PRODUCTION STRUCTURE, OUTPUT AND PROFITS - A NOTE*

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Abstract

This paper argues that the case of product differentiation of concentrated markets (i.e., innovation competition) is one where production per unit of profit of non-financial corporations is lower than in competitive mass production and profit share is not an increasing function of capacity utilisation. Rather the desired excess capacity is higher since the break-even point where total costs and revenues equalize tends to be lower. The argument is supported with descriptive annual data for the period 1947-2019 in the USA.

Keywords: Product differentiation; Market structure; Capacity utilisation & Profits.
JEL Codes: D24; E12 & L11.

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1. Introduction

The shift from mass production to customised production has not been underlined in macroeconomics literature as much as in managerial economics literature (Piller and Tseng, 2010) and in economic sociology- in the context of debates on post-Fordist regime (Burrows and Loader ,1994). Especially in the macroeconomic field, the analyses on profits in the monetary circuit (Rochon, 2009) and debates on wage-led vs. profit-led growth regimes (see Lavoie, 2017, and Oyvat, et al. 2020 for literature review) are based on mass production assumption, despite post-Keynesian approach acknowledging imperfect competition where product differentiation prevails (Eichner ,1976. Lavoie, 2014, pg. 127-128, Baskoy, 2018).

In post-Keynesian literature on capacity utilisation (Nikiforos and Foley, 2012, Nikiforos, 2013, 2016, Tavani and Vasudeva, 2014, Gahn, 2021), only Lavoie (1995, 1996, 2014, 2017), Rollim (2019) and Lavoie and Nah (2020) consider overhead labour. Yet, product differentiation and 'economies of scope', where producing different but related goods together is less costly then producing them separately (Baumol, et al. 1982), are absent in their analyses, despite employment of overhead labour (white-collar workers) is necessary for product differentiation to increase the market share of the firm (Minsky, 1986, Dögüs, 2019)[1].

Lavoie and Nah (2020) find that the profit share is an increasing function of the rate of capacity utilisation as the economy grows in the expansion phase of the business cycle, profits and labour productivity rise. They recognize the case that rising wage differential between overhead labour and direct labour might reduce the capacity utilisation when the actual rate of utilisation is higher or lower than the normal rate of utilisation (ibid: 19-20). Despite they take the wage differential into account, they fail to consider the impact of wage differential on product differentiation, hence make the argument that "an increase in the wage differential will generate a decrease in the profit share" (ibid: 26), yet rising wage differential has contributed to market concentration and profit share (Dögüs 2019 and 2021a). Their argument is more likely be the case if mass production and price competition prevail, as higher amount of profits requires more output due to lower mark-up rate.

[1] See Meloni (2021) for a post-Keynesian discussion on price competitiveness vs. non-price competitiveness regarding export. Nor the Monetary Circuit Theory (Ponsot and Rossi, 2009) takes product differentiation and market structure into account. See Dögüs (2018 and 2021b) for a discussion from a monetary circuit perspective on the relationship between financialisation and market concentration in which rising financial profits of NFCs outweigh nonfinancial profits.

However, if one needs to distinguish 'between those shifts to or from profits which are due to effective demand, and those which result from changed price-cost relations independent of demand' (Steindl 1979, pg. 3), then mass production and product differentiation has to be distinguished, too, regarding the relationship between profits and capacity utilisation.

Departing from that point of view, I argue that production per unit of profit of non-financial corporations (NFCs) is lower and the desired capacity utilisation which is not caused by a temporary change in demand toward which actual capacity utilisation would converge (Lavoie 2016, pg. 173) is lower in concentrated markets than in mass production of competitive markets because of product differentiation.

2. Theoretical reasoning

Before both the rise of market concentration in 1970[2] (Dögüs, 2019) and the collapse of the Fordist-regime, 'growth in wages served capital's interests in attaining full capacity utilisation in a closed economy in which mass production was dominant' (Jessop, 1993, pg. 20). As 'Fordist mass production could only be profitable when high levels of demand were maintained (Jessop, 1994, pg. 27), higher amount of profits has required more output due to lower rate of markup.

