

EC534 - REFEREE REPORT

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I am refereeing “The rise of Market Power and Macroeconomic implications” (November 2019 version) by **Jan De Loecker**, **Jan Eeckhout** and **Gabriel Unger**. The paper is forthcoming in the *Quarterly Journal of Economics*.

SUMMARY OF THE PAPER

This paper is an ambitious empirical exercise attempting to document the rise in market power in the US. It uses a novel and micro-founded estimation strategy in conjunction with firm-level balance sheet data to show that aggregate markups were stable at around a fifth of marginal cost from 1955 to 1980, but increased to three fifth of marginal cost over 1980-2016. The rise in aggregate markups is driven by a combination of two trends: firstly the upper tail of the markup distribution has fattened, and secondly high markup firms have captured a larger share of sales. These effects account for 1/3 and 2/3 of the aggregate increase, respectively. The paper then relates the rise in markups to macroeconomic trends such as the fall in the labour and capital shares, the decline in business dynamism and the decline in geographical and firm-to-firm labour reallocation.

While the authors' investigation of the consequences of large markups on macro outcomes provides a useful motivation for their empirical exercise, their main contribution is methodological. The authors uses data on publicly listed firms and on the universe of firms observed in the US Manufacturing, Retail and Wholesale Censuses to support their argument. Importantly, this version of the paper addresses several criticisms related to what this new markup measure may capture beyond market power, such as a rise in fixed costs, a rise in output elasticity or a rise in the share of marketing and advertising expenses in total expenditures.

The following section stresses the relevance of the paper for some central debates in macroeconomics. The section after it summarises my main comments about the paper. The last section concludes and the appendix provides a summary of the method used by the authors to estimate firm-level markups.

RELEVANCE

The paper's relevance cannot be overstated. A rise in markups can provide a unified explanation to several secular trends in macroeconomics whose causes remain the subjects of intense debates: (i) the fall in labour income, (ii) the decline in low-skill wages, (iii) the decline in labour force participation, (iv) the decline in geographical and inter-firm mobility, (v) and the slowdown in productivity growth. Irrespective of the solidity of the empirical evidence, a single unified explanation for all these phenomena is worthy of attention. While the authors remain agnostic about the causes of rising market power, simply showing long-term trends in markups is of central importance to the macroeconomics literature.

The paper's contribution is also important for the Industrial Organisation literature on market power and firm-level markup estimation. IO scholars had estimated sector- or firm-specific markups before, but cross-sector aggregate markup measures based on firm-level data has been a very recent endeavour. Moreover, the time-coverage of the paper is unmatched, making it a reference point for the study of long-term trends in markups

MAJOR COMMENTS

The paper opens itself to two types of criticisms: methodological and theoretical. The methodological concerns are about aggregation of firm-level markups, how the share of variable inputs is calculated and the relevance of their sample. The theoretical concerns are related to the link between the estimated rise in markups and the secular trends. As the empirical part of the paper is the most important contribution I dedicate more space to the methodological concerns.

Methodological concerns.

1. Aggregation. The authors use the sales share of firms to compute their headline measure of weighted average of markups in the American economy.¹ This choice is not innocuous. Markets are heterogeneous in a number of dimensions and competition plays out differently in different markets. Some are subject to high

¹The authors defend this assumption by invoking the three following reasons: as reallocation of sales toward high-markup firms seems to be the driving force behind rising aggregate market power using input shares as weights would miss this trend, profits rates are aggregated with sales shares, and revenue weighting is used in the calculation of macroeconomic indicators such as GDP.

entry costs (airlines), some have become less competitive due to regulatory capture (broadband and communications), and some have been prone to collusion (chemicals). IO economists have always been sceptical of aggregating measures of market power across industries. This methodological concern is a consequence of the authors' decision not to take a stance on the causes of rising market power. More justification about why it is acceptable to use sales shares as weights would have been welcome.

Simple tweaks in weights can dramatically affect the level and growth of markups estimated by De Loecker and co-authors. One graph that did not survive in the latest version of the paper shows just how important this choice is. In the 2017 NBER working paper version, the authors find that the sales-share-weighted average of markups is actually lower than the unweighted average. See figure 1 below. This is counter-intuitive as one would expect the weighted average to be larger than the unweighted one if high-markup firms are also those with the largest sales share. This would be consistent with the theoretical prediction of competition *à la* Cournot, and with empirical findings from recent papers on the superstar firm effect (Autor et al., 2019).

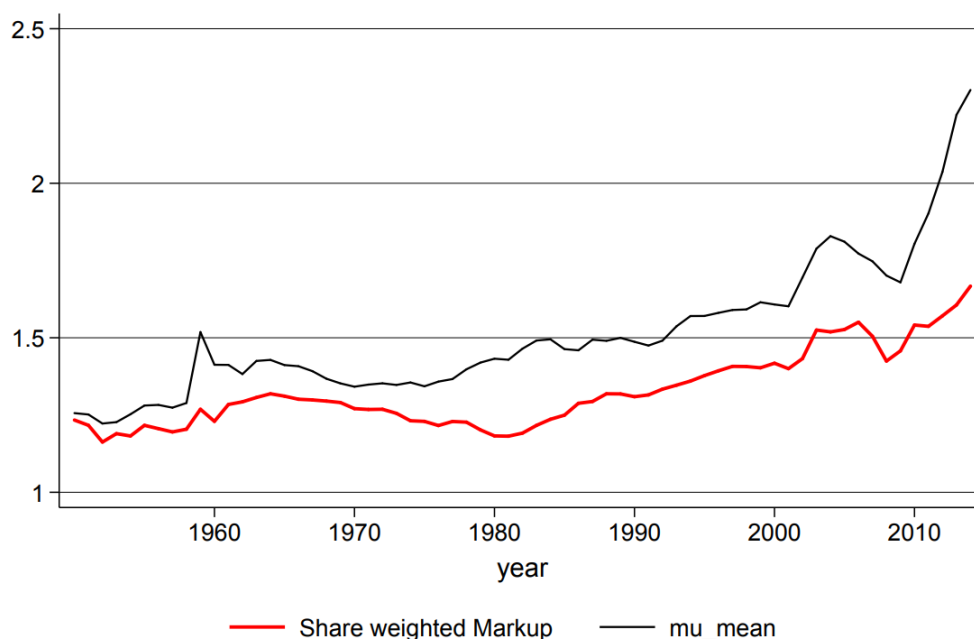


FIGURE 1. Unweighted versus weighted markups (Figure 2(a) from De Loecker and Eeckhout (2017))

But smaller firms indeed charge higher markups than big firms in the *Compustat* sample. The correlation between firm size and markups **across sectors** is negative. What can salvage the Cournