

## THE TSSI & MELT: MEASURING AN UNKNOWN QUANTITY USING A FLAWED MEASURE.

*This article has emerged from the conclusion to a recent written debate between a proponent of TSSI and me during which time we tried to move each other's positions. I emerged from this debate more convinced than ever that the TSSI belongs to that interpretive school which has sought to render Marx more profound but instead has ended up debasing his method.*

The TSSI proves what does not need to be proved, namely that total prices in the world economy will equal total value, or what is the same thing their actual cost of production when measured by labour time but avoids that which needs to be proved or at least accounted for, the deviation of prices and values at a local level. To prove something which does not need to be proved while failing to prove what needs to be proved is politely called evasion. It is clear that total prices only balance with total values because the differences between individual prices and values cancel each other out when aggregated. And we should add, this does not occur over the 24 hours of the business (industrial) cycle, but only in the mid-point of the upphase of the cycle when on average commodities are neither overpriced nor underpriced relative to values when aggregated, as opposed to the period of overproduction when they are overpriced or to the period of recession when they are underpriced.

However, as we shall see this is not the main concern. For the purpose of debate let us assume that in fact total prices and total values agree. Let us settle for this abstraction (generalization). So this is what the TSSI has to say. Inputs are fully priced as are outputs. Outputs are larger than inputs because of the additional labour applied to the inputs to produce the final output through a transformation in form (use values). In turn outputs in period  $T^1$  form the inputs of the next period of production or  $T^2$ . So everything is sequential, because despite the best effort of quantum scientists time cannot be made to flow backwards or around and around. So Bravo to the TSSlers, 10 out of 10 for empiricism.

The difference between the output and input in any period is the price of value newly added plus or minus the transference of surplus value. The question is how we connect this price to the underlying cost of production. In fact we cannot do so using the TSSI because of discounts. The very pricing system which needs to be unscrambled makes it impossible to do so. In every industry, bar retail, and then only in the absence of sale-days, discounts abound. The main discount is given by producers to distributors. This discount translates into the margins enjoyed by retailers and some wholesalers amounting to about 25% of the selling price according to the [Stern Business School](#) which I have referenced before.

However we must understand, that if the price of production is orchestrated to achieve an average rate of profit, these prices even after discounts must still be prices of production. Otherwise the discounts would obstruct the equalization of the rate of profit. The problem lies elsewhere. We normally assume prices of production are formed by the transfer of surplus value between industries bearing different compositions of capital. But if it transpires there is a further transfer, this time not caused by the movement of capital between industries altering the balance of demand and supply, but through the very price mechanism itself, then the TSSI is rendered obsolete. This will become clear.

Let us set aside the transfer of value associated with the equalization of profit in order to consider the following; a commodity sells for  $x + 25$  at the till in a supermarket before being taken home to be finally consumed. But for the manufacturer their price of production is merely  $x$ . The 25 represents the margin enjoyed by the distributor which is the obverse of the discount given to the retailer.

So if we were to follow in the tracks of these TSSlers which is not a good idea because they are heading for the undergrowth, we would argue that the price of labour added is the sum of the output prices of production minus the input prices of production. This is false. In the realm of production it would be the sum of output prices plus discounts added back, then minus the input prices.

False again, input prices are subject to the same issues. Input prices can be at final prices or intermediate prices (that is discounted prices) as well. Take a roll of mild steel. It could be sold to a car manufacturer or a steel service merchant (wholesaler). In the case of the former it is a final sale because it is worked up into components, body parts, panels and so on, but in the case of the steel merchant it is an intermediate sale because the merchant will sell it on. In this event final prices (to the auto manufacturer) tend to be higher than intermediate prices to the wholesaler to generate their margin.