With the increase in market concentration and the rise of white-collar workers in last decades (Dögüs, 2019), there has been a shift from Fordist regime of 'mass production, scale economies, and mass consumption' to post-Fordist regime of 'flexible production, innovation, scope economies, and more differentiated patterns of consumption' (Jessop, 1993, pg. 14). Profits in case of product differentiation of concentrated markets depend more on markup enabled by 'the capacity to engineer flexible production systems (or to design flexible service delivery systems) and to accelerate process and product innovation' (Jessop, 1994, pg. 20). 'Absolute cost advantages and product differentiation serve to create a margin between the average variable and fixed costs' (Eichner, 1976, pg. 74), and this margin, i.e. markup, has 'a function to secure the firm to survive and to validate their investment and financing decisions' (Minsky and Ferri, 1984, pg. 490) in a world of innovation competition. Blundellet al. (1995) finds that dominant firms tend to innovate more than non-dominant firms while increased market competition at the same time dampens innovative activity.

[2] Grullon et al. (2019) document that 75% of industries in the USA have experienced an increase in market concentration since the late 1990s.

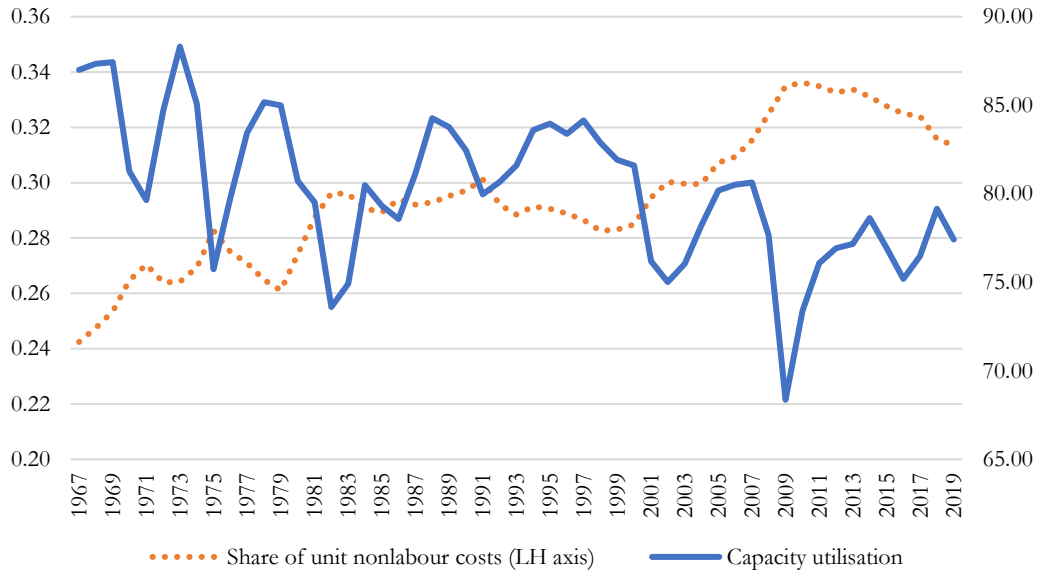
In case of product differentiation, 'economies of scope' outweighs the 'economies of scale' of mass production (Jessop, 2014, pg. 19-20). Sahoo (2007) empirically documents that economies of scope are negatively associated with capacity utilisation, as scope considerations become more important than scale considerations when demand fall short of optimum level (ibid: 324) and idle capacity enables the firm to meet varying demand for its differentiated goods, because inputs that are shared by the processes utilised to produce several different products may be imperfectly divisible (Kim, 1999, pg. 333). Besides that, product differentiation increases the uncertainty about demand which reduces capacity utilisation- as documented by Setterfield and Avritzer (2020). Economies of scope with product differentiation requires different prices, i.e. a price structure 'that corresponds to the different qualities and types of the product' (Steindl, 1952, pg. 40). Firms segment the markets in order to capture different customer groups those have different price elasticities of demand (Lazonick, 2013, pg. 137-138). In a competitive case, there would be uniform price due to lower markup. Different and higher profits generated by way of markup seduce new entries into markets. However, not only excess capacity, but also 'product differentiation can be expected to make entry even more difficult' (Eichner, 1976, pg. 74). So, it is possible to infer that actual excess capacity and product differentiation go hand in hand, as depicted in Figure 1. According to my own calculations based on fred.stlouisfed.org/, the correlation between actual capacity utilisation and the share of non-labour costs within total costs of NFCs in the USA for the period 1967-2019 is -0,75. It can be stated that it is because of the fact that labour costs rise with capacity utilisation, but it is crucial that (desired) normal rate of utilisation (calculated as the average for 10 years to eliminate any temporally deviations and to capture the structural change[3]) has dropped to from 83 percent for the period 1967-1977 to 76 percent for the period 2010-2020 and that indicates that the desired rate of excess capacity has structurally increased due to oligopolistic reasons referred by Steindl (1952). Even if we regard merely the effect of demand on capacity utilisation, we have to admit the negative impact of inequality on utilisation as the increase in inequality driven by market concentration depresses the effective demand. Gans et al (2019: 559) document that 'in 2016, removing market power would cause the bottom 60 per cent income share to rise from 19

