Production structure, output and profits - a note

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Production, structure, outputs 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 compared 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

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: 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. This 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. 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: 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 excess capacity is higher in concentrated markets than in mass production of competitive markets because of product differentiation.

[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.

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: 20). As 'Fordist mass production could only be profitable when high levels of demand were maintained (Jessop 1994: 27), higher amount of profits has required more output due to lower rate of markup.

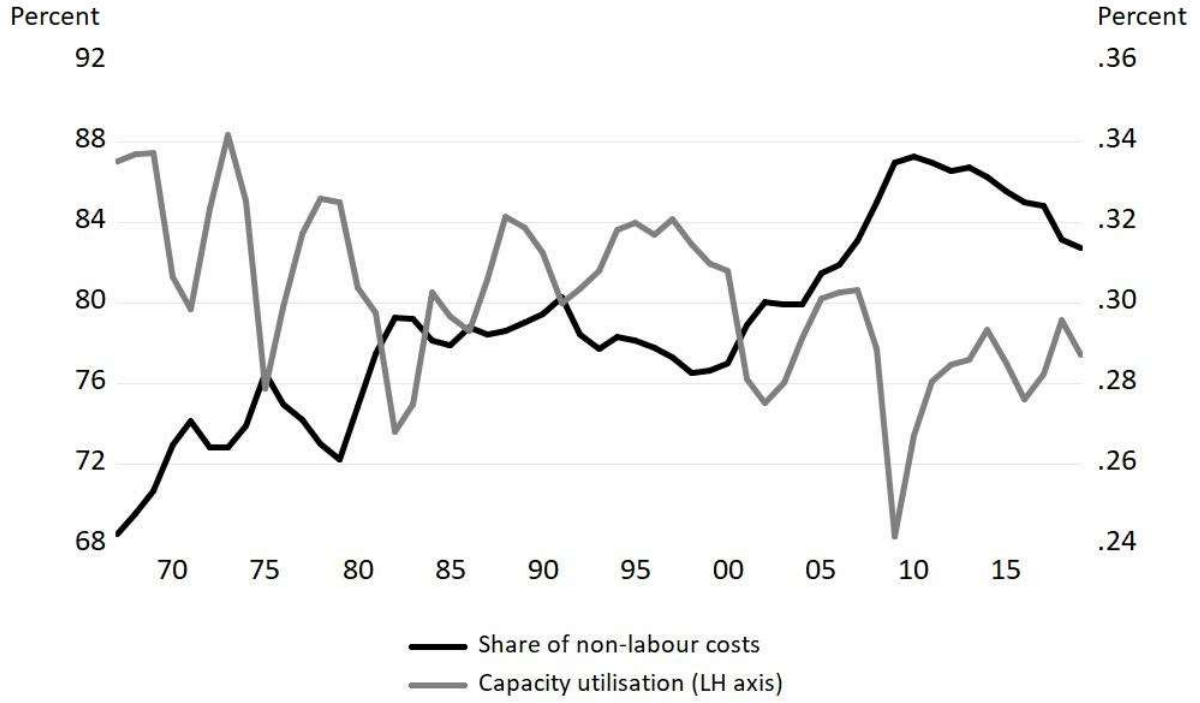
With the increase in market concentration and the rise of white-collar workers in last decades, there has been a shift from Fordist regime of 'mass production, scale economies, and mass consumption' to post-Fordist regime of 'flexible production, innovation, scope economies, and more differentiated patterns of consumption' (Jessop 1993: 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: 20). 'Absolute cost advantages and product differentiation serve to create a margin between the average variable and fixed costs' (Eichner 1976: 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: 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.