And then there is the devil in the money. Inventories (inputs at the start of the year) could be valued differently to inventories at the end of the year because of inflation (the depreciation of money). Some companies value their inventories on the basis of first-in while some adjust them all to last-in, and similar anomalies apply to output inventory. As a result the statistical bureaux subtract what they call IVA or Inventory Valuation Adjustments from profits to cancel out any gains to profit from price rises. This sum is not nearly as large as discounts as it is no more than 4% the size of discounts but it is another nuisance which disturbs prices of production due to the fact that money is not invariable.

It is true of course that input-prices differ from input-values meaning these prices may represent a greater or lesser aliquot share of the labour time of society than the time actually expended on the production of these inputs. Freeman et al quoting Marx seem to think that this changes the value of commodity which consumes these inputs because it absorbs a bigger share of the labour time of society through being priced. I do not subscribe to this view. The price of inputs will add to the output price, certainly, and if they are raised above value, they will tend to elevate the resulting market price of output, but they will not change the actual cost of production. If they did as Freeman et al claim, then actually that disqualifies the TSSI altogether for this very good reason, what they are measuring via MELT is therefore not the actual expenditure of labour, but the share of labour as captured by price. So if the input price is higher than the input value meaning that a greater share of the labour of society will be incorporated into that commodity rather than the labour actually expended on it, then the TSSI will be measuring the former which is not the actual cost of production.

Here is a contemporary example. Due to shortages of gas and oil, power stations are migrating over to using coal which is now cheaper. But coal is less fungible than gas or oil. Gas can be pumped into storage tanks and then drawn off into the furnaces and burnt with little or no ash, with little expenditure of labour. On the other hand when it comes to coal, trains are needed to deliver the coal to power stations, the wagons need to be offloaded, the coal stacked and then delivered to the head of the conveyor belt feeding the power station. After burning, the ash has to be collected and dealt with.

Thus the actual cost of burning coal to produce a megawatt of electricity is far higher than for say gas. However, if the price of coal is well below the price of gas per calorific equivalent, according to TSSI it can have a lower cost of production. How? Earlier we stated that the price of inputs represents not the embodied value of that product but its share of the total labour time of society expressed through money. If the gap between the price of coal and gas is large enough so that the share of the total labour time of society expressed by the input price of coal outweighs the extra labour time needed to burn it, then according to the TSSlers the value of that output of electricity measured sequentially will be lower.

As a rule of thumb sales within a sector, say manufacturing, tend to end up as final sales and sales between sectors say between manufacturing and retail are always intermediate sales. Before the TSSlers challenge us on this point let us quantify how large these discounts are. Most of the GVA for the Retail Sector and the Wholesale Sector arise out of the discounts given to them. Not all, there is some production within these sectors as well which adds value, but this is the smaller part. The issue with wholesale GVA is more complicated because it is home to most goods imports, and this requires an adjustment. Together after adjustments, the total GVA per annum for these two sectors alone adds up to \$3.47 trillion (2019). Erring on the cautious side it reasonable to assume that \$2.5 trillion at least is due to discounts. This compares to the total GVA added by private business of \$18.22 trillion yielding a ratio of 14% or one in seven dollars that year. A considerable and unavoidable sum, and this applies to only two sectors. <https://apps.bea.gov/iTable/iTable.cfm?reqid=150&step=2&isuri=1&categories=gdpkind>

So here is the conundrum. It could be said that the base price of the new output derives from the price of outputs minus the price of inputs. But that cannot equal the labour newly added for three reasons, two of which we will deal with now. Firstly, the output price and input prices are net of discounts, they exclude discounts. Secondly, the output price includes transfers which adjust for the rate of profit. If we take an above composition manufacturer it could both be the recipient of surplus value raising its production price while at the same time being the donor of surplus value via the discount it provides. In some cases it could even be said that the loss from the discount exceeds the gain from the redistribution of surplus value via the equalization process. So while the TSSlers take output prices and input prices as their starting and end points, those prices are subject to more qualifications than their premises allows for.

Paradoxically this controversy does not exist as far as the structure of the national accounts go. Unlike the academic Marxists over the last 40 years, I do pay tribute to Leontief and Kuznets, who steeped in Marxism really knew their stuff and were thereby able to produce authentic accounts tabulating the production of value. The way GDP is arrived at or what is the same thing the value of final sales is as follows. Total sales in an industry, the gross output for that industry is aggregated. Then intermediate sales are aggregated (the ones that flow between the make and use tables). Then intermediate sales are deducted from total sales to arrive at final sales. For a clear exposition this [BEA Primer](#) is unequalled. (See page 4)

Now here is the thing. If in an industry intermediate sales rise, this does not affect final sales. It increases total sales but not final sales. Let us assume the following simple example. Total sales are 3000, intermediate sales are 2000, then final sales must be 1000. If the price but not the value of intermediate sales rises to 2200 then the following applies, total sales rise to 3200 less intermediate sales of 2200 equals final sales of 1000.

This must be the case. The price of final sales has to be equal to the sum of the profits, taxes, interest, depreciation, and worker remuneration for that industry. If the price of inputs were to add to the price of final sales, then the sum of profits, taxes, interest etc. would no longer correspond to the price of final sales. There would be an amount left over which could not be accounted for. Thus if the TSSlers use the national accounts as they do, the issue of the price of inputs altering the 'value' of production added is unjustified.

Of course there is another issue. The way inputs as categorized by the BEA and others is not the Marxist concept of inputs, which is limited to circulating constant capital comprising materials, energy, components etc. all of which are worked up to produce commodities for sale in their finished form. On the other hand, the statistical bureaus also include inputs derived from revenue or what is the same thing

expenses found on the Profit and Loss Account. They include outsourced services such as accounting, advertising, marketing, payroll, and a host of others. These are normally found in the category 'Purchased-services inputs' in the intermediate sales section alongside Energy inputs and Material inputs. (To confuse matters even more, certain service inputs such as software used in the manufacturing process should be treated as circulating constant capital.)

Not all expenses are outsourced and therefore categorized as intermediate sales. Some are provided in house by employed workers. These in-house expenses are therefore treated differently. The reason for all of this is that the bureaus identify as Marx did, that the chain of value in all the privately produced links, will add up to the value composing the final sale. That this in turn can be broken down into its paid and unpaid parts, that is undivided profit plus worker remuneration. Thus output prices less inputs and expenses will yield the price of 'value added'. Or more simply, the totality of money coming in (output prices of production), less all the money going out bar wages, yields the value added by that industry.

The conundrum of course is this. The inputs to be worked up are paid out of capital (previous labour) while the service inputs (expenses) are paid out of revenue (current labour). So if we take  $T^2$  the inputs to be worked up come from the previous period  $T^1$  while the expenses come from  $T^2$  itself. The former therefore is a deduction from the labour newly added, whereas the latter is not. Thus if we were to merely deduct input prices from output prices to determine the price of labour newly added we would encounter three known unknowns. The first is the discounts on both sides, the second is the transfers associated with the equalization process and the third is the expenses being deducted. All three will individually and collectively tend to divorce the price of output added from its actual cost of production. Of the three only one is directly reversible which is expenses whose origins and destinations can be tracked in the input-output tables or make and use tables.

Discounts are the big problem. Sure the Stern Business School samples these discounts but there is no system for registering these discounts except indirectly by including all those sectors where the distribution of commodities takes place but not their production. It is vast as was demonstrated above, and of such statistical significance as to render any conversion of price into value redundant. In effect therefore, the TSSI can only work at the level of the whole economy where transfers and discounts are irrelevant, but that defeats the purpose of the TSSI which is to connect values to prices sequentially at a local level once output is priced.

In sum it is questionable whether nor not the national accounts support the single system upon which the TSSI depends and whose data it uses for the purposes of analysis. Instead it is closer to Marx's methodology found in Volume 2 which is designed to ensure that value is not duplicated in the form of repeatedly adding the input prices to subsequent steps in the chain of production. In fact it seems that the single system is a system prone to duplication because of the overlap of inputs and outputs.