[3] It is worth nothing that the desired (normal) rate of capacity utilisation is indeed non-observable as it is an *ex-ante* measure whereas the actual capacity utilisation rate is an *ex-post* magnitude (Trezzini and Pignalosa, 2024, pg. 3) and the difference between them represents an 'unstable position arises if the actual rate of economic growth is either greater than or less than the warranted rate' (Fields, 2023, pg. 208).

to 21 per cent, and would cause the top 20 per cent income share to fall from 64 to 61 per cent'.

I employ the share of nonlabour costs within total costs as a proxy to depict the product differentiation at macro level as overhead labour[4], i.e. white-collar workers, being employed to conduct product differentiation. In a case of full competition, where products are homogenous, there would be no need for overhead labour such as advertisement, market research, R&D, brand management etc and hence the share of non-labour cost expected to be lower.

Figure 1- Share of unit nonlabour costs within average total costs and capacity utilisation rate for US-NFCs, 1967-2019



Source: own calculations[5] based on fredfred.stlouisfed.org/.

Since unit direct costs are roughly constant below full capacity (Lavoie, 2006, pg. 45), as products are reproducible (Lavoie, 2014, pg. 126) and 'unit prime cost does not depend on the degree of utilisation rate' (Kalecki, 2003 [1954], pg. 19, footnote 1), capacity utilisation is not a matter of cost minimisation; rather it is endogenous to demand (Lavoie, 1995, Kalecki 2003 [1954], pg. 131). Therefore, persistency of excess capacity in the long run is a function of both uncertainty in demand for products and possibility of new entries into markets due

[4] The limitation of this assumption is the fact that all attempts to differentiate products by overhead labor to increase or maintain the market share of the firm may not always succeed.

[5] Actual capacity utilisation retrieved from https://fred.stlouisfed.org/series/TCU. Share of non-labour cost within total costs per unit of gross value added of NFCs calculated as the ratio of unit non-labour cost (retrieved from: https://fred.stlouisfed.org/series/A467RD3A052NBEA) to the sum of unit labour cost, (retrieved from: https://fred.stlouisfed.org/series/A460RD3A052NBEA) and unit non-labour cost.

to excessive profits in oligopolistic markets (Steindl, 1952, pg. 55). That is why firms prefer to hold excess capacity to preserve their market share (Steindl, 1952, Eichner, 1976, pg. 195).

In a full competitive case,[6] excess capacity is close to zero because there is neither excess level of demand uncertainty because level of inequality is too low[7] and products are homogenous, nor excessive profits to induce new entries to be encountered with excess capacity. If products are homogenous, then there would be no possibility for markup to generate excess profits. If products are different to address different consumption preferences, especially consumption preferences of white-collar workers (Dögüs, 2021a), then firms can advertise and charge markup over average costs. Matraves and Rondi (2007) highlight that in markets where vertical product differentiation dominates, firms are prone to invest in advertising and/or R&D, whereas in mass production case, firms incline to expand their production capacity. Orhangazi (2019, pg. 29) reinforce this finding showing that 'firms invest in intangible assets that help them curtail competition and lead to monopolistic markets'.

Another crucial issue regarding the existence of excess capacity in concentrated markets is the lower level of break-even point where revenues and total costs are equalized. Quantity of break-even point (q_b) is where unit markup (i.e. unit price (p) over unit labour cost (u)) covers fixed costs (f).

