LETS GET PHYSICALIST WITH THE TSSI METHOD.

TSSI stands for the Temporal Single System Interpretation. Really it should stand for the Temporary Multi System Interpretation given all its variants. I consider it a capitulation to the criticisms levelled at Chapter 9 of Volume 3 where Marx investigates the Transformation Problem. It has achieved two things; re-ordered Marx's assumptions while failing to stop the original criticisms levelled at Marx. This article is a criticism of TSSI and why it needs to be shunted out of the Marxist lexicon.

While the proponents of TSSI engorge their articles with mathematics, this article does not. The reader will find an attached worksheet which does all the work and whose results appear as easily read graphs on these pages. When mathematics is set the task of solving a wrongly posed problem, all it ever achieves is to give greater precision to the original error. Mathematics cannot be used to derive assumptions, rather it is the assumptions that directs the maths, and when those assumptions are incomplete or unbalanced, then the maths will draw incomplete or even false conclusions.

I have recently submitted a more elaborate manuscript on this question to the journal *Historical Materialism.* For those who have read the articles on this website know, it is possible to answer the criticisms levelled at Chapter 9 using Marx's own assumptions. To the proponents of TSSI this is called the physicalist approach. However, I can assure them that commodities always exist simultaneously in 3 forms, as use values, as market values and as prices of production. This corresponds to a society where workers labour without owning their product. This alienation results in their products of labour circulating as products of capital, at prices which rewards profits instead of labour.

It is only when this inner connection is shown in a closed system, as Marx did in Chapter 9, can we move on. If we cannot show the set of values that corresponds to a set of prices in such a setting, then we cannot sustain the view that prices have their origin in value. This the temporalists have failed to do, they have abandoned the battlefield, only to get lost in the woods.

The many ways prices deviate from values.

Before proceeding to criticise the TSSI the reader needs to be acquainted with the terrain on which Mister or Mistress price carries out their merry dance. The norm in a capitalist economy, is for exchange to be unequal, that is to say, the monetary equivalent received exceeds or falls short of the value of the commodity sold. We will be examining what causes price to rise above or fall below value.

This examination is confined to the US manufacturing sector for the period 2011 to 2016. Because the data is so detailed, 2016 is the last year all the data is available. Instead of hours used, number of workers are used, because the same detail does not exist for hours. The standard against which all the specific industries will be measured is the aggregate for manufacturing as a whole. Where it appears, it is represented as a broken line to distinguish it.

There are 8 individual industries, 4 above average and 4 below average, when measured by their composition of capital or c/v. They are:

| Above	Below
Fabricated metal products	Furniture & related Products
Machinery	Food, beverage and tobacco products
Motor Vehicles	Textile Mills
Chemical Products	Apparel, leather and related products.

Marx determined, correctly that market value equates to c + v + s while price equates to $c_p + v_p + p$ where $_p$ indicates that values have been converted into prices and s into that amount of profit needed to attain an average rate of profit. Immediately we hit a problem with most of the proponents of TSSI. They only concentrate on productive workers to the exclusion of unproductive workers when determining their v in labour hours. It is true of course, that only workers who engage in the production process produce profits. And it is equally true that the workers employed to circulate and administer these commodities cost profits (they are unproductive).

The capitalists are aware of this distinction. Capitalists may not understand what makes their cars run, why they tend to break down so often, and why their performance is so erratic. But they do know how to steer, brake and accelerate. Otherwise capitalism would have been a car wreck from inception. Their experience of production and circulation has informed their Set of Accounts. First the Trading Account which is based on sales revenue less cost of inputs and production-line wages. This yields their gross profit. This gross profit is then transferred to the Profit and Loss Account, where the wages of the unproductive workers such as those employed in sales, marketing, admin, buying, accounting and so on are deducted. This reduces gross profit to net profit which is transferred to the Balance Sheet to add to the existing capital found there after the deduction of interest payments and tax.

The capitalist employer is aware that the working capital needed to be advanced, must not only cover the wages of workers in the factory but the wages of the office workers as well. Marx and Engels were aware of this as well and they discussed this often in Section 4 of Volume 3 when examining commercial capital. At no time did Marx ever suggest that the wages paid to commercial workers, office workers included, was not paid out of capital. Indeed, they also recognised, as on page 413 of the Penguin Edition, that the growth of commercial workers relative to industrial workers, increased variable capital while failing to increase profits.

Unfortunately, most of the proponents of TSSI consider that variable capital (v) applies only to the wages expended on productive workers. We do not make that mistake. The figures provided in our first graph does not distinguish between the two. It even includes the wages of senior managers. (Total compensation is composed of both wages and benefits such as health care.)

Graph 1.
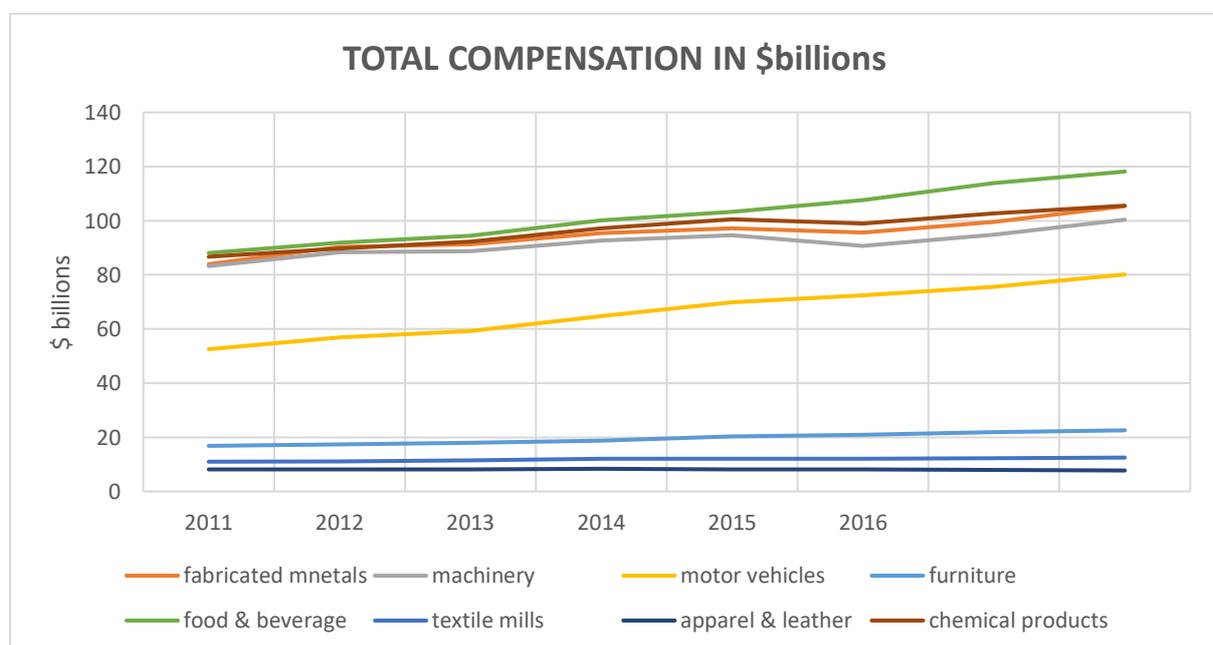
This is the least important graph which is used for comparison purposes providing a rough sketch of the size of each industry. What is interesting is how diminished the bottom three industries are by international competition, all of whom are low value and low tech (composition), thus industries with the lowest capital thresholds.

The following graph is more interesting. It plots the differences between the rates of compensation per worker in each industry. The average for the industry is around $80,000 p.a. - the broken blue line. The two most skilled industries lie above it, chemical and machinery. All the others lie below it, including motor car manufacturing. Predictably, the three low-tech, internationally based sectors - furniture, apparel & textiles - have the lowest wages, approximately one third that found in the chemical industries populated by huge automated refineries.

Graph 2.
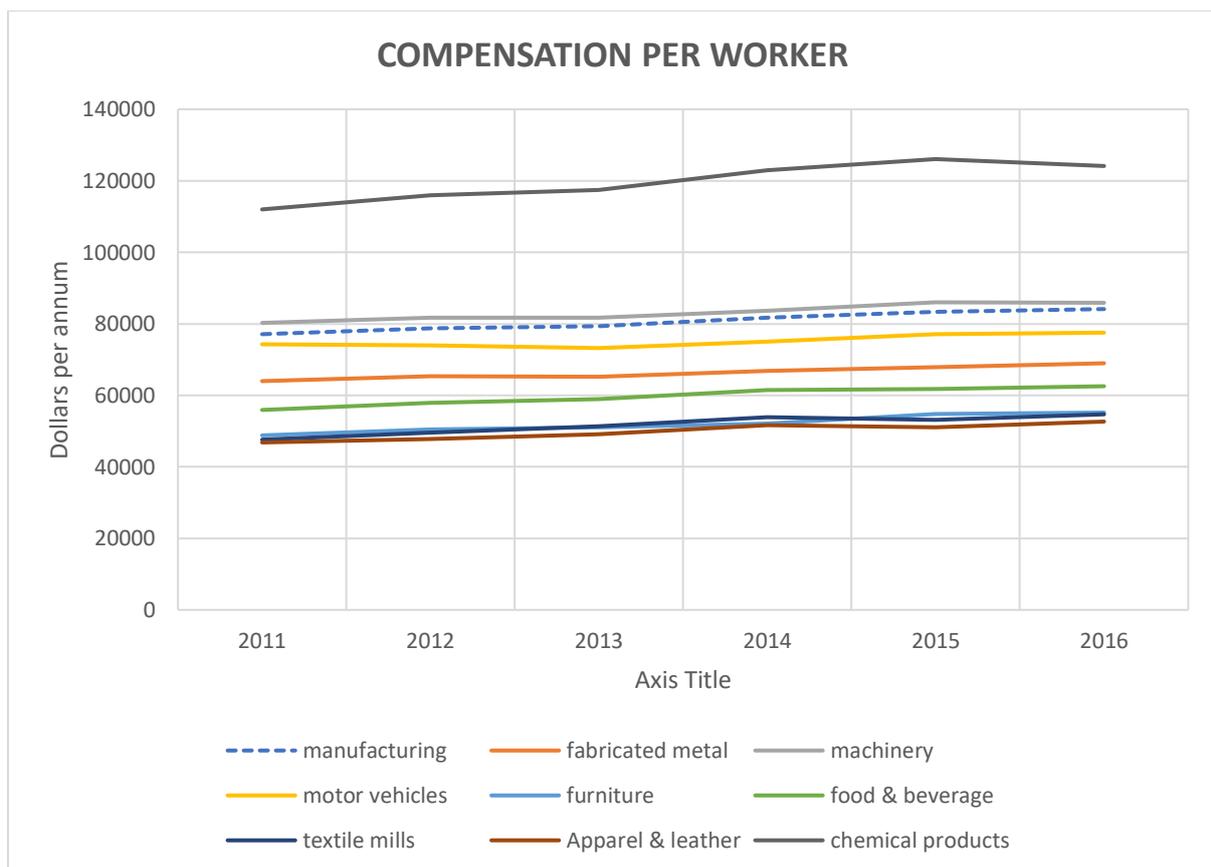
This dispersion of wages is important. Its main driver is the skills required to operate the means of production. All of the industries above, including the lowest, resides above the average compensation levels in the USA which amounted to $46,640.94 in 2016. https://www.ssa.gov/OACT/COLA/central.html Thus it is likely we are not viewing the price of labour power being depressed below the value of labour when taking a general view of these industries. However, within all of these industries, wage rates would vary significantly.