Where there is no duplication the value of the final sale represents only the cumulative value added by each step in the production process as illustrated in the table below. Step 1 has a 0 input out of necessity otherwise we would be assuming infinite steps.

Table 1.

Steps	Input price	+ Value added	= Sales Value	Value of final sale
(1)	(2)	(3)	(4)	Columns 4 - 2
T1	0	20	20	
T2	20	20	40	
T3	40	20	60	
<b>totals</b>	<b>60</b>	<b>60</b>	<b>120</b>	<b>120 - 60 = 60</b>

Duplicated sale prices add up to 120 (column 4) but the value added is only 60 which happens to be equal to the value of the final sale priced at 60 as well. If we now introduce irregular amounts the value of the final sale does not change for reasons previously explained when discussing the structure of the national accounts.

Table 2.

Steps	Input price	Value added	Gross Output	Value of final sale
(1)	(2)	(3)	(4)	Columns 4 - 2
T1	0	30	30	
T2	30	20	50	
T3	50	40	90	
<b>totals</b>	<b>80</b>	<b>90</b>	<b>170</b>	<b>170 - 80 = 90</b>

It is clear the national accounts are not a single system set of accounts where inputs feed into the current period of production be it measured monthly, quarterly, or annually. Rather the system of national accounts is a single period system of accounts where previously produced inputs are deducted to remove any influence they have on current output. Moreover, as the primer shows, GDP or Gross Domestic **Product** concerns itself with production. While it is formed from final sales, those final sales are adjusted by deducting the inventory brought forward from the previous period or year and by adding in the inventory on hand which will be carried forward to the next year or period. In this way final sales are reduced to sales produced during this current year or period. This inventory adjustment conclusively reveals the statistical bureaus' intention to insulate the current period of production from previous periods of production. It can be described thus [T<sup>1</sup>] [T<sup>2</sup>] [T<sup>3</sup>] where every period is walled off. In doing this the national accounts reveal more fidelity to Marx's method than does the TSSI.

**MELT.**

Assuming that we have adjusted the 'current value added' for the three unknowns listed above at the end of a period, could we then convert the 'value-added' in its price form into the actual expenditure of labour time. That is can we connect these prices to their actual costs of production. The TSSIers say yes, all we have to become are MELTers, using the Monetary Equivalent of Labour Time as the standard to measure this difference. MELT is obtained by dividing the aggregate Net Product by the aggregate number of physical hours needed to produce this product by productive workers. This yields the price of output per hour worked. (Net Product here is value added less depreciation.)

And for forty years Marxists have been using this flawed metric because MELT makes no distinction between economic hours (or compound hours as Engels called it) and physical hours. It is one of the

foundations of Marxism that labour of differing skill will produce value of differing magnitudes. Thus a skilled worker generates more value in a given time than an unskilled worker. We need not go into how skill is evaluated and therefore how these expressed values differ. Suffice to say both Engels and I guesstimate that the aggregated gap between the least and most skilled is about three, meaning that in the same time, the most skilled workers will produce three times more value than will the least skilled. Taking this into account, let us settle for the following proxy, in aggregate therefore, the total number of economic hours is likely to be double that of physical hours.

Fine will say the MELTers, instead of dividing the Net Product by  $x$  hours we will divide it by  $2x$  hours, all that has happened is that a unit of MELT will be half of what it used to be, which will not break the bond between money and labour time only adjust its measure. At a global level that is true. But that part is actually the lesser problem, it is at the local level where it falls apart. Just as the composition of capital differs between industries because of specific technical requirements, so too does the composition of skill (to steal a phrase). In some industries the density of higher skills will be above the average and in other industries it will be below the average. Generally the density of higher skills will be above the average in the above average composition industries and the density of skills will be lower in the below average composition industries, say engineers and technicians in manufacturing vs seamstresses and cutters in the garment industry.

Thus what is required in each industry or sector is to create a coefficient of skills so as to convert the physical hours expended in that industry into its unique set of economic hours. Were this to be done one would no longer be comparing apples to oranges. But this has never been done from what I have seen.

