A FURTHER INSIGHT INTO THE TURNOVER FORMULA

I received the following email from a PHD student, which is not the first.

Dear Brian,

I am a PhD student in economics, specialising in Marxian economic theory and political economy. I came across your work some time ago and found your turnover formula intriguing. The simplicity of it makes it quite attractive to use to estimate turnover rates, and I'm considering adopting it in some of my future work.

However, I find the explanation of the logic or interpretation of the two ratios a bit unclear. In your introduction to the turnover formula, after realising that GO/GVA is not a sufficient estimate of turnover, you end up adding the second term IC/GVA, and write that the reason the formula had taken such long time to discover is because "[t]he Final Sale is quite peculiar. Not only does it add to the total value, but it simultaneously incorporates the value added to it from the earlier stages of production."

I'm not quite sure how to interpret this, since it is GO which contains in it both final sales and intermediate sales, and I don't see in what way the 'peculiarity of final sales' would then obstruct adding the second ratio of intermediate sales to final sales? You essentially end up double counting the ratio of intermediate consumption to gross value added – as the formula could be rewritten as:

t=2×IC÷GVA+1t = 2 \times IC \div GVA + 1

I understand that you want to account for the duplicated value of the intermediate sales, but why twice? What is the logic of that, other than it simply seems to work for whatever reason? I have not read all your work, but in the above mentioned text, I cannot figure out how to interpret the two ratios.

Kind regards,

Alexander Mörelius-Wulff

I always treat constructive criticism, commentary and objections with respect, otherwise what is lost is a deeper insight into the phenomenon being discussed and analysed. So I thank Alexander for his email which has led me to examine the formula in a novel way.

In explaining the formula this is the example I always use. In producing the final product, the sandwich there are four production periods each conducted by an independent private producer, the farmer who grows wheat, the miller who grinds the wheat into flour, the baker who converts the flour into bread and the sandwich maker who converts the bread into sandwiches. Each labour is costed at 10 and their efforts and sales are represented in the table below.

Sale number	Value added GVA	Intermediate (duplicated) Sales	Value of sales excluding final sale	Nature of the sale
1 wheat	10	0	10	intermediate
2 flour	10	10	10 + 10 = 20	intermediate
3 bread	10	20	10 + 20 = 30	intermediate
4 sandwich	10	30	10 + 20 + 30 = 60	final
TOTALS	**10+10+10 + 10 = 40**	**60**		**10+20+30+40=100**
column	**(1)**	**(2)**	**(3)**	**(4)**

This table reveals that Gross Output is 100 incorporating intermediate sales of 60 and final sale of 40. We need to find a formula which yields the 4 sales, and if that occurs within a year we could say the average annual turnover in the sandwich industry is 4. If we simply took GO/GVA we would arrive at 2.5 sales which when divided into GVA implies each producer contributes value equal to 16 which when multiplied by 4 implies a total value added of 64 not 40. The difference is 24/40 or 60%. It means the numerator must be increased by 60 to 160 at which point 160/40 = 4 the correct answer. This is the same answer the two part turnover formula described as GO/GVA + (GO-GVA)/GVA or GO/GVA + IS/GVA would yield where IS stands for Intermediate Sales.

But here Alexander's objection comes into play, there is duplication. What we have is 60 + 40 + 60, so intermediate sales appears to be counted twice. Or are they? As I have pointed out each sale is a complete circuit of capital, which involves a purchase and a sale at either end. It can be presented graphically below as reproduced circuits.

M^{0} ..C^{0} ….P^{10}…C^{10}…M^{10} (farmer)
M^{10}...C^{10}…P^{10+10}…C^{20}…M^{20} (miller)
M^{20}..C^{20}…P^{20+10}…C^{30}…M^{30} (baker)
M^{30}..C^{30}…P^{30+10}…C^{40}..M^{40} (sandwich maker)

I have highlighted the distinct sale and the purchase in each circuit. This is the money handed over down the circuits giving rise to the upward reciprocal movement of the commodities being worked up. If we add the highlighted M's we find they total 120 or 60 x 2. The final sale however is quite distinct which is why it is not highlighted. Unlike the intermediate sales, the final sale ends up with the product being consumed not passed on. There is no longer a reciprocal movement. If the sandwich was delightful we can assume not a crumb was left over.

