, organized through the association of free individuals was incompatible with exchange value, money and markets (Marx, 1973: 158–9). In Marx’s communism, the production process is under the “conscious and planned control” of “freely associated men” (Marx, 1976: 173), and “socialized man, the associated producers, govern the human metabolism with nature in a rational way, bring it under their collective control instead of being dominated by it as a blind power; accomplishing it with the least expenditure of energy and in conditions most worthy and appropriate for their human nature” (Marx, 1981: 959). In other words, planners are the direct producers themselves. Considering that the essence of Marxian planning is the conscious and autonomous control of production by free producers from below, the conventional assertion that Marx regarded the problem of socialist production mainly in terms of administration and technical methods is groundless. In *The Civil War in France*, Marx emphasized that “possible communism” is nothing else than the coordination and planned control of national production by cooperative associations (Marx, 1986: 335). The principle of economic coordination in Marx’s communism is participatory planning, or planning from below, based on labor-time calculation. Marx sketched it in *Critique of the Gotha Programme* as follows:

Within a collective society based on the common ownership of the means of production, the producers do not exchange their products; just as little does the labor employed on the products appear here as *the value* of these products, as a material quality possessed by them, since now, in contrast to capitalist society, individual labor no longer exists in an indirect fashion but directly as a component part of the total labor. The phrase ‘proceeds of labor,’ objectionable even today on account of its ambiguity, thus loses all meaning. What we are dealing with here is a communist society, not as it has *developed* on its own foundations, but on the contrary, just as it *emerges* from capitalist society, which is thus in every respect, economically, morally and intellectually, still stamped with the birth-marks of the old society from whose womb it emerges. Accordingly, the individual producer receives back from society – after the deductions have been made – exactly what he gives to it. What he has given to it is his individual quantum of labor. For example, the social working day consists of the sum of the individual hours of work; the individual labor time of the individual producer is the part of the social working day contributed by him, his share in it. He receives a certificate from society that he has furnished such and such an amount of labor (after deducting his labor for the common funds), and with this certificate he draws from the social stock of means of consumption as much as the same amount of labor costs. The same amount of labor which he has given to society in one form he receives back in another. (Marx, 1989a: 85–6, emphasis in original)

Lenin's Concept of Planning

Apart from his overemphasis on nationalization, accounting, and control in Soviet planning, Lenin did not contribute anything notable to the development of Marxian planning. Unlike Marx, Lenin distinguished the first phase of communism from its developed phase, identifying the former with socialism. He emphasized how “accounting and control ... is mainly what is needed for the ‘smooth working’, for the proper functioning, of the *first phase* of communism” (Lenin, 1964: 478, emphasis in original). In 1918 Lenin asserted that he had no Marxist precedent for the construction of a socialist economy, neglecting Marx’s model of PLTC: “We know about socialism, but knowledge of organization on a scale of millions, knowledge of the organization and distribution of goods, etc. – this we do not have” (Lenin, 1965a: 296). Eventually, Lenin found a precedent in the contemporary German war-time state monopoly capitalist economy. In May 1918, he asserted: “Our task is to study the state capitalism of the Germans, to spare no effort in copying it and not shrink from adopting dictatorial methods to hasten the copying of it. Our task is to hasten this copying even more than Peter hastened the copying of Western culture by barbarian Russia, and we must not hesitate to use barbarous methods in fighting barbarism” (Lenin, 1965b: 340). Lenin believed that capitalism itself was creating the centralized accounting mechanism that could be used for Soviet planning (Barnett, 2004: 54–5).

However, Lenin’s conception of communism and planning is problematic from a Marxian standpoint. There is no distinction between socialism and communism in Marx. For Marx, the two are synonymous. Unlike Lenin², Marx never imagined the existence of the state in communism (Marx, 1989b: 519). It is also obvious that Lenin’s famous catchphrase, “Communism is Soviet power plus the electrification of the whole country” (Lenin, 1966: 419) is a far cry from Marx’s view of communism, for the latter presupposes the “withering away” of any sort of state, not just a bourgeois one but also Soviet power even in its first phase. Lenin’s approach to planning mainly in terms of control of the economy by the party-state, centered on the management of a state capitalist trust, is also opposite from Marx’s conception of democratic planning from below. Above all, Lenin had no interest in PLTC, despite his repeated emphasis on the importance of accounting and calculation in planning³.

Trial of Labor-Time Calculation Planning during War Communism

During the period of War Communism from 1918 to 1921, Lenin and the Bolsheviks attempted to nationalize industries and abolish the market economy. As the regime of War Communism was characterized by the nonexistence or non-functioning of a market economy, it is frequently regarded as a prototype of Marxian communism. In fact, War Communism was nothing else than a rationing economy, imposed by the extreme shortage and besieged

situation of wartime. Indeed, the industrial production of Russia in 1920 fell to less than 15 percent of that of 1913. On the other hand, the supply of money doubled from 1913 to 1918, and quintupled by 1920. With galloping inflation, the distribution of the goods at the prices fixed by the Soviet government became virtually free. The calculation of equivalents was frequently made on the basis of amounts of grain or other products. Indeed, as Carr noted, “The financial characteristic of war communism was the virtual elimination of money from the economy. This was, however, in no sense the product either of doctrine or of deliberate design. ... the system was dictated not so much by theory as by urgent practical needs” (Carr, 1952: 246, 230). However, the Bolsheviks made virtue of necessity and even tried to accelerate the process by identifying specifically how the market economy would cease to function with the coming of communism. In 1918, the 2nd All-Russian Congress of Councils of the National Economy “express[ed] the desire to see the final elimination of any influence of money upon the relations of economic units” (Nove, 1992: 64). In 1919, Lenin trumpeted the abolition of money and the expansion of planning in the Draft Programme of the Russian Communist Party (RCP): “The RCP will strive as speedily as possible to introduce the most radical measures to pave the way for the abolition of money, first and foremost to replace it by savings-bank books, cheques, short-term notes” (Lenin, 1965c: 115–6).

In *The ABC of Communism* (1919), one of the representative works of War Communism, Bukharin and Preobrazhensky described communism as a system where workers collectively own the means of production and take the goods that they need from public warehouses. According to them, the communist economy was a planned administrative one managed by newly trained specialist recruited from the working class: “one of the fundamental tasks of the Soviet Power was and is that of uniting all the economic activities of the country in accordance with a general plan of direction by the State ... The foundation of communist society is laid by the organization of industry, and first of all by a purposive unification of industry under State control” (Bukharin and Preobrazhensky, 1966: 266, emphasis in original). During this period, the Bolsheviks seriously considered money and replacing it with natural units, including a “labor unit” (Nove, 1992: 65). Some Party members imagined that they would “come in the end to doing without any calculations in rubles, reckoning the energy used by number of days and hours” (quoted in Carr, 1952: 264). Reflecting the contemporary mood, in 1920 the 3rd All-Russian Congress of Councils of the National Economy decided to organize a seminar to study the “problems of a moneyless economy”. At the seminar, Kreve suggested a “labor unit” (*trudovaya edinista, tred*) – that is, socially necessary labor – as the unit of account for the moneyless economy. Kreve’s model seemed to apply to the Marxian PLTC, for it assumed that “the worker would receive units specifying the number of man-hours worked, and would draw from the ‘distributive organs’ various products up to this labor-value” (Nove, 1986: 56).

However, this construction did not progress beyond theory. In fact, the market economy was not abolished during War Communism. Indeed, the Soviet government introduced a new ruble, *chervonets*, in 1919, replacing the old ruble of the Czar. The so-called abolition of money during this period was nothing else than a clearance transaction on the books, similar to the practices of the banks of Western capitalism. Money functioned as accounting money during War Communism. Goods were distributed not only through rationing at fixed prices by the state agencies but also substantially through private commerce, including parcel businesses.

New Economic Policy and the Struggle for Planning

In 1921, the Soviet government ended the period of War Communism and adopted the New Economic Policy (NEP). The NEP allowed peasants to pay taxes – already lower than War Communism’s requisitions – in kind and sell agricultural surpluses in local markets. It also permitted small scale private business. The Soviet economy revived; however, it was accompanied by severe contradictions, such as a scissor crisis, food shortages in urban areas, and increasing inequality, which intensified Party debates about the economy’s direction. Trotsky, the leader of the Left Opposition, regarded these problems as symptoms of the revival of capitalism and argued in response for the acceleration of industrialization and the strengthening of planning. Trotsky insisted on the empowerment of the State Planning Commission (Gosplan) as the center of economic planning: “The lack of a real economic centre to watch over economic activity, conduct experiments in that field, record and disseminate results and coordinate in practice all sides of economic activity and thus actually work at a coordinated economic plan ... not only inflicts the severest of shocks on the economy, such as [the] fuel and food crisis, but also excludes the possibility of the planned and coordinated elaboration of new premises for economic policy” (quoted in Swain, 2014: 149, 141–2). In 1922, at the 11th Congress of the RCP, while the majority of Bolshevik leaders put the prioritized finance, Trotsky argued that planning should take place through actual monitoring of large-scale state-owned industries. He argued that the imbalances between industry and agriculture could be corrected by planning. In 1932, Trotsky listed three conditions of a planned economy: “(1) special state departments, that is, the hierarchical system of *plan commissions*, in the center and locally; (2) *trade*, as a system of market regulation; (3) *Soviet democracy*, as a system for the living regulation by the masses of the structure of the economy ... Only through the interaction of these three elements, state planning, the market, and Soviet democracy, can the correct direction of the economy of the transitional epoch be attained” (Trotsky, 1973: 273, 275, emphasis in original).

Trotsky was critical of Stalin and the Party’s interference with economic management. For Trotsky, this was not planning; what the economy needed was the economic guidance of specialists. In 1923, Trotsky argued that the work of planning should be transferred from the Party to Gosplan

(Swain, 2014: 142–3, 147). Indeed, Trotsky's policies in the 1920s were oriented to a democratic socialist economy (Day, 1973). Trotsky's concept of planning was crucially different from a Stalinist command economy, in that it emphasized control by market and Soviet democracy as well as autonomy from the party. However, it is also true that Trotsky's concept of planning was substantially different from that of Marx, in that it prioritized the roles of leadership of the party and the state sector. Indeed, Trotsky tended to equate planning with the issue of leadership, reverting to his militaristic approach to planning during War Communism. Above all, the Marxian idea of PLTC is totally missing from Trotsky's concept of planning.

Besides Trotsky and Left Opposition theorists, like Preobrazhensky, many prominent Russian economists, like Kondratiev, Chayanov, Milyutin, Kritsman, Smit, Groman, Popov, Strumilin and Varga, produced important works on planning during the NEP. For example, 30 percent of the articles published in a Soviet daily newspaper, *Economic Life*, and a Soviet monthly economic journal, *National Economy*, between October 1920 and February 1921 were about the issue of planning (Remington, 1982: 589). Based on these flourishing studies of planning, the Central Statistical Administration of Gosplan published *The Balance of the National Economy of the USSR, 1923–24* in 1926 (Davies, 1960: 289; Jasny, 1972: 104). It laid the basis for the control figures of 1925–26, consequently reborn as the first Five-Year Plan during 1926–27 (Davies, 1960: 290). It also provided a prototype of input-output tables (Leontief, 1960). However, under the NEP the PLTC, tried in the preceding period of War Communism, was no longer considered as a feasible option but instead was postponed to the distant future of developed communism. For example, Preobrazhensky, once a representative theoretician of War Communism, argued in his book *The New Economics* (1926) that only after the transition to socialism would the economy be coordinated “on the basis of direct calculation of labor-time” (Preobrazhensky, 1965: 20).

Suppression of Marxian Planning under the Stalinist Administrative Command Economy

All the debates on planning during the NEP suddenly stopped with Stalin's counterrevolution in 1929. In 1931 Stalin purged and executed most of the planning experts, such as Kondratiev, Chayanov, Groman, Ginzberg, Rubin et al., branding them as Menshevik counterrevolutionaries. Ginzberg was accused of lowering the target rate of growth of the first Five-Year Plan. *The Balance of the National Economy of the USSR, 1923–24* was denounced as based on the anti-Bolshevik philosophy of equilibrium advocated by Bogdanov (Remington, 1982: 589). Stalin himself discarded *The Balance of the National Economy of the USSR, 1923–24* as just “juggling with figures” (Stalin, 1954a: 178), signaling the physical termination of planning specialists. Ironically, the so-called Stalinist planned economy was born on the corpses of almost all the contemporary Marxist planners.

Stalin forcibly started and drove the first Five-Year Plan after the state capitalist counterrevolution in 1929. Seventeen hundred pages long, *The First Five-Year Plan of Building the Soviet National Economy* was authorized at the 15th Party Conference and published in 1929. This was the historically unprecedented attempt to administer the whole economic system. In 1931 Stalin announced that the purpose of the plan was to catch up with Western advanced capitalist countries: “We are fifty or a hundred years behind the advanced countries. We must make good this distance in ten years. Either we do it, or we shall go under” (Stalin, 1954c: 40–1). With the promulgation of the new constitution in 1936, Stalin declared that Soviet Russia had entered the first phase of communism⁴. In 1939, Stalin asserted that Soviet Russia was advancing towards the developed phase of communism by surpassing the advanced capitalist countries in terms of per capita product: “Only if we outstrip the principal capitalist countries economically can we reckon upon our country being fully saturated with consumer goods, on having an abundance of products, and on being able to make the transition from the first phase of Communism to its second phase” (Stalin, 1978b: 378–9). Stalin’s words clearly show that the main purpose of Stalinist planning was to catch up with the advanced capitalist countries rather than to organize the allocation of resources in an egalitarian and non-market way (Ellman, 2014: 4, 15).

Stalinist planning was practiced as follows. Stalinist planners tried to resolve the problem of complexity inherent in a planned economy by concentrating on a limited number of sectors. Indeed, Gosplan planned only a few strategic industries, targeting the ministries and not individual companies. The party’s top directive was transmitted through the ministries downward to the level of individual companies as control figures, preliminary production targets of the Five-Year Plans. These were computed only for a few strategically important products, such as corn and steel. In 1951, Gosplan’s Five-Year Plan was compiled for 127 products, while material balances, the main tool of planning, were prepared for 60 products, although there were millions of products in contemporary Russia (Gregory, 2004: 117, 152). Then, the mandatory “technpromfinplan” (technical-industrial-financial plan), involving detailed directions for the operations of individual companies, including output, assortment, labor and finance for the following year, was determined. The plans were not prepared from scratch but revised and updated the performances of the previous year. Intense bargaining and conflicts through vertical and horizontal interactions among the plan units were also characteristic of Stalinist planning. Accurate techniques like input-output tables or optimal linear programming, which could balance supply and demand, were never applied to Stalinist planning. As Gosplan planned to produce goods or services on an aggregated, rather than disaggregated basis, so balancing the national economy through consistent planning was impossible from the start. In fact, Stalinist planning was not meant to achieve a balanced national economy: unbalanced growth was not a problem to be avoided but tolerated and even promoted.

Far from being a Marxian planned economy, characterized by democratic control from below, the Stalinist economy was not planned in the technical sense of the word, that is, *ex ante* by economic coordination. Indeed, all the plans in Stalinist Russia were preliminary and subject to change by the party-state at any time. What actually executed the resource allocation in Stalinist Russia was not planning itself but the resource manager of the party-state. Resources were allocated by “feel and intuition,” and planners had little idea about the technical coefficients of inputs and outputs (Gregory, 2004: 211): “They, not the plan, allocate resources” (Gregory and Stuart, 2014: 394). In Stalinist Russia, Five-Year Plans were never operational. Instead, they were composed of preliminary and always-changing plans of ministries, *glavks* and companies on an annual, quarterly and monthly basis (Gregory, 2004: 111). Thus, it would not be correct to describe Stalinist Russia as a planned economy. Rather, it was a kind of administrative command economy (Gregory, 2004). In 1930 Stalin himself argued as follows: “For us the five year plan, like every other, is merely a plan adopted as a first approximation, which has to be made more precise, altered and perfected in conformity with the experience gained in the localities, with the experience gained in carrying out the plan ... The drafting of a plan is only the *beginning of planning*. Real guidance in planning develops only after the plan has been drafted” (Stalin, 1954b: 357, emphasis in original). In Stalinist Russia, all the words of the plan played the role of ritual, propaganda, or vision, serving to justify the un-planned exploitative regime. What was fundamental to Stalinist Russia was not the plan but “the role of administrative hierarchies at all levels of decision making” and “the absence of control over decision making by the population” (Ellman, 2014: 14). The conventional wisdom that Stalin adopted Trotsky’s project of Marxian planning after he purged both Trotskyists and Bukharinists in 1929 is far from the truth. In fact, the Stalinist planned economy emerged from the physical destruction of all the ideas of Marxian planning in the 1920s, including Trotsky’s. However, equating the developed phase of communism with outstripping the economic level of advanced capitalist countries or modernization is a cruel mockery of Marx’s ideal of communism⁵. Stalinist Russia had nothing to do with Marx’s idea of an emancipated society without exploitation and oppression. Just considering the facts, such as a rapid increase in the labor productivity despite decreasing or stagnant real wages in Stalinist Russia (Nove, 1992: 208, 210, 253, 253), is enough to confirm that Stalinist Russia was no less an exploitative regime than a Western capitalist one.