Why is this important? In an above average composition of skill industry, the crude MELT based on physical hours would necessarily underestimate the value being produced in that industry and vice versa in an industry with below average composition of skill. Why, because in the above average composition of skill industry with its higher ratio of economic hours, more total value is being produced per physical hour than would be produced in below average composition industries. Thus, assuming an average rate of exploitation of say 100%, more surplus value will be produced because of the higher proportion of economic hours, meaning proportionately less surplus value will need to be redistributed to equalize the rate of profit.

It is important at this point not to confuse economic hours with productivity. Yes, a skilled worker is more productive of value than a less skilled worker. But here we are not discussing changes to productivity but existing or established differences to productivity. We could of course model changes to productivity, but this is unnecessary here though essential in a broader analysis. (In another context further below I do introduce an element of this when discussing the basket of goods which forms the price of labour power.)

Nor is it true that successive TSSI periods and the prices they produce automatically captures productivity changes correctly. This is a complex process, especially if productivity increases are due in part to upskilling, which would mean that economic hours increase together with the volume of production diluting the increase in productivity, as compared to physical hours which may not have increased at all. (Productivity is expressed as priced output divided by physical hours.)

Thus the TSSI fails to properly quantify total prices then uses a flawed measure to convert these prices into costs of production measured by labour time.

### A quick word on the price of labour power.

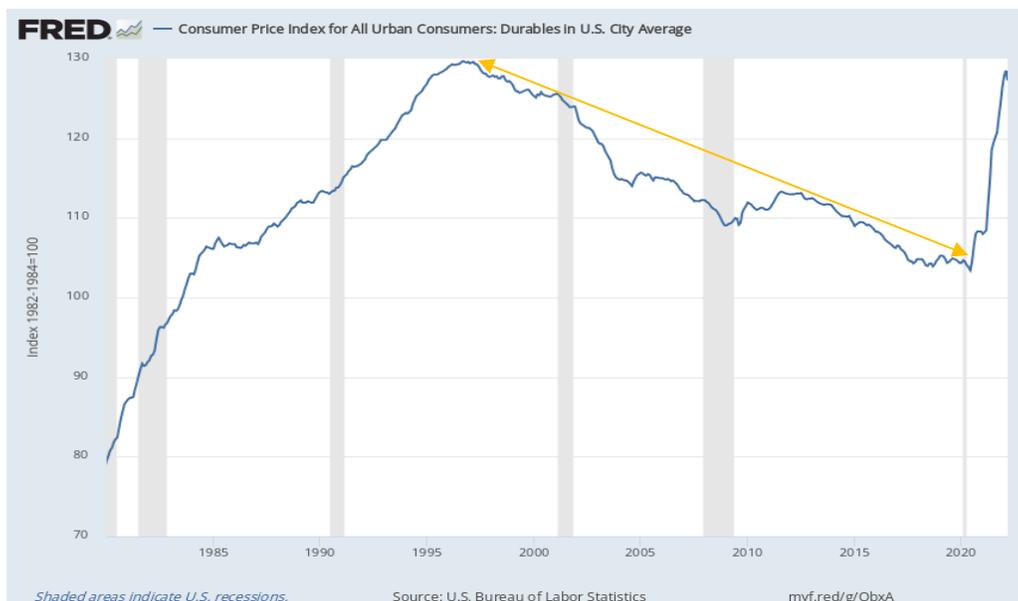
All that the application of MELT to worker remuneration achieves is to arrive at the average price of labour power. Marx's approach was indirect not direct, labour power was to be measured on the basis of the basket of goods that constitutes the standard of living of workers. By standard of living Marx meant both the biological and cultural measure of the value of their labour power. By cultural we mean the gains and losses deriving from previous class struggles. Marx's approach is the correct one because it is only changes in the value of the components of this basket which can affect the value of labour power.