In case of product differentiation, 'economies of scope' outweighs the 'economies of scale' of mass production (Jessop 2014: 19-20). Sahoo (2007) empirically documents that economies of scope are negatively associated with capacity utilisation as idle capacity enables the firm to meet varying demand for its differentiated goods. 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: 40). Firms segment the markets in order to capture different customer groups those have different price elasticities of demand (Lazonick 2013: 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: 74). So, it is possible to infer that excess capacity and product differentiation go hand in

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

hand, as depicted in Figure 1[3]. I employ the share of nonlabour costs within total costs as a proxy to depict the product differentiation at macro level as overhead labour, 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[4] based on fredfred.stlouisfed.org/.

Since unit direct costs are roughly constant below full capacity (Lavoie 2006: 45), as products are reproducible (Lavoie 2014: 126) and 'unit prime cost does not depend on the degree of utilisation rate' (Kalecki 2003 [1954]: 19, footnote 1), capacity utilisation is not a matter of cost minimisation; rather it is endogenous to demand (Lavoie 1995;

[3] According to my own calculations based on fred.stlouisfed.org/, the correlation between 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 (average) normal rate of utilisation 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, increased 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 to 21 per cent, and would cause the top 20 per cent income share to fall from 64 to 61 per cent'.

[4] Details on calculations and sources of data can be found in Appendix.

Kalecki 2003 [1954]: 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 to excessive profits in oligopolistic markets (Steindl 1952: 55). That is why firms prefer to hold excess capacity to preserve their market share (Steindl 1952; Eichner 1976: 195).

In a full competitive case,[5] excess capacity is close to zero because there is neither excess level of demand uncertainty because level of inequality is too low[6] 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: 29) reinforce this finding showing that 'firms invest in intangible assets that help them curtail competition and lead to monopolistic markets'.

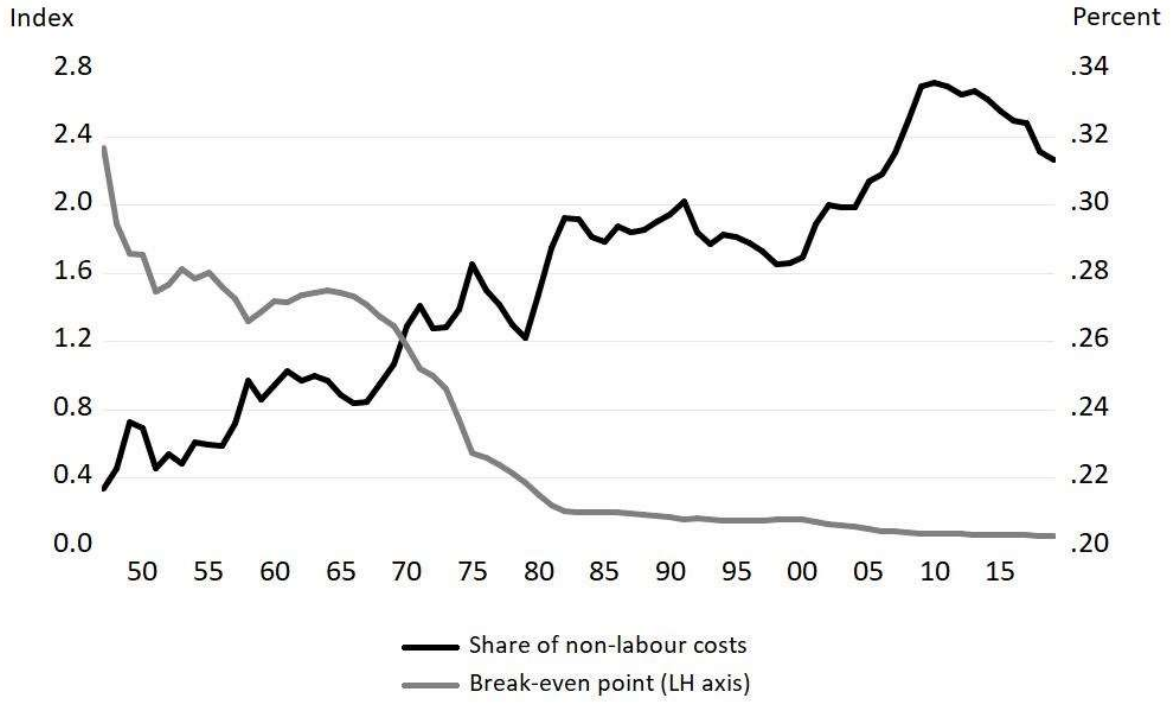
Another crucial issue regarding the existence of excess capacity in concentrated markets is the lower level of break-even point where revenues and total costs are equalized. Once the break-even point is lower, firms can easily survive and can still make profit either if they cut prices in order to remove 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 demand via advertisements, market research, sales operations (Dögüs 2019). These tasks envisage 'creating and sustaining customer loyalty' (Eichner 1976: 73) and enable the innovating firm to 'access high income, price insensitive markets through product innovation' (Lazonick 2013: 139) and to charge markup over average costs. As Steindl (1990: 307) notes, 'break-even point is a measure of the degree of monopoly' and 'the