Practices of Planning Based on Labor-time Calculation: Material Balances and Input-Output Tables

The above discussion shows that Stalinist Russia had nothing to do with Marx’s PLTC. However, in technical respects, Soviet experiences after the revolution of 1917 witnessed two important developments in Marxian labor-time planning: material balances and input-output tables. Material balances were

balance sheets, compiled for specific products in physical terms, in order to balance the demand for the products and their availability by comparing the products' supply and use schedules, in which prices played no role. Material balances were compiled and adjusted by the planners and were expected to be useful for balancing the supply and demand of the basic industrial goods, agricultural products, transportation goods, and others without resorting to market prices. Material balances were widely adopted as a major planning instrument in most Stalinist regimes; however, their planners were not able to compile balances for millions of products. At most, they could do that only for hundreds of products, which they considered to be the "commanding heights" of the economy (Ellman, 1973: 35). Moreover, material balances turned out to be less useful for their stated purpose, even for a few select items. Above all, it was very difficult to correctly determine the total quantities of the inputs that were required to produce the outputs, that is, total input coefficients, from material balances, for the latter could not take into consideration all the so-called second-round effects. The latter are the effects of changing one input or output to other inputs and outputs elsewhere in the balance, implying that changes in one part of material balances result in changes throughout the whole (Gregory and Stuart, 2014: 174–5). For example, when more steel is needed, more coal is also needed to produce more steel, which again necessitates more production of electricity, and so on. Algebraically, the second-round effects can be expressed as the sum of $I + A + A^2 + A^3 + \dots$. However, only the first two terms of the sum, $I + A$, can be captured in material balances. This means that constructing a balanced plan is beyond the latter's scope (Hatanaka, 1967: 143). Nemchinov, a leading Soviet planner in the 1960s, confessed as follows: "We have the rows of material balances but not the table – the row is balanced but the column is not" (quoted in Trembl, 1967: 89)⁶. Moreover, Stalinist planners usually compiled the plan from the previous year, using the input coefficients of the previous year, without knowing whether they were optimal minimum quantities of inputs required to produce the unit output. From this, the repetition of existing technology, a fixation on the past pattern of resource allocation, and the dwindling dynamism of the economy were inevitable. Even if the consistent plan, which could balance supply with demand, was found through material balances, there was no guarantee that it would be optimal, maximizing the objectives of planners among all the feasible consistent plans. In fact, Popov, editor of *The Balance of the National Economy of the USSR, 1923–24*, cautioned as early as 1926 that material balances were just "a tool to study structural changes in the Soviet economy", rather than "a tool to implement directive planning of fast industrial development" (Akhabbar, 2014: 196).

As late as the late 1950s, when the malfunctioning of material balances planning became severe, Soviet planners began to seek an alternative in input-output tables. Nemchinov emphasized their merit, while emphasizing that input-output tables originated in Russia (Ellman, 1973: 3)⁷. In 1958, Leontief's seminal work on input-output tables, *The Structure of the American Economy*

(1941), was translated and published in the USSR (Tretyakova and Birman, 1976). Eventually in 1961, the Central Statistical Administration of Gosplan published *The Input-Output Tables of the USSR for 1959*. The main features of input-output tables can be summarized as Equations 5.1 and 5.2:

$$X = AX + Y \quad (5.1)$$

$$X = (I-A)^{-1}Y \quad (5.2)$$

[X: vector of X_i (total output of sector i); A: matrix of a_{ij} (direct input coefficient ($=X_{ij}/X_j$); X_{ij} : sale from sector i to sector j ; in other words, input of sector i to sector j); Y: vector of Y_i (the final demand for X_i)]

By using Equation 5.2, planners can simulate the effects of an alternative mix of final demand, Y, on total output, X. Especially by considering all the second-round effects, $I + A + A^2 + A^3 + \dots$, through the calculation of $(I-A)^{-1}$, input-output tables enables the planning of a consistent set of total outputs, which was not possible using material balances.