The key factor is skill. No Marxist who has studied this factor denies that skilled labour can be quantified as a multiple of simple unskilled hours. Thus, if we had to add up all the hours worked in a year it would not amount to the number of physical hours as counted by the Bureau of Labour Statistics. Economic hours are not the same as physical hours. For argument sake let us say the physical figure recorded is 1 trillion. But we know that some labour is unskilled, some semi-skilled and a

minority skilled. Therefore, the total number of hours adjusted for skill must be more than 1 trillion. It could be 3 trillion. They key thing is that the total number of hours will have to be a weighted figure. By this we mean each skill would have to weighted by the number of workers within it. In turn their output would be added to the weighted outputs of all the other skills. Only once this is totalled up and divided by the number of physical hours could we arrive at the weighted average hour. It could be for example 1.6 rather than the average of 1. This would of course require a lot of number crunching.

Why is this important? It is important because of MELT, or what is known as the monetary equivalent of labour time. This measure is needed to translate prices back into values. It attempts to translate the prices of production into labour hours which is the source of value. At this stage it could be argued that as only productive workers produce value, only the aggregate hours worked by productive workers can enter into the calculation. There is merit in this argument, but it misses the point. Whether the hours of chosen relates exclusively to productive workers or not, the proponents of MELT are still working with averages, and not with the weighted averages needed to account for variable skill within the computations.

There is another problem when we move away from aggregated figures, where no differences exist because differences balance. And that is a specific disturbance that is caused at an industry level, by the price mechanism itself which affect the total price of output in that industry. This has to do with mark up. In order to sell their products, industrialists must give distributors an inducement to sell their product. The discount offered in turn forms the mark up of the distributors which after paying their costs leaves them with a profit.

What governs these discounts is the profit yielded, which tends to be the average for the economy. However, while average profits may emerge the same cannot be said for the costs of distribution. Costs can never be average. Some things take more time, effort, and resources to sell than other things. Thus, discounts or margins vary significantly between industries. This can be seen when viewing the gross margin column on the attached spreadsheet prepared by the Stern Business School attached to the New York University.

We see a variety of margins. What is the significance of this? Well, it depends on whether the industry within the manufacturing sector above sells directly to an end user or indirectly to a middleman who sells it on. The longer the wholesale/retail daisy chain the bigger the cumulative discount. And when discounts are given, then the value added per worker is reduced because part of that value has been transferred to the distributor. In the industries we are investigating it is likely that the least discount given occurs in the machinery, fabricated metal and chemical industries who tend to sell their products to users. So, a fabricated oil tank is likely to be sold to an oil company, and machinery to other manufacturers for use, while higher discounts are given for food and Apparel.

The point being made, is that it is extremely difficult to account for the value produced in any industry without reclaiming the value lost to that industry in the form of discounts.

But this is not the only loss or transfer of value. A bigger loss occurs from outsourcing or buying in services from other industries. In order to prevent double counting, the statisticians deduct the value of the expense in the industry which incurs it in order to add it as revenue to the industry providing that service. Take my favourite - advertising. The manufacturing industry buys more advertising than any other industry by far. This advertising is deducted from the value added in manufacturing so that it can form the value added of the advertising industry.

This is where the bulk of money for Facebook and Google comes from. Facebook and Google provide free to use services. Consumers do not pay for these services. So where does the money come from