[5] 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 is 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?
[6] 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).

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.

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, 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: 230).

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



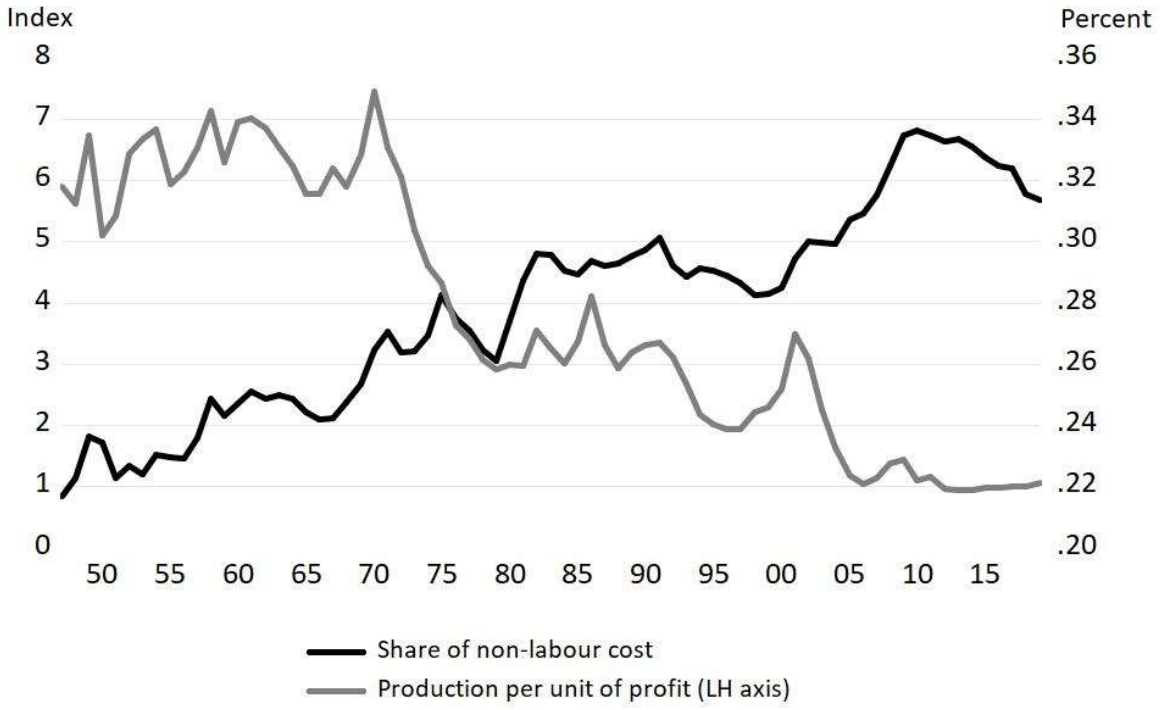
Source: own calculations based on fredfred.stlouisfed.org/.