As I showed in the following [article](#), due to the movement of surplus value from below average composition industries to above composition industries, consumer goods intended for workers consumption are usually underpriced. Department 2A which produces these commodities tends to be populated with firms who have below average compositions of capital and below average compositions of skills. In addition, these products lend themselves to mass production and therefore economies of scale which further reduce their prices.

Thus on balance it can be said that consumer goods of this category are underpriced relative to their value, and thus if workers monetary income remains constant, they can purchase more of these products thereby elevating their standard of living. Under these circumstances it can be said that the price of labour power stands below the value of labour power. In the article cited I therefore developed a new metric, the rate of unpaid labour, namely the price of labour power relative to the price of output. I show how it is that the rate of surplus value amounting to 300% when measured by value translates into a rate of unpaid labour which amounts to 400%.

The extent of this underpricing of consumer goods relative to value can be seen in the graph below, where thanks to globalisation and the integration of China, a rapid and sustained fall in the price of this class of consumer goods took place. No doubt these container loads of cheaper consumer goods also helped defuse the class struggle which otherwise could have erupted due to stagnating wages.

Graph 1.



What MELT combined with the TSSI tells us is the number of physical hours worked by workers which are paid. It thus yields the rate of exploitation in price terms which is not insignificant. But what it cannot do, and which is the object of the exercise in the first place, is to inform us what share of the labour time of society is actually expended by workers reproducing themselves, rather than the share of the total time commanded by their monetary wages. In other words it is stuck when it comes to connecting the value of labour power to its price which can only be determined via the basket of goods and their price of production. It simplifies complexity in a way Marx's approach forbids.

### **Simultaneous vs sequential.**

I have shown that in the realm of the national accounts there is no single system. If input prices which diverge from values were allowed to infect the value of final sales, that is add value to or subtract value thereby modifying the final sale price then the 'value added' by these final sales could not equate to the sum of undivided profits plus remuneration upon which GDP is based. (Undivided profits means gross profits before the division of these profits into interest, rent, taxes and enterprise profit.) It is no coincidence that final prices or what is the same thing the sum of prices of production equates to profit plus wages paid earned in that industry.

Were input prices to modify final prices we would end up with duplicated value at a local level, though at an aggregate level the plusses and minuses would cancel each other out. (It is worth adding that the BEA's revision of methodology, I think about 14 years ago, reconstructed the National GDP as the sum of industry GDPs, because they found it reduced duplications.) So for example if the following applied, total sales rise from 3000 to 3200 because input prices rise from 2000 to 2200 but somehow that additional 200 finds its way to final sales raising them from 1000 to 1200, what would happen. Well this duplication would result in final sales being overvalued because  $3200 - 2200$  cannot yield 1200.

No home for this extra 200 in final sales could be found. Total income would exceed total product. GDP of 1000 would now be GDP of 1200. Instead what really happens is this. Assuming input prices rise by 200, it should mean that the price of output of one of the suppliers producing this input has risen. Let us say this is a gas supplier which at the moment is topical. Here the GDP of the energy industry, the seller, would increase by 200 but leave the final price of the buyer's GDP unaffected. (Of course it will reduce the buyers profit margin all being equal.) Thus what has been achieved is the lack of duplication, the 200 has been accounted for in only one industry, not two.

I have been attacked for being a simultaneoust. This is the equivalent of serial criticizing parallel. The TSSI method is serial, that is sequential, while the method of a simultaneoust is not parallel, that is value and price exist side by side. Prices and values are neither serial nor parallel. To assume they are, is the equivalent of saying the outward appearance of a thing is not shaped by its internal essence interacting with outside forces. Of course they are connected albeit in a manner which is elastic. The following analogy captures this complex process. Prices of production move within the gravity-well formed by value, with their orbits tending to be disrupted by changes to the gravity well itself caused by incessant movements within the galaxy of capital. But what never happens is for the gravity-well itself to dissolve.

Mathematics can be an obstacle or a solution, it all depends on assumptions. So let us examine these assumptions. The first assumption is that the commodity is a product of labour, but one circulated by capital. As the property of capital the market price so formed must meet the needs of capital, that is to

say, market prices must end up equalizing the rate of profit. Thus prices will necessarily diverge from values.

We know a commodity is never priceless, it either has a cost price or a selling price. The cost price represents the paid costs of production. The selling price represents the actual cost of production. In the former case the capitalist pays out money, in the latter the capitalist receives back money. Because the actual cost of production (the cost to the worker) exceeds the paid costs (the cost to the capitalist) the capitalist receives back more money than is paid out. The difference, the surplus money represents the unpaid element of labour which is the source of the capitalists undivided profits (surplus value).

However because of unequal exchange, which is the norm, the money received may be overpaying for the actual cost of production or underpaying it. This means that one set of capitalists may be paid for more labour than their employees produce, while another set may not be paid for all the labour of their employees, but in a manner where the local gains and local losses cancel each other out at a global level. This being so, prices do not equate to values at a local level. But for prices to deviate from values, money as the universal equivalent must have a social value prior to the individual values being exchanged.

The central assumption therefore is that all products of labour, that is commodities usefully formed, have a value (actual cost of production) and a price and that the cost emerges from the production process itself prior to exchange. Let us use a scientific expression, the production process yields latent value forming the potential for price. While it is true that the actual cost of production is latent, that is it is only realised at the time of sale when monetized, it is never absent. If an insured factory burnt down, the insurer would have to reimburse the owner for the lost means of production – the structure, equipment and machinery, as well as all inventory – plus the loss of profit, all of which would have to be confirmed by the accounts of the business. The dual and contradictory character of the commodity, as a product of labour circulating as the property of capital, must be expressed in its dual connected form as value and as price. Once produced, a commodity has an actual social cost which it never loses.

The key is to be able to construct the connection between market value (cost) and price at a theoretical level which I have done. I have shown that it takes a [double-solution](#) to convert market values into prices and that this double solution both [reprices](#) capital in a way that appreciates above average composition capitals while depreciating below average composition capitals. If we take the TSSI and apply it to Table 5 in this article, then cost price would be 681 compared to cost price in value terms of 600, while the profit would be 219 compared to the surplus value of 300.

Total value still equals total price at 900, but at a local level the TSSI cannot account for the value of each commodity. Let us say that the social product of 900 is equal to 900 hours. MELT in this case would be 1. If we take Capital (1) in table 5  $T^0$  would be 300 and  $T^1$  would be 449 assuming simple reproduction. On this basis the price of the labour newly added would be 149. In Table 2 based on market value,  $T^0$  equals 200 while  $T^1$  equals 300 yielding value added of only 100. If we take all three capitals, then in terms of price the difference between  $T^0$  and  $T^1$  is 600 but only 450 when measured by value. The difference is accounted for by the change in inputs which are 450 in  $T^0$  when priced and only 300 when valued.

It is clear the single system has led us astray despite being temporal. Due to the fact that it is based on [money-commanded-labour-time](#) the share of the total labour time appropriated by Capital 1 in aliquot terms amounts to 49.9% when priced but when measured by the expenditure of labour time it is only 33.3%.

### **The problem compounded.**

We are thus left with the uncomfortable conclusion that both the quantity to be measured is wrong, and that it is being measured by a defective standard.

I have always approached Das Kapital in a multi-dimensional manner. For me it is not only a critique of capitalism, it is also a primer for communism. By teaching us how to interpret the convoluted capitalist pricing system it prepares us for constructing an objective pricing system in the future where prices are directly connected to weighted average labour times or what is the same thing, the actual cost of producing a use value. It allows us to untangle the prices of production without which conscious planning is impossible.

In the correspondence over this issue, I was asked why it is necessary to have a dual solution, why in other words it is necessary to reprice capital. My answer is this, the difference between abstraction and forced abstraction, is that the former is real, and the latter is unreal. With the latter it is impossible to move back to the concrete, or if this movement does take place, then the concrete is described noticeably different to the actual conditions.

In reality the transfer of value can only take place via the medium of circulating capital, actual market prices yielding cost prices, and if that is the case, then of course output prices must become input price ala the TSSI, which is why I found this comment surprising coming from a supporter of the TSSI method. Marx stopped short of doing a double solution which is why his tables based on simple reproduction always revert back to 100 per capital once the capitalists have unproductively withdrawn their 120 in profits. Or to put it this way his commodity prices are reduced back to their underlying market values. This being so, the total transfer of value must exceed 120 if capitals are to be priced and no longer revert back to 100 (a looping abstraction).

Thus my double-solution is correct and corresponds to reality. True it does not explain the totality of the global economy, but then its ambitions are more modest, to connect at an elementary level, the market value to its price under given conditions of exploitation and composition.

The question is now posed; how we proceed in real life and in real time to examine the global economy which is both more complex and dynamic. However, the statistical bureaus have done half of our job for us with their collating of “value added” per industry thereby avoiding duplication more or less.

In determining the Net Product to be analyzed we should use Domestic Business data, where we need not separate out productive from unproductive industries because here, we are examining the metabolism of capitalism itself not merely reproduction. Although the statistical bureaus continuously use the term “value added” this applies only to productive industries, and not to unproductive industries where “value transferred” should be used. Nevertheless as we shall see total value added is the sum of value added plus value transferred within the domestic economy.

Step 1. Our base period would be the ‘phase of rising prosperity’ located in the up-phase of the cycle as this is the only time total prices equate to total values.

Step 2 Estimate economic hours and use it to calculate MELT-EH which is the net product divided by total economic hours.

Step 3. Calculate the average composition of capital.

Step 4. Calculate the average rate of exploitation.

Step 5. Calculate the composition of capital in individual industries and by how much it differs from the average.

Step 6. Using the density of skills for that industry calculate the economic hours expended there and by how much they differ from the average.

Step 7. Weight the aliquot share of labour time per industry by dividing its economic hours into the total number of economic hours. This sizes the industry in terms of labour time and value.

Step 8. Using the average rate of exploitation calculate the likely amount of surplus value produced by workers in that industry. The higher the density of skills the higher the quanta of surplus value. (This is weak step, because at this stage the full quantum of industry specific surplus value is not known.)

Step 9. Using this, solve for the indigenous rate of profit. Determine by how much this indigenous rate of profit diverges from the average.

Step 10. Using the weight of the industry, and the deviation of its profit rate from the average, calculate the amount of surplus value needed to be redistributed to it to equalize its profit rate.

Step 11. To this redistribution of surplus value formed by the equalization process return the value transferred by inputs other than the inputs to be worked up.

Step 12. Reverse discounts and add back their value to the productive industries. (By now much of the 'value added' in unproductive industries will have shriveled up while the 'value added' in productive industries will have swelled.)

Step 13. Convert the new 'value added' in the productive industries into labour time by dividing the value actually produced there into labour time via MELT-EH.

I never said it was going to be easy, but it can be done. All we need is a mass movement of statisticians.

The TSSI constitutes a commanded labour time species which the National Accounts seeks to avoid. Whatever quotes supporters of the TSSI assemble from Marx to claim he was in support of a single system; I believe fundamentally that Marx would have recognised that a single system invariably leads to the duplication of value in its price form. Had the statistical bureaus adopted this process they could never have created industry (local) level accounts because the 'value added' in that industry could not be mated to the final prices emerging from that industry, nor would the sum of profits and remuneration produced in that industry in their price form correspond to these selling prices.

I propose it is time we moved on from the narrative around the transformation problem dominated by TSSI and MELT.

**Note 1.** I do not think it necessary to engage with the controversy over adopting Net Output rather than Gross Output or  $v + s$  versus  $c + v + s$ . It casts no light on the subject under discussion. The same criticism applied here to the Net Output would apply to the Gross Output.

Brian Green, 16<sup>th</sup> March 2022.