to pay their workers and provide them with monopoly profits? From the productive workers in manufacturing who pay for this advertising. The workers in Ford and General Motors, Procter and Gamble, Pfizer, Dow Chemicals, Boeing, and so on who are all located in the manufacturing sector. The manufacturing sector would be much larger without these deductions and the service sector much smaller had value produced being utilised rather than value transferred.
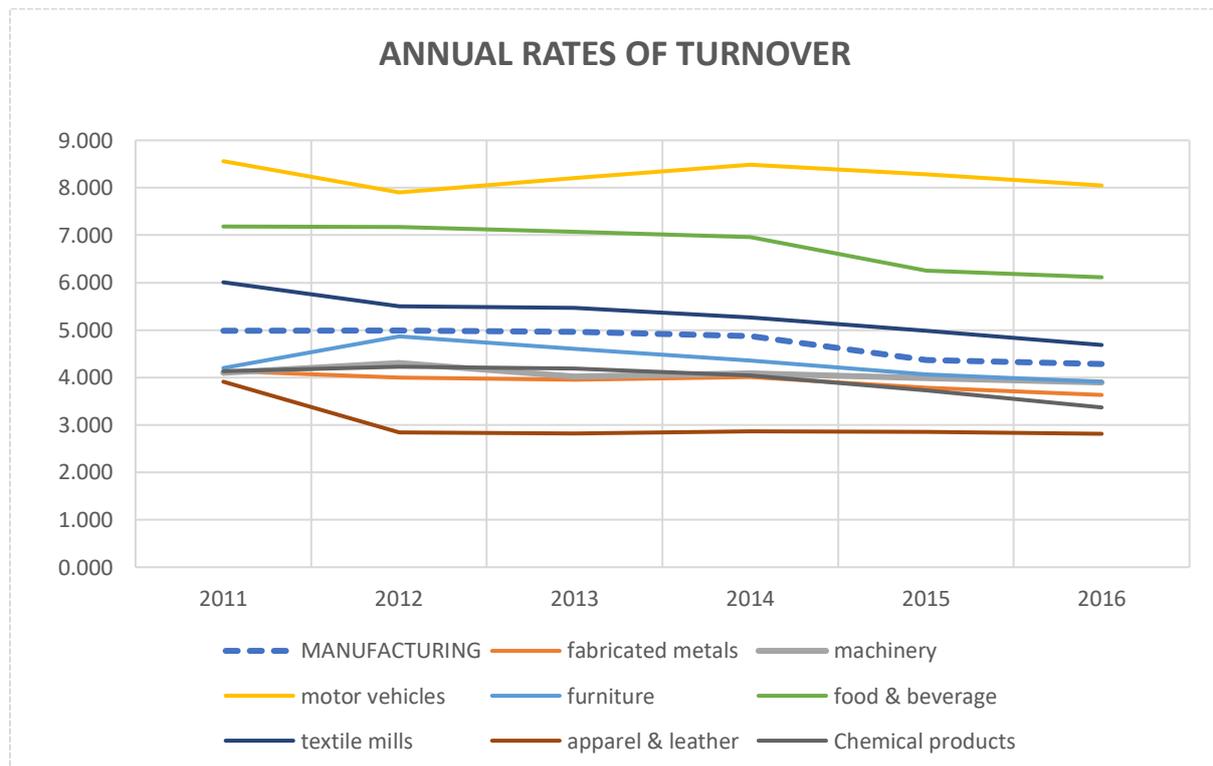
Returning to discounts, both cost prices and selling prices are distorted by these discounts. This is the big problem. With regard to c, which comprises inputs plus depreciation, inputs enter into the corporation's inventory at a price, generally below its value because of these discounts. This is particularly prevalent in the wholesale and retail sector. Thus, the c + v + **S** which populates individual industries waiting to be converted into labour hours (by TSSI) is meaningless.

The turn of variable capital or v to be misstated.

The proponents of TSSI confuse annual compensation with variable capital. As we shall see they are not the same. Graph 3 below sets out the differences in the annual rates of turnover found in the eight industries. Three are above the average for manufacturing as a whole, while five sit below. We are unconcerned in the fall in the rates over the 5 years. Motor vehicles had a rate of turnover of 8.6 in 2011 food and beverage 7.2 while the bottom four were grouped around 4.0 or half the rate of motor vehicles.

If we translate the annual rates into the days measured by each period of circulation, the following obtains. For motor vehicles each individual period is 42.4 days (365 days/8.6) while for apparel it is 93.6 days (365 days/3.91). This is the period of time between the purchase of the factors of production and the sale of the resulting commodities produced. It marks the period when cash goes out when it is replenished with a profit. It describes the capitalist social relation. Capitalist employers do not need to cover wages for 365 days but for only 42.4 days for motor vehicles and 93.6 days for apparel.

Graph 3.

ANNUAL RATES OF TURNOVER

Legend: MANUFACTURING, fabricated metals, machinery, motor vehicles, furniture, food & beverage, textile mills, apparel & leather, Chemical products

(Based on the formula: GO/GVA+(GO-GVA)/GVA where GO = Gross Output and GVA = Gross Value Added)

The result is that variable capital is, in most cases, far smaller than annual compensation. (There are exceptions where the production period may exceed a year such as construction and ship building, but they are rare in the scheme of things.) This can be seen in Graph 4. Compare, especially, the variable capital needed by motor vehicles and food to the total compensation found in Graph 1. Food which has the highest annual compensation in Graph 1 now sits in the middle. Motor vehicles which sat much higher than the low-tech industries in Graph 1 now sits adjacent to them.

It is obvious that confusing annual compensation with variable capital leads to a significant mistake. The magnitude of the mistake depends on the individual rate of turnover in an industry, and because these rates vary between industries, using annual compensation just muddies the water.

