REVERSING THE TRANSFORMATION PROBLEM.
DISTILLING MARKET VALUE FROM MARKET PRICES OF PRODUCTION.

The logical direction of travel for solving the transformation problem is to move from market values to market prices of production. This posting offers an additional proof, (a corollary) through changing the direction of travel, by deriving market values from market prices of production. This new proof compliments the original transformation solution, demonstrating from a different angle, the vital role played by market values in determining market prices.

The preceding post explained that Marx's transformation problem in Chapter 9 involved the movement from market prices to market prices of production. This article will, and my original posting already has, demonstrated conclusively that it is mathematically possible to convert both input and output prices to those governed by prices of production without affecting the relation between total value = total prices and total surplus value = total profits. Of course, in real life, the movement from market-value-prices to market prices of production is not done mathematically but is executed by the restless movement of capital from areas of low profitability (measured by rate) to areas of high profitability. The question is posed, can we replicate this movement? The answer is an emphatic yes, and, because of this, the final proof that prices in the end are based on market values is provided here. Our starting point is the final table in the preceding posting, now reproduced here as Table 1.

Table 1.

Newly priced capital	Adjusted profit	+ cost price =	**Price of Production.**	Marx's "***Price of commodity***" *(Volume 3 Chapter 9).*	
102	22.4 (102 x22%)	+ 72	=94.4	*92*	*+2.4 difference*
93	20.5 (93 x 22%)	+ 74	=94.5	*103*	*-8.5 difference*
85	18.7 (85 x 22%)	+ 76	=94.7	*113*	*-18.3 difference*
106	23.3 (106 x 22%)	+ 61	=84.3	*77*	*+7.3 difference*
114	25.1 (114 x 22%)	+ 29	=54.1	*37*	*+17.1 difference*
500	**110**	**312**	**422**	***422***	***0***

The important column is the first column which shows the aliquot shares of each capital, 102, 93, 85, 106 1nd 114. These are the new and transformed prices. Together they still continue to add up to 500. Previously we held the conditions of production to be fixed so that we could examine the difference between the newly priced capital and their original market value without disruption. However, this assumption is now abandoned, and, the conditions of production are allowed to change.

This change is not random but is determined by strict laws. It is clearly the case that in the original tables set up by Marx in Chapter 9, different rates of profit prevailed when market prices were set by market values. These are replicated in Table 2 below.

Table 2.

Capitals	Surplus Value	Rate of Profit
i) 80c + 20v = 100	20	20%
ii) 70c + 30v = 100	30	30%
iii) 60c + 40v = 100	40	40%
iv) 85c + 15v = 100	15	15%
v) 95c + 5v = 100	5	5%
390c+110v = 500	**100**	**22% average**

Of the five capitals set out above, two are below average composition (capitals ii and iii) and three are above average (i, iv, and v). In vulgar economic terms two capitals are labour intensive and three are capital intensive. The result is that the two capitals that have lower compositions of capital yield a rate of profit above the 22% average for the economy while the three higher composition capitals yield a rate of profit below the average. The reason is simple. As living labour is the only source of profit, the capitals that employ more workers compared to means of production, or more v and less c, produce more profits.

Under these conditions it probable that capital will migrate from the three higher composition capitals to the two lower composition industries where the rate of profit is higher. There will be a shift of 22% worth of capital out of i, iv and v to ii and iii. How do we know this? We know this because we have the repriced capitals before us in Table 1 to guide us. They deviate by 22 in the aggregate from their original values of 100 each. Capital i will lose 2 bringing it back to 100, capital iv will lose 6 and capital v will lose 14. On the other hand, capitals ii will gain 7 to bring it up to 100, and capital iii will gain 15.

As a result of this movement in capital, production would have contracted in capitals I, iv and v. The resulting contraction in production would have forced prices up and hence profits, allowing these capitals to enjoy a rate of profit of 22%. The converse happens in capitals ii and iii. There production expands driving down prices and by forcing down profits until they will also yield a rate of profit of 22%. The total demand per cycle remains unchanged at 422 per Marx's example.

This migration of capital is carried out within definite limits. The overarching objective is that there is no change in the combined composition of capital measured over the five capitals which is 390c/110v (Table 2) or 355%. This implies that the three donating capitals will donate capital in proportion to their own composition of capital. As these tend to be higher than the compositions found in the two recipient capitals, the composition of capitals ii and iii will be raised by the composition of the in-coming capital. This is a valid assumption as it does not require any c being converted into v. Secondly, the assumption is also supported by the fact that most new investment will be based on higher compositions of capital or more technically advanced investment. Hence none of the assumptions are unreal. This movement of 22 capital will break down as follows.

Table 3.