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[7]. 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

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

2017 [1943]: 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.[8]

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/.

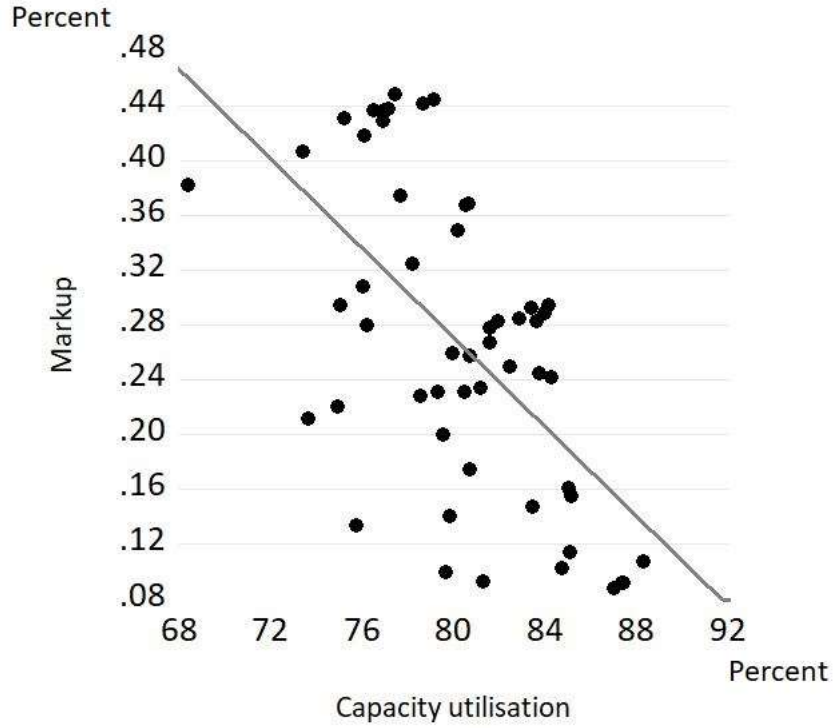
The market power 'may be a prerequisite for the use of expensive and highly specialized capital assets and large-scale debt financing' (Minsky 1986: 181) and 'the non-oligopolistic subsector is characterized by less capital-intensive methods of production' (Eichner 1976: 261-262). In this context, the statement of Steindl (1952: 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

[8] 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.

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.

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) is not a positive function of capacity utilisation, unlike argued by Lavoie and Nah (2020), rather it has a correlation of -0.59.

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



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

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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Appendix

Data sources and variable definitions

-Capacity utilisation: https://fred.stlouisfed.org/series/TCU

-Production per unit profit: (Industrial production (index 2017=100, https://fred.stlouisfed.org/series/INDPRO) / (Profits before tax, NFCs, https://fred.stlouisfed.org/series/A464RC1Q027SBEA, index 2017=100)

-Markup: (Price per unit of gross value added of NFCs, https://fred.stlouisfed.org/series/A455RD3Q052SBEA) – (Labour cost per unit of gross value added of NFCs, https://fred.stlouisfed.org/series/A460RD3Q052SBEA)

-Share of non-labour cost within total costs: per unit of gross value added of NFCs: (Unit non-labour cost, https://fred.stlouisfed.org/series/A467RD3A052NBEA) / (Unit labour cost, https://fred.stlouisfed.org/series/A460RD3A052NBEA + Unit non-labour cost)

-Break-even point: (Fixed costs, i.e. consumption of fixed capital, structures, equipment, and intellectual property products, https://fred.stlouisfed.org/series/BOGZ1FU116300001A, per real value added of NFCs, https://fred.stlouisfed.org/series/B455RX1Q027SBEA) / (Markup)

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

$$q_b * p = f + u * q_b \quad (1a)$$

$$q_b = f/(p - u) \quad (1b)$$