Total Revenue= Total Costs

$$q_b * p = f + u * q_b \tag{1a}$$

$$q_b = f/(p - u) \tag{1b}$$

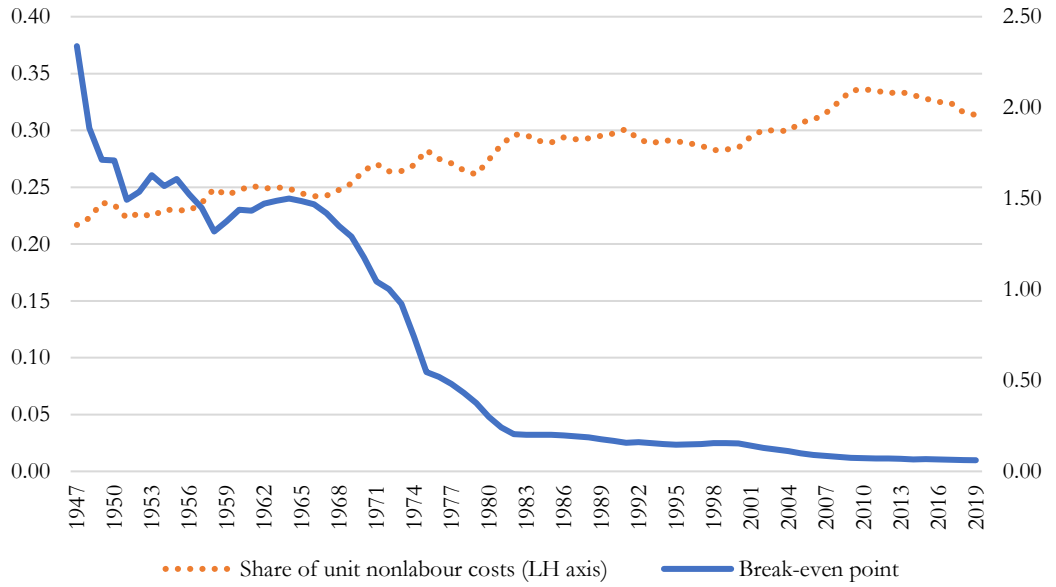
Once the break-even point is lower, firms can easily survive and can still make profit either if they cut prices in order to remove rivals out of market and to prevent new entries or if the level of output is reduced (idle capacity). Break-even point can be lowered either by way of reducing the share of variable costs within total costs by virtue of new productive technologies (i.e. more capital-intensive production) and/or by reducing price elasticity of

[6] It is worth noting the crucial inconsistency of Walrasian competitive market imagination: If all goods and costs are homogenous and hence there is no product differentiation, then there are no profits, no wage inequality. Firms and customers are homogenous, too. If so, why can some firms supply less when prices are low? And why cannot some customers demand when prices are high despite all incomes are equal?

[7] Davis (2013, p. 8) shows that sales volatility has increased since 1970, especially for small firms (by 25.4 percent for small and 5 percent for large firms). Setterfield and Avritzer (2020) and Bassi et al. (2022) document empirically the negative impact of uncertainty on capacity utilisation both at micro and macro levels.

demand via advertisements, market research, sales operations (Dögüs, 2019). These tasks envisage 'creating and sustaining customer loyalty' (Eichner, 1976, pg. 73) and enable the innovating firm to 'access high income, price insensitive markets through product innovation' (Lazonick, 2013, pg. 139) and to charge markup over average costs. As Steindl (1990, pg. 307) notes, 'break-even point is a measure of the degree of monopoly' and 'the break-even point will be lower if mark-up is higher'. In short, as seen in Figure 2, product differentiation helps to reduce the break-even point by making the total revenue curve steeper, i.e. by making price elasticity of demand for goods less elastic.

Figure 2- Share of unit nonlabour costs within average total costs and break-even point for US-NFCs, 1947-2019



Source: own calculations based on fredfred.stlouisfed.org/[8].