Capital	**Donates**	**Marx's ratios Table 1.**	**Composition of investment.**
i.	2	(80c:20v)	= 1.6c + 0.4v
iv.	6	(85c:15v)	= 5.1c + 0.9v
v.	14	(95c+5v)	= 13.3c + 0.7v
	=22		**= 20c + 2v =22**

We note despite the ratios, the total capital transferred remains at 22. This 22 is then applied to the two recipient capitals ii and iii in the proportions, 7 to capital ii and 15 to capital iii. The alteration is detailed in Table 4 below. The ratios are taken from the total under "Break down" in Table 3 and is an average for the three donating capitals.

Table 4.

Capital	**Receives**	**Ratios Table 3**	**Break down.**
ii.	7	(20c:2v)	6.4c + 0.6v
iii.	15	(20c:2v)	13.6c + 1.4v
	=22		**=20c + 2v = 22**

Once again the c + v received equals 22. It makes no difference that we have applied the same ratio of c + v to both the above recipient capitals because it does not alter the assumption that the total ratio must remain at 355% or 390c:110v. The alterations to the market value of the five capitals from this movement of capital is now detailed in Table 5.

Table 5.

(Column)	(1) Original Market Value	(2) Movement of Capital	(3) New Market Value	(4) Surplus value
i.	80c + 20c = 100	-1.6c and -0.4v	78.4c + 19.6v = 98	19.6
ii.	70c + 30v = 100	+6.4c and + 0.6v	76.4c + 30.6v = 107	30.6
iii.	60c + 40v = 100	+13.6c and 1.4v	73.6c + 41.4v = 115	41.4
iv.	85c + 15v = 100	-5.1c and -0.9v	79.9c + 14.1v = 94	14.1
v.	95c + 5 v = 100	-13.3c and -0.7v	81.7c + 4.3v = 86	4.3
	390 +110 = 500		**390c + 110v = 500***	**110s* (22% profit rate)**

(* Due to the use of only one decimal point there is a rounding off error.)

Column 1, "Original Market Value" above is Marx's original compositions of capital at market value. Column 2 is the movement of capital from i, iv and v to ii and iii. Column 3 is the new market values that apply to the five capitals under the new conditions of production, where production has contracted in i, iv and v and expanded in ii and iii. Column 4 is the new surplus value produced in each capital based on the same rate of exploitation of 100%. As in Marx's example (s) = (v) so that 110v = 110s. This 22s yields an average rate of profit of 22%.

The important point to note in Table 5 is that the market value of each capital is no longer 100 but different. The question is now posed, what will be the price of each capital based on these new market prices. The answer is 100. The competition between capitals based on the new market values will yield new prices of production that will reprice each capital back to 100. This is shown in Table 6 below.

Table 6.

		ORIGINAL POSTING		**CURRENT POSTING.**	
Capitals		**Marx's original Market Values**	**Repriced Capitals**	**New Market Values**	**Price of capital**
	i.	80c+20v=100	102	78.4c+19.6v=98	100
	ii.	70c+30v=100	93	76.4c+30.6v=107	100
	iii.	60c+40v=100	85	73.6c+41.4v=115	100
	iv.	85c+15v=100	106	79.9c+13.1v=94	100
	v.	95c+5v=100	114	81.7c+4.3v=86	100
Totals		**390c+110v =500**	**500**	**390c+110v=500**	**500**

In the first, fourth and fifth capitals, the contraction in production will cause a rise in prices. Hence the additional money returning will raise the prices of each of the three capitals above their new market values. In the case of the first by 2 from 98 to 100, in the case of the fourth by 6 from 94 to 100 and in the case of the fifth where production has contracted the most sharply, by 14 from 86 to 100. The opposite will happen in the case of the second and third capitals where production has expanded forcing down prices. (In short, by adding the repriced capitals to the new market values and halving the result, 100 is obtained in all five cases.)

In the table below, using the same methodology I applied in my original posting, the transformation of market values into prices of production is explained, but in greater detail. Again, for congruity, the same consumption of capital as applied by Marx, is used. The table begins with the new market values obtained from the right side of the above table. Column two is the amount, in percentage terms, that is consumed in each cycle of production. Column 3 is the amount of value unconsumed and held by each capital. The fourth column titled New Money Capital is the important column. The first figure applies to the additional money received, or the loss of money, due to prices that have changed because output has changed. The second figure is the value of the consumed market value. They are bracketed to isolate the new money capital returning. The third figure is retained market value, that part of the capital unconsumed but which will be repriced by the new money capital.

In these instances, we ignore the profit element contained in the selling price. In the case of capital i the 70.6 comprises the increase in price of 2 plus the original value sold of 68.6. When this 70.6 of new money capital is added back to the original element of capital unconsumed, the total price is elevated from 98 to 100 (because the circulating element and the unconsumed element must have the same price). Similarly, with capital ii. It receives back 79.7 in new money, or 7 less than the market value of its product of 86.7. Its capital is now reduced to 100 in monetary terms equal to 79.7 plus 20.3.

TABLE 7.