However, input-output tables were rarely used for Soviet planning, despite their significant merits. As Belkin, one of the leading planners in USSR, confessed in 1963, “input-output techniques have been sufficiently perfected but are not being used in actual planning” (quoted in Treml, 1967: 102). Even when input-output tables were compiled, they were regarded as just an experiment rather than as an actual planning tool (Treml, 1967: 101). Why were they not put to use? In planning using material balances, planners first set the target of total output, X, while final demand, Y, is determined as residual. In planning using input-output tables, the order is reversed. As Equation 5.2 shows, the direction of causation in planning using input-output tables runs from final demand, Y, to total output, X. Hence Soviet planners criticized input-output tables as a consumer oriented approach incongruent with a Marxian emphasis on production and accumulation. Paradoxically, the pursuit of consistency and equilibrium enabled by input-output tables was not what Soviet planners wanted. Their top priority was to maximize their discretionary power. Indeed, “fear of the abolition of the administrative system of intermediate goods supply lies at the core of the opposition [to the introduction of planning based on input-output tables]. The moment the demand for intermediate goods is derived from final demand in an activity model, the *raison d’être* of the entire administrative supply system, comes into question” (Becker, 1967: 128).

But a grain of salt is needed when evaluating the relative advantage of input-output tables. First, it is not so comprehensive in its coverage of sectors compared to material balances. In fact, the number of sectors compiled in an input-output table was usually about 500 to 600, far short of comprehensive. Moreover, an input-output table is not free from the fallacy of the aggregation of material balances (Ellman, 1973: 32). On the contrary, from the perspective of Marxian communist planning, material balances may appear to be a

better tool than input-output tables. For example, Green (2000) argued that material balances promote the communist ideal of diversity. Indeed, material balances apply different measures of a natural unit, like ton, meter, m², m³, etc., to different products rather than homogenizing them to a single unit, like money or labor-time, which differ only in their quantities. According to Green (2000), “both the Soviet version of ‘material balances’ and future communist planning required and will require, the use of not one, but many separate natural units. The experience of the method of ‘material balances’ verifies that there is no single natural unit of economic planning”. However, considering that input-output tables can be compiled in terms of physical natural units as well as monetary or labor-time ones, the alleged merit of material balances evaporates. It is also not correct to regard material balances as a specifically communist method of resource allocation. Even in capitalism, variants of material balances have been frequently used to allocate some strategically crucial goods when the monetary economy does not work, like during war-time. Material balances may appear to be more true to the Marxian distinction between productive and unproductive labor, for they cover only material productive sectors. However, as Shaikh and Tonak (1994) show, input-output tables render possible an accurate empirical distinction between productive and unproductive labor.

It is impossible to achieve macroeconomic coordination and balance without adopting a single unit of measure that enables the calculation of social averages. Thus, while admitting the need for diversity and individuality, it is crucial to stick to planning using labor-time, at least in the first phase of Marxian communism. Planning without this single accounting unit is simply a contradiction in terms, tantamount to the rejection of planning altogether. From the Marxian perspective of PLTC, input-output tables are all the more indispensable in that only they can provide the necessary tools and data for that task. The main elements of this planning model can be summarized as follows. First, indicative prices of the products, expressed as labor-time directly and indirectly expended for the products, are calculated using Equations 5.3 and 5.4.

$$\lambda = A\lambda + l \quad (5.3)$$

$$\lambda = (I - A)^{-1}l \quad (5.4)$$

[λ : vector of λ_j (labor-time directly and indirectly expended for the production of X_j); l : vector of l_j (labor-time directly expended for the production of X_j)]

It is also assumed that the producers are compensated by the labor certificates, which show how much time they worked (l_j), after deducting the tax for the common use of labor-time, such as investment, collective consumption, support for the disabled, and so on. People submit their consumption plan

for each product before the beginning of the year, considering its indicative price as the labor-time embodied in it (λ_i) calculated by Equation 5.4, as well as their budget, based on the labor certificates they got through their work the previous year. People also submit their yearly labor plan (l_i) which shows their preferred workplace (industry and job) and scheduled labor-time for the next year. Producers also submit their production as well as procurement plans for the equipment, materials and labor before the beginning of the year, considering their announced indicative prices. If the total sums of planned supply and demand for all products and labor are balanced in the simulation, then the system is in equilibrium and labor, production, and consumption are executed as planned. If the planned demand does not equal the planned supply for any good, planners announce a new indicative price: a newly calculated labor-time socially necessary to produce it (λ_i), until the two measures become balanced. The planners raise it for goods with excess demand and lower it for goods with excess supply. When the consumption and production plans are balanced after a few iterations, people draw consumption goods from the social warehouse, obtaining the amount equal to their labor certificate in terms of labor-time. As the above procedure shows, PLTC implies the radical egalitarian principle of equal exchange in labor-time. That is why Soviet planners never attempted to practice this planning using input-output tables, although the tools were available then. Indeed, it conflicted with the interests of Soviet ruling class, including that of their planners (Cottrell and Cockshott, 1993).