A flatter revenue curve due to higher price elasticity of demand and lower markup, and a steeper cost curve due to higher share of variable costs would meet at a higher output level. Whereas a steeper revenue curve due to lower price elasticity of demand (especially of white-collar workers, Dögüs, 2021a) and higher markup, and a flatter cost curve due to higher share of overhead labour would meet at a lower output level. Needless to say, small firms,

[8] Break-even point is calculated as the ratio fixed costs, i.e. consumption of fixed capital, structures, equipment, and intellectual property products (retrieved from: https://fred.stlouisfed.org/series/BOGZ1FU116300001A) per real value added of NFCs (retrieved from: https://fred.stlouisfed.org/series/B455RX1Q027SBEA) to markup. Markup is calculated as the difference between price per unit of gross value added of NFCs (retrieved from: https://fred.stlouisfed.org/series/A455RD3Q052SBEA) and labour cost per unit of gross value added of NFCs (retrieved from: https://fred.stlouisfed.org/series/A460RD3Q052SBEA).

due to their more elastic demand curves and restrictive cost structures, cannot afford employing white-collar workers as much as large firms can (Dögüs, 2019, pg. 230).

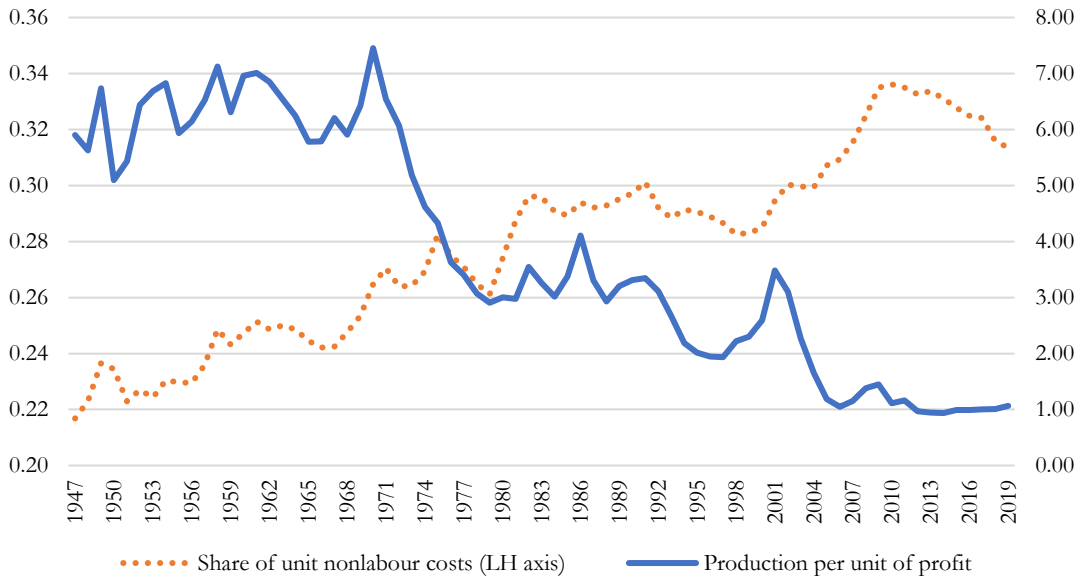
Based on the differences in slopes of cost and revenue curves, Toporowski (2005) points out that firms in capital-intensive industries tend to raise output more than their prices when demand increases, in order to spread their higher overheads over a larger output[9]. If they do not increase the production level in order to enjoy the decline in average cost and 'to offset the increase in capital intensity', 'the rate of profit falls if there is a rise in capital intensity of production and the degree of utilisation does not increase' (Kalecki 2017 [1943], pg. 30). For the same reason, because of the higher share of overhead and other fixed costs, they tend to lower prices more than output when demand falls. On the contrary, labour-intensive firms tend to raise prices more than output when demand for their products increase and tend to cut output when demand falls.[10]

The market power 'may be a prerequisite for the use of expensive and highly specialized capital assets and large-scale debt financing' (Minsky, 1986, pg. 181) and 'the non-oligopolistic subsector is characterized by less capital-intensive methods of production' (Eichner ,1976, pg. 261-262). In this context, the statement of Steindl (1952, pg. 3) that 'average cost of larger equipment with excess capacity is smaller than average cost of smaller equipment with full capacity' and so that 'long run cost curve declines' makes sense in terms of the positive relationship between capital intensity, excess capacity and lower break-even point. Under the circumstances of product differentiation and economies of scope with capital-intensive production techniques, where the break-even point is reduced, the level of production per unit of profit is lower. As depicted in Figure 3, the higher share of non-labour to conduct product differentiation, the lower is the industrial production per unit of profit.