That is why the final sale must be treated differently and why a two part formula is needed. The second part factors for the necessary duplication which must exist because every sale has two sides.

Alexander, I hope that answers your objection. For my part I thank you for the opportunity to gain this insight which up to now I have missed. I have previously admitted to my weakness when it comes to mathematics. On the plus side however, having always proceeded on the basis of theory, I do see the world in an analogue manner, as explained existence.

Kind regards

Brian.

And his response.

Dear Brian,

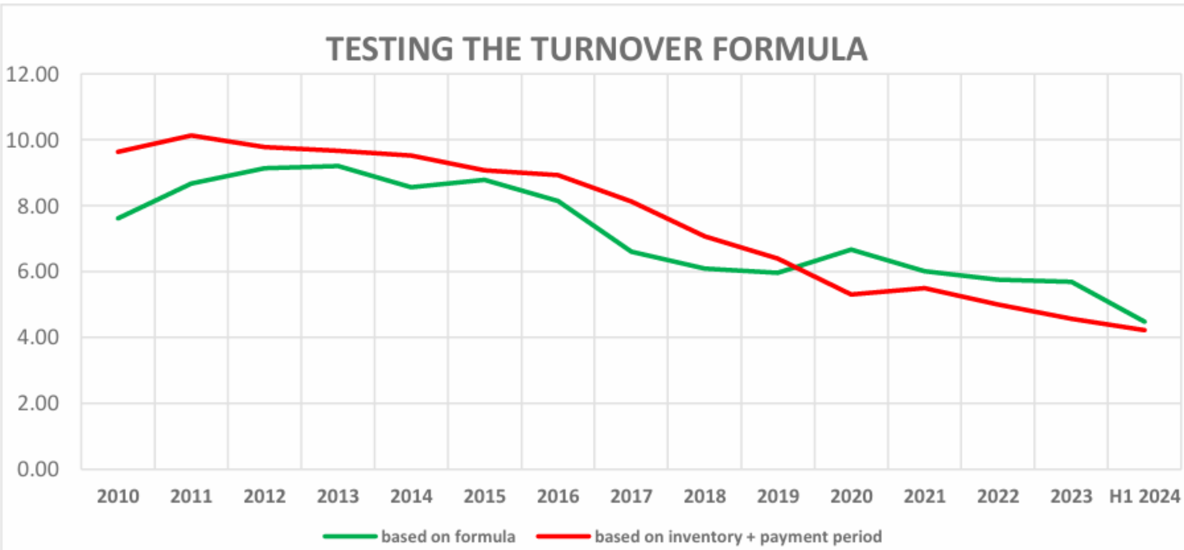
thank you for your extended reply, I appreciate that you're taking your time to answer my question.

As far as I understand then, it is double counted since the sum money of IC serves as both a sale and a purchase (e.g. the wheat sold by the farmer is also the wheat purchased by the miller to make flour, etc.). This makes complete sense. I guess the answer was there in the original article all along, but emphasising the reason for double counting IC with reference to the numerical example really draws out the intuition.

I then emailed him as he requested the latest report by the National Bureau of Statistics on Industrial Profits for Jan/Feb which I use to calculate monthly turnover data. In addition, I emailed him this graph below which I use as one of my proofs. The Red Graph is based on days of inventory plus days of payment divided by annual days (365) to obtain the annual rate of return. The green graph is based on the formula which I believe to be the more sensitive gauge.

Kind regards

Brian



(Source: Chinese Statistical Year Book Tables 3.6 and 13.3 for GO & GVA – green graph)