Implications for Socialism for the 21st Century

PLTC is one of the essential components of Marx's communism. However, in Russia, it was tried just temporarily during War Communism, marginalized with the transition to the NEP, and eventually discarded after the establishment of the Stalinist administrative command economy in the 1930s. Nevertheless, Soviet experiences left us a valuable legacy for labor-time calculation planning, such as material balances and the input-output table. Despite its failure, the experiences of planning in Soviet Russia can be isolated and reconstructed as an alternative model for actualizing Marxian communism in the 21st century. For that, in addition to their history recounted above, some methodological conjectures are in order. First, it will be useful to clarify the meaning of labor-time for constructing a Marxian model of PLTC. Sometimes it is argued that it should not be social but actual or individual labor-time, for the category of socially necessary labor-time no longer exists in communism where the category of abstract labor or value, specific to capitalism, is abolished (Hudis, 2012). However, PLTC, as was suggested in *Critique of the Gotha Programme*, is unthinkable if the unit of calculation is actual or individual labor-time. In the first phase of communism, where the economy of time to cope with the state of scarcity is still needed, PLTC is unavoidable, and its unit should be social. If the main task of economic coordination in

the first phase of communism is the ex ante equilibration of social demands and social production of goods and services for social individuals on a higher level, and if recovering the metabolism between nature and humanity that has been broken in capitalism, then planning based on socially necessary labor time is imperative. Indeed, all the existing planning models, regardless of whether it is Stalinist or democratic participatory, adopt the average or socially necessary quantities as their yardstick for planning. It also needs to be noted that the category of “socially necessary labor-time” can exist even after the category of value is abolished. As Marx emphasized, not just labor-time, but *congealed* or *objectified* labor-time is value⁸.

On the other hand, privileging of the labor-time planning model as a final or closed model of a post-capitalist alternative society conflicts with Marxian communism that pursues the eventual abolition of labor (Jeong, 2016). Indeed, the historical mission of this planning expires with the transition to the developed phase of Marxian communism. According to Marx, PLTC, characterized by the exchange of equal quantities of labor using labor certificates, is not an absolute principle of communism that should be permanently observed and reproduced, but rather it is part of the remains or “defects” of capitalism that need to be overcome “from the outset” of the first phase of communism. What Marx called defects in *Critique of the Gotha Program*⁹ is nothing other than the principle of the exchange of equal quantities of labor, where “a given amount of one labor in one form is exchanged for an equal amount of labor in another form” (Marx, 1989a: 86). For Marx, actualizing the principle of the exchange of equal quantities of labor has nothing to do with the abolition of workers’ exploitation, not to mention building communism. One of the essential contributions of Marx to a critique of political economy was to prove the existence of exploitation even on the basis of the exchange of equal quantities of labor. It would be alien to Marx to conceive of full-blown communism not as the abolition of value, abstract labor, and labor but as some sort of labor society where the principle of the exchange of equal quantities of labor, using a labor-time calculation planning model, predominates. Indeed, Marx assumed that even in the first phase of communism, the substantial part of the total social product will not be distributed to people according to the labor-time they perform but deducted for the common use “from the outset”: “*Secondly, that which is intended for the common satisfaction of needs, such as schools, health services, etc. [is deducted]. From the outset, this part grows considerably in comparison with present-day society and it grows in proportion as the new society develops*” (Marx, 1989a: 85, emphasis in original). The fetishization of labor-time calculation should be avoided. Just replacing a market price-based coordination by a labor-time calculation is not sufficient to free the system from the law of value. Existing works on reverse transformation, which finds the total labor-time embodied in products, using the input-output tables in price units, mostly show that they are proportional to their prices and that the ratios of value to price, or surplus value to profit converge

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at ‘1’ (Shaikh and Tonak, 1994). If the price of a product is proportional to the socially necessary time embodied in it, just converting the former to the latter by calculating the inverse matrix of input coefficients using an input-output table could neither reveal a novel fact nor produce a new reality. The Marxian communist model of PLTC is inherently contradictory, in that it tends to virtually simulate and reproduce the capitalist labor-value system. Moreover, the calculation of labor-time embodied in a product by solving Equation 5.4 might be accused of committing Adam Smith’s dogma of ‘ $v + s$ ’, as it was criticized by Marx (1978: 446–54), in that it reduces all the dead labor embodied in the means of production that was consumed to produce the product, or constant capital, to the sum of dated labor, and puts them on the same level as living labor: l in Equation 5.4.