Graph 4.
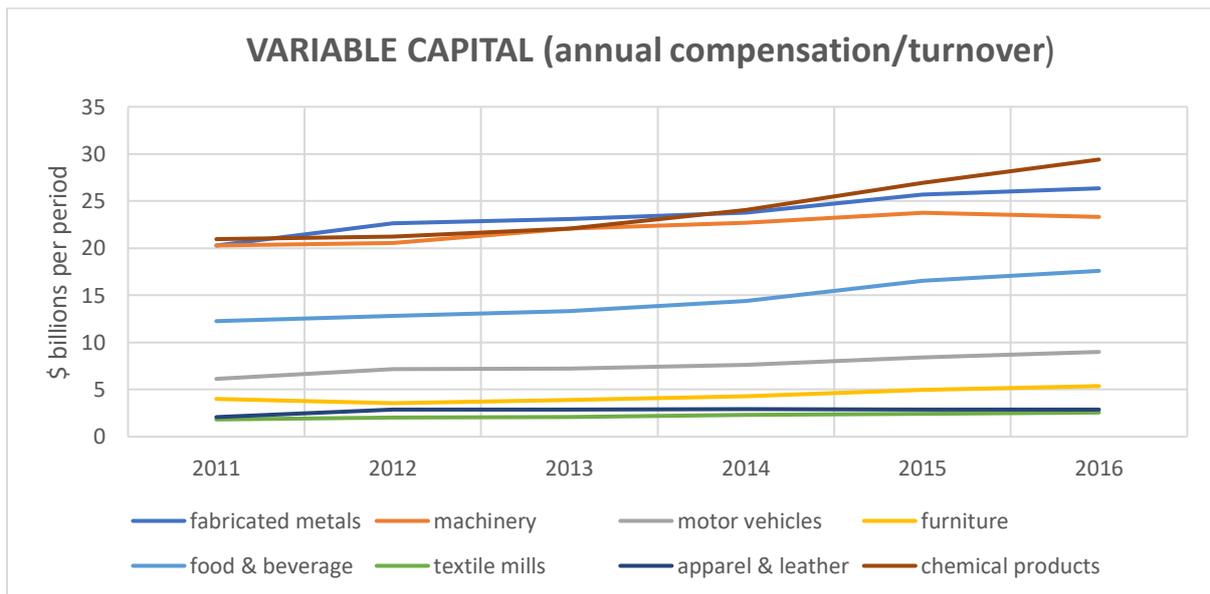
There is a final issue which is not only unquantifiable, but impossible to grasp. That is the intensity of labour itself. It varies not only between industries, not only within an industry but within individual factories. This is the reason I have always said, that in a socialist society, intensity based on capacity has to be made uniform, otherwise it is impossible to cost production without a wasteful army sitting around checking up on individual outputs.

There is a difference between raising productivity and intensity. Higher productivity leads to a reduced expenditure of labour time per item. Higher intensity does not. In the case of the former, the price of the commodity falls while the output increases. In the case of the latter, the price does not fall while output increases. Clearly, it is impossible to separate out the two outputs. As far as statisticians are concerned both are lumped under productivity. In other words, if workers work harder (more intensely without increasing hours) it appears that value added per hour has increased and with it, productivity.

Capitalism is a chaotic system. The movement of capital is restless and relentless, eroding prices here, adding to them there. It overshoots here and it undershoots there. And this is before we even factor in the demand side, which is continuously remodelled by changes in market values altering prices. Does this mean we cannot model capitalism and expose the rocks of market value sitting below the surface ripples? Probably not. It is likely we could arrive only at ideal prices but not real prices which include the multitude of interacting variables.

THE TSSI explained.

The TSSI takes its data from the System of National Accounts. Cost prices are derived from the input table and selling prices from final output prices. So gross output (total sales) minus intermediate sales and depreciation equals net value added. We therefore arrive at total $c + v + s$ equal to total gross output while total $v + s$ equals net value added, or, living labour.

Everything is priced. Although the SNA uses the term "value added" courtesy of Leontief, in fact the SNA is based on prices, prices bought in and prices sold out. Thus, the TSSI is not floored, though it is flawed, by the problem of values needing to be converted, a priori, into prices.

Temporal means sequential, or a number of sequences within a given time frame. If we stick to turnover periods rather than the nebulous annual data, T_0 refers to the inputs from the previous period and T_1 to the output at the end of the current period, which then forms the inputs of the next period which ends in T_2.

Let us begin with the cost price or the input price. Even if we assume that T_1 forms the input prices for period ending in T_2 seamlessly just as T_2 forms the input prices, for the period ending T_3, this does not alter the fact that they all have an actual cost of production. It's like trying to avoid one's own shadow. All the TSSI gang are doing is playing leapfrog, jumping over the problem.

The cost price cannot be taken for granted. All inventory is based on purchase price not selling price. There are complex formulas to cost inventory based on tax law such as LIFO or FILO (last in first out or first in first out). There could be inventory write downs, particularly prevalent in the sale of finished goods such as in retail which are more price sensitive. But the fact that inventory is mostly based on purchase price allows c to be priced properly but not accurately. Experience has long since taught capitalists not to count their chickens before they are hatched. They know only too well that inventory can lie around unsold which is why it is never costed at selling price. Thus, the cost of finished inventory is associated with $c + v$ and not $c + v + s$.

The real problem is not whether cost price is measured accurately by the buyer. Its price will always deviate from its value because of discounts, the magnitude of which depends on which part of the production and distribution chain that particular industry inhabits, and of course, its price will have been disturbed by demand and supply, itself a function of investment. Furthermore, the input price or c also has depreciation as one of its elements, that is the wear and tear passed onto the throughput of commodities. Thus T_0, if that is the starting point, is full of history, the history of prior investment.