Capital.	New Market Value	Market Value Consumed	Retained Market Value	Total Money	Repriced Capital
i.	98	70%	29.4	(+2 + 68.6) + 29.4	=100
ii.	107	81%	20.3	(-7 + 86.7) +20.3	=100
iii.	115	90%	11.5	(-15 + 103.5) +11.5	=100
iv.	94	55%	42.3	(+6 + 51.7) + 42.3	=100
v.	86	15%	73.1	(+14 + 12.9) + 73.1	=100

The important point to note is that the market prices of production between the two series will be different because the market values are different as found in Table 8 below. This being so, it establishes the important fact, that in the end, it is a combination of market values and the movement of capital that sets market prices of production. Each is capable of acting independently of the other thereby altering market prices of production, but whereas the latter only serves to redistribute profits, it is the former that sets the average rate of profit around which individual profits fluctuate when disturbed by the movement of capital.

Having proven why each capital is now repriced at 100 it is a simple matter to solve for cost price together with market prices of production, on the basis that all capitals now amount to 100. Here we assume for the purposes of congruity the same percentage of capital consumed applies.

Table 8.

	Price of capital	share of capital consumed.	Total cost Price.	+ Total profit margin.	=Total prices of commodities.	*Original prices* of *production, Table 1.*
i.	100	70%	70	22	92	*94.4*
ii.	100	81%	81	22	103	*94.5*
iii.	100	91%	91	22	113	*94.7*
iv.	100	55%	55	22	77	*84.3*
v.	100	15%	15	22	37	*54.1*
Totals	**500**		**312**	**110**	**422**	***422***

We now arrive back at the prices Marx proposed in Chapter 9 as found in Table 1 of this posting under the heading “Prices of Commodities”. These prices of commodities are now actual prices of production because the market values that gave rise to them are different to the market values that Marx originally used in his example. They are real because they are the result of a defined movement of capital, the kind of behaviour that would be undertaken by investors seeking a higher return on their capital.

Comparisons of prices of production between the two series are shown in Table 1 above. Their marked differences derive from the changes in market values and attest to the role played by market values in their determination. Any change in market values must result in changes to market prices of production and cannot be undone by the movement of capital itself, because that movement is not immune to market values and their composition.

Hence in summation, when using Marx’s original market values, and holding the conditions of production constant, different prices of capital will result when measured by market prices of production. Alternatively, when applying the new market values resulting from the now changed pattern of investment, the prices of capital are returned back to 100 each. But this repricing of capital back to 100 required an expansion of output by the second and third capitals, compensated in turn, by a contraction in output by the first fourth and fifth capitals. Hence when reduced to 100 in price, new market values applied.

In all cases Marx’s market values and prices cannot be reconciled without a change in market values or a change in the price of capital. This does not prove Marx wrong and I would strenuously rebut anyone using these postings to criticise Marx. Marx and I set two different goals. Marx limited himself to providing an example which highlighted the law that governed the extent for the movement in prices needed to equalise profits. He knew full well how difficult it was to capture the complexity of prices thrown up by the restless waves of investment, which is why he limited himself to only an example.

I used the selfsame divergences Marx used, firstly to complete his example and secondly to turn it into a proof. My goals were more ambitious because of the criticisms levelled at Marx’s “solution”, which claimed it was impossible to either, conceptually or physically, solve for prices of production and/or market values. What this posting has demonstrated is that it is possible to distil market prices of production from market values and, conversely, to distil market values from market prices of production. It is the solution to the first problem which provides the solution to the second, because it furnishes the amount of capital that needs to move between industries to restore the prices of the respective capitals back to 100. In so doing the finite relationship between market values and market prices of production has been established.

I am no mathematician, but I am sure that there are those, more able, who could translate these relationships into formulas, allowing computers to transform values into market prices of production, literally, on an industrial scale, mimicking real-life market movements. These two complimentary proofs irrefutably demonstrate the unbreakable link between market prices of production and market values and through them to Marx’s “labour theory of value”.

This posting should be read in conjunction with the original posting whose link appears below:

https://theplanningmotivedotcom.files.wordpress.com/2015/09/transformation-solution-pdf.pdf

and

it should be read together with the preceding posting whose link appears below as well:

https://theplanningmotivedotcom.files.wordpress.com/2018/01/the-transformation-problem-additional-notes-pdf.pdf

Postscript:

I have decided to add a postscript. In reviewing this article and the original article, which answers most issues relating to the transformation of value into price, one aspect has come to light. The two proofs may not exist as two distinct proofs, but may comprise a single sequential process. After all the transformation problem is executed by the movement of capital itself, not by mathematics. In that case, the repricing of capital based on the original market values provided by Marx (my original posting) is merely a staging post for revealing how much capital needs to be redistributed to achieve an average rate of profit. And it is that finite redistribution of capital, that altered pattern of investment, which is the real leveller of the rate of profit. Hence the purpose is not to reprice capitals per se, but to arrive back at the market values, now changed, needed to average out the rate of profit for capitals priced at 100 but with different market values. That is the real solution to the transformation problem.

Brian Green. January 2018.