It is also important not to forget that the diversity of individuals, with their cultural and aesthetic aspects, is abstracted from PLTC. As Marx noted, individuals “are regarded *only as workers* and nothing more is seen in them, everything else being ignored” (Marx, 1989a: 87, emphasis in original). Indeed, it is difficult for Marxian PLTC to take into consideration all the diversity of human life in an emancipated communist society or ecological issues. In addition, with the radical shortening of the working day thanks to the rapid development of artificial intelligence, machine learning, the internet of things, 3D printing and so on, the scope of PLTC would be substantially narrowed in the 21st century. Admitting the limitations of the Marxian model of PLTC is as important as overcoming them.

It also should be noted that PLTC cannot be equated with the developed phase of Marxian communism where labor is abolished, for it is still the model of the first phase of communism, which just “*emerges* from capitalist society” (Marx, 1989a: 85) and where the “economy of time” is still crucial. With the transition to the developed phase of communism, where abundance will become a reality, labor will also be transformed into activities. Considering that the essence of Marxian communism is not the domination of labor but its abolition, PLTC should be considered a tool for facilitating the tendency of the abolition of labor, rather than the best possible alternative post-capitalist model. It is necessary to promote and extend this tendency – already beginning to operate in the first phase of communism – towards the developed phase of communism through PLTC (Jeong, 2016). The abolition of labor as well as needs-based distribution should be considered a current task that must be tried “from the outset” of the first phase of communism rather than reserved for distant future objectives (Lebowitz, 2015).

However, the above qualifications should not be considered a rejection of PLTC. Far from being incongruent with the developed phase of communism, PLTC is indispensable to the advance of communism to its developed phase. Only by labor-time calculation can a radical shortening of labor-time, the expansion of free time, needs-based distribution, and the abolition of labor itself can be planned.

Notes

- 1 This chapter is supported by the National Research Foundation of Korea Grant funded by the Korean Government (NRF-2013S1A5B8A01055117). Author is thankful to Greg Sharzer for illuminating comments.
- 2 Lenin argued that the “bourgeois state” would remain in the first phase of communism: “under communism there remains for a time not only bourgeois law, but even the bourgeois state, without the bourgeoisie!” (Lenin, 1964: 476).
- 3 While extolling GOELRO (State Commission for Electrification of Russia), Lenin was disdainful of the “empty talk and word-spinning” of debates over planning (Barnett, 2004: 96).
- 4 “Our Soviet society has already, in the main, succeeded in achieving Socialism; it has created a Socialist system, i.e., it has brought about what Marxists in other words call the first, or lower, phase of Communism. Hence, in the main, we have already achieved the first phase of Communism. ... The fundamental principle of this phase of Communism is, as you know, the formula: ‘From each according to his abilities, to each according to his work’” (Stalin, 1978a: 164).
- 5 Barnett (2004: 116) described the entire history of the USSR “as a giant category mistake”, in that “the facts of Soviet history were represented as belonging to one logical type of category, ‘planning’, when actually they really belonged to another very different type, ‘industrialization’”.
- 6 The problem of inconsistency of material balances might not be so severe in the balance of the entire economy, as in *The Balance of the National Economy of the USSR, 1923–24* which attempted to cover the whole economy, because the former is only a truncated part of the latter. However, devoid of an inverse matrix of input coefficients, that is, $(I - A)^{-1}$ in Equation 5.4, even the balance of the entire economy could not handle the problem of inconsistency.
- 7 Leontief admitted that he hinted at the idea of input-output tables in 1925 while he worked for the production of *The Balance of the National Economy of the USSR, 1923–24* in Soviet Russia (Foley, 1998). In fact, the idea of inverse matrix of input coefficients, that is, $(I - A)^{-1}$ in Equation 5.4, which is the essence of input-output tables, can be dated back to the work of Dmitriev (1974), a prerevolutionary Russian economist, published in 1898–1902.
- 8 “Human labor-power in its fluid state, or human labor, creates value, but is not itself value. It becomes value in its coagulated state, in objective form. ... Labor is the substance, and the immanent measure of value, but it has no value itself” (Marx, 1976: 142, 677).
- 9 “But *these defects* are inevitable in the first phase of communist society as it is when it has just emerged after prolonged birth pangs from capitalist society” (Marx, 1989a: 87, emphasis added).

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