All the TSSIers get it wrong. There are three ways to price the means of production: historical cost, current cost, or replacement cost, not only two. Replacement cost is not the same as current cost. I like using the analogy of a shower to explain this. The new water coming out of the shower is replacement cost. But the water covering one's body consists of a blend of new and older water. There is less of the older water as time passes because it drips to the floor and is replaced by newer water. Their average age is therefore a blend of the new and the old. Thus, current cost is always less than replacement cost because it consists not only of the new but additionally, the depreciated old. Actually, this blend is not a problem. Current cost is the residual market value of the remaining means of production and it is the denominator best suited when calculating the current rate of profit. The total assets in the SNA will correspond to the fixed assets on corporate balance sheets. The only problem that arises occurs in the field of future investment, because the rate of profit is lower when based on replacement cost which informs investment decisions.

Nor can the selling price be taken for granted because it is subject to the same forces. Discounts are given, demand and supply alter momentarily. Nor can v be taken for granted because turnover periods vary incrementally from period to period in the best of times. Or even s, if the level of inventories at the end of the period of production-circulation exceeds the level of inventories at the beginning because sales have slowed down resulting in a divergence between produced surplus value and realised surplus value.

And we have not even looked at the question of the transfer of value between nations due to unequal terms of trade.

Then there is the question of how we translate prices into values. If we subtract output prices from input prices it should yield a difference which in aggregate amounts to v + s. But how to translate aggregate compensation plus aggregate undivided profit into actual v + s based on labour time at the level of individual industries which differ in composition. We know that the v + s which forms the numerator is wrong because s is modified by discounts and transfers. So, there is a false start for the TSSIers even before they have forged a conversion measure.

This measure is called MELT. Melt which is the price equivalent of a labour hour, can be applied uniformly to all industries to derive the expenditure of labour hours within that industry. The deviation of the hours arrived at via MELT can then be tested against the actual physical hours in that industry and this deviation in turn can be used to demonstrate how much prices deviate from values there. But MELT provides a misshapen measure because it excludes skill and intensity though the latter is less important. MELT is based on simple averages not weighted averages. Which brings us to the crux of the matter. It is always possible to do the maths at the aggregate level. Seen from the moon, the earth looks unified with the warring nations invisible. But the aggregate hides what is happening at a local level.

In reality the TSSI is wrong on all counts. The industry figure it seeks to measure after deducting selling prices from input prices is itself misstated. In turn this misstated figure is divided by a flawed measure. The result is statistical garbage. That is predictable given that TSSI is a temporal system that measures the end against the beginning when both are indeterminable.

TSSI, or time lapse, places the emphasis on the moments of exchange. But exchange is merely the resolution of the contradiction between private production and social consumption. Marx described it as $M.C\ldots P\ldots C^+..M^+$. (M.C) is the first exchange when part of the social product enters the realm of private production through the conversion of money into commodities. The second exchange $(C^+.M^+)$ reconverts the results of private production back into the social product yielding money. That is all, it is a conversion process no more. The surplus value that allows more money to be retrieved compared to the money spent emerges from the production process itself. Between those exchanges, the divergence between prices and values is ever present. All commodities therefore have a cost of production, their market value, and at all times this differs from the prices appended to them.

An alternative method

Step 1. At the aggregate level, add fixed capital to circulating capital to obtain total capital.

Step 2. Obtain the total undivided profit (surplus) and divide it by this total capital to obtain the average rate of profit.

Step 3. Reduce annual compensation by turnover to obtain variable capital.

Step 4. Divide fixed capital by variable capital to obtain the average value composition of capital.

Step 5. Size individual industries by their share of fixed plus variable capital.

Step 6. Obtain the composition of the capital for a specific industry and its organic rate of profit.

Step 7. Determine the amount of redistributed surplus value needed to equalise its rate of profit (adjusted organic rate of profit). This will provide an ideal number.

Step 8. That ideal number should provide the deviation of prices from underlying value in that industry. So, if the price of net output in that industry is $5 billion and the amount of surplus value gained to equalise its rate of profit which is estimated at $350 million, then prices would probably have risen 7.5% above values in that industry ($350/$3650 = 7.5%) This refers not only to the moment of sale, but to the production process leading up to that sale.

But hang on. This seems to be kind of familiar. Did not a certain K Marx do precisely this in Chapter 9 of Volume 3. He did. Instead of sequential deviations we have real time interconnected deviations, which occur throughout the production cycle. We are reminded that every commodity at any moment exists as a use value, as a market value and as a price of production. Finally, this actual deviation of prices from values within the circuit of capital, may be different to the deviations of prices and values of the commodities that serve as inputs, rendering the TSSI obsolete. In short, subtracting input prices from output prices will result in a different deviation of prices from values for that industry compared to the above methodology.