[9] Taking production function into account, findings of Gechert et al. (2021) show that the Cobb-Douglas production function contradicts the data.

[10] A comparison of developed and developing economies during recession would support this argument. In developed countries deflation emerges during recessions, in developing countries the increase in unemployment prevails.

Figure 3- Share of unit nonlabour costs within average total costs and production per unit of profit for US-NFCs, 1947-2019

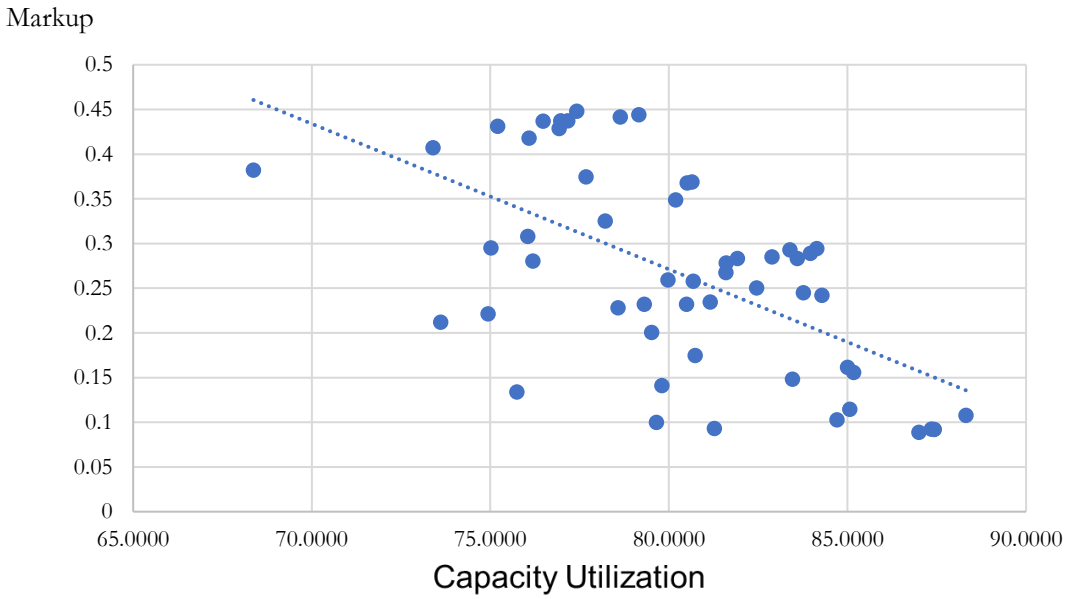


Source: own calculations based on fredfred.stlouisfed.org/[11].

To sum up, if the capacity utilisation is a positive function of effective demand and effective demand is stronger and higher in a less unequal and more competitive market case, then profit rate needs to be lower. On the other hand, in a more unequal and concentrated market case, the effective demand is structurally weaker and there is the possibility to charge higher markup due to product differentiation, which is the outcome of inequality-driven consumption preferences. As seen in Figure 4, profit rate (i.e. markup)[12] is not a positive function of capacity utilisation, unlike argued by Lavoie and Nah (2020), rather it has a correlation of -0.59.

[11] Production per unit profit calculates as the ratio of industrial production (index 2017=100, retrieved from: https://fred.stlouisfed.org/series/INDPRO) to profits before tax of NFCs (retrieved from: https://fred.stlouisfed.org/series/A464RC1Q027SBEA, index 2017=100).
[12] Markup is an *ex-ante* measure and *profit rate* is an ex-post measure.

Figure 4- Markup and capacity utilisation for US-NFCs, 1967-2019



Source: own calculations based on fredfred.stlouisfed.org/.

3. Conclusion

Product differentiation alters the cost and the demand structures, which then reduces the break-even point. Lower break-even point enables not only a higher markup and but also a higher desired excess capacity. As a result, the level of production per unit of profit, i.e. dependency of profits on production, tends to be lower in concentrated markets than in competitive markets.

This finding has implications for further research on the decline in unionisation, as the cost of strike activity would be lower in the product differentiation case where dependency of profits on output is structurally lower.

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