By knowing how much surplus value needs to be diverted we can approximate how much capital has migrated between them to achieve this result. The reader should note, these are not real results but ideal results because they are much less complex than the real or concrete results which shapes day to day market prices and which embody many more specific and temporary variables. The difference between the ideal (or average) result and the real or concrete result (the day to day market prices) can be compared to a buoy and its anchor. The ideal result represents the anchor which prevents the buoy from floating out to sea and disappearing, but does not prevent the buoy (market prices) undulating up and down in the waves nor moving left and right in the currents, just as actual market prices tend to do.
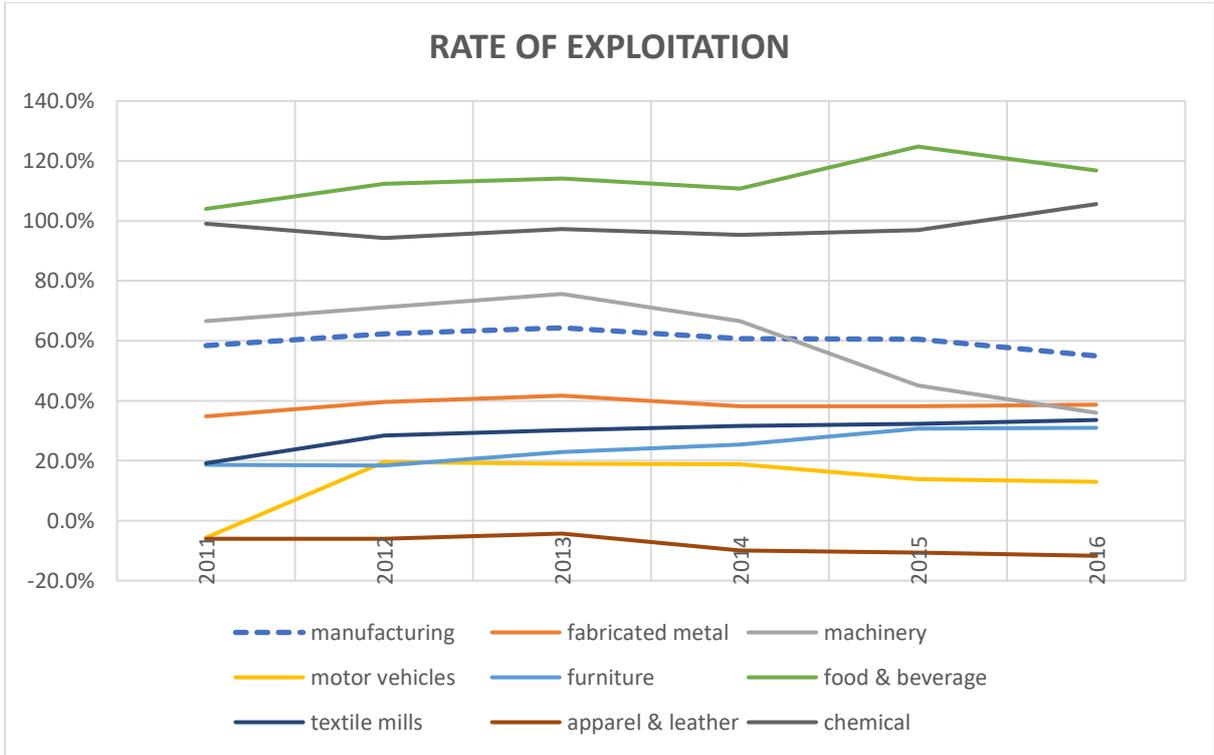
Marx showed that despite being chaotic in appearance, the capitalist pricing system is a regulated system. Regulated, because the distribution of surplus value has a definite direction and a definite limit even if that limit is discovered after a series of overshoots and undershoots. If the pricing system designed to reward profit was not regulated in any way, it would have torn capitalism apart long ago.
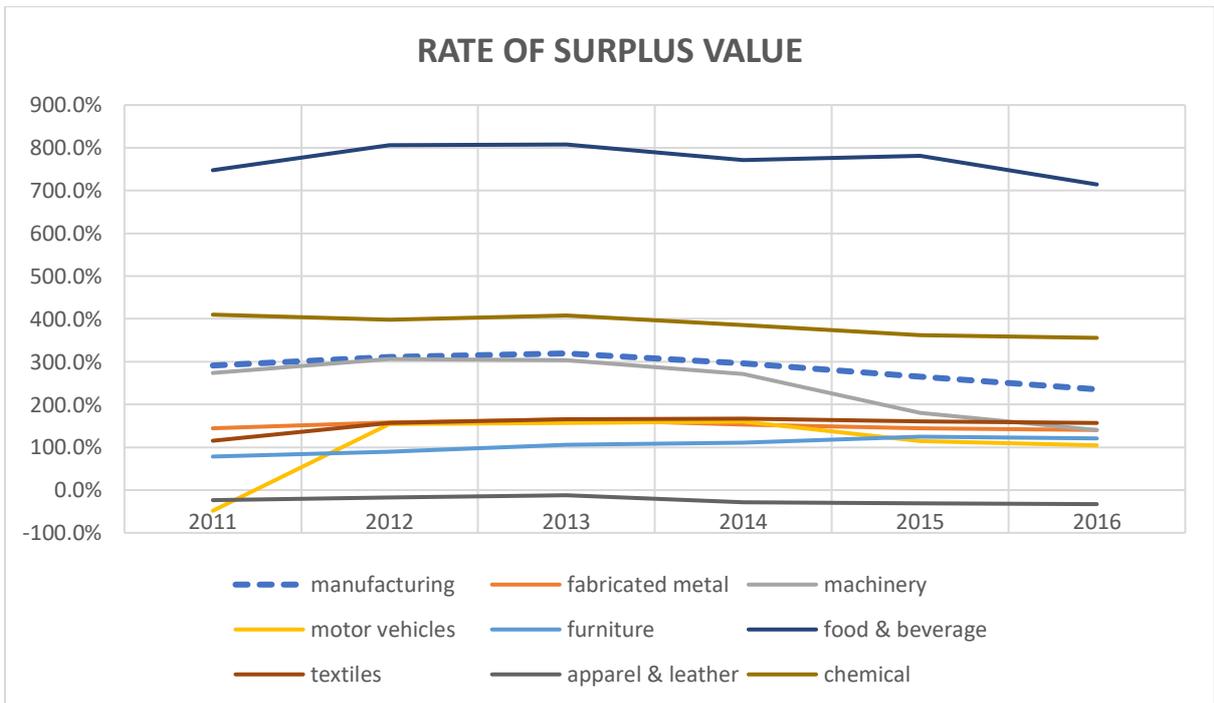

Addendum.

For those readers without Excel, three graphs are reproduced below. The first is the rate of exploitation which is surplus divided by compensation. The second is the rate of surplus value, where compensation has been reduced to variable capital, which in turn forms the denominator while the surplus forms the numerator.

The first thing the reader will note between Graph 5 and 6, is scale. The highest rate of exploitation is under 140% while the highest rate of surplus value is over 800%. The next thing to observe is that the order changes between the two graphs changes. For example, motor vehicles which had the second lowest rate of exploitation now has the fourth highest rate of surplus value. Thirdly, the volatility in the rate of surplus value exceeds that of exploitation. Finally, there is a greater convergence in the rates of surplus value compared to that of exploitation. In other words, the dispersal is tighter.
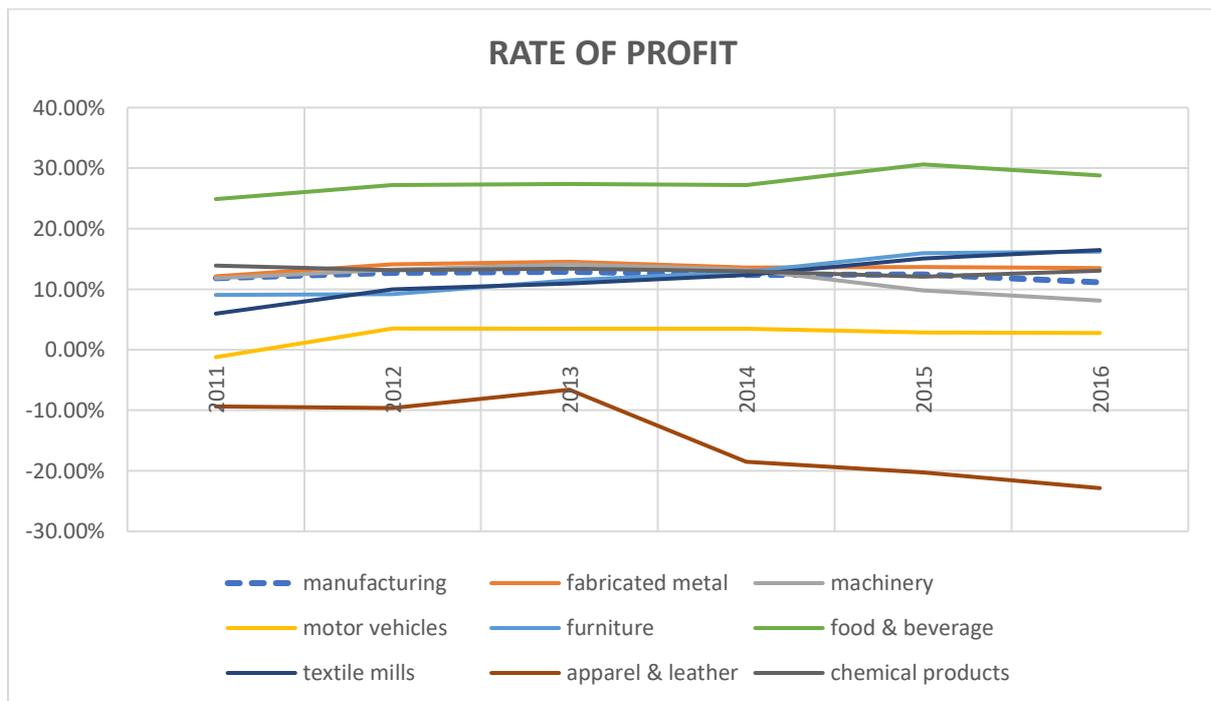
Graph 5.

RATE OF EXPLOITATION

Legend: manufacturing, fabricated metal, machinery, motor vehicles, furniture, food & beverage, textile mills, apparel & leather, chemical

Graph 6.

RATE OF SURPLUS VALUE

Legend: manufacturing, fabricated metal, machinery, motor vehicles, furniture, food & beverage, textiles, apparel & leather, chemical

Finally, the all-important rate of profit (surplus divided by fixed + circulating capital. Note the tight grouping in Graph 7. If we include motor vehicles whose profitability has improved consistently then 75% of the profit rates sits proximate to each other. Thus, despite diverging rates of surplus value and compensation the final result is more uniform.

This result would not be found simply using the rate of return which is surplus over fixed capital. Using the crude rate of return leads to a greater dispersion. The convergence is due to the presence of circulating capital. Hence it is impossible to prove the averaging out of the rate of profit except by means of a rate of profit based on both fixed and circulating profit. By averaging out we do not mean each and every industry converges, their will always be temporary outliers.

Graph 7.

Brian Green, 4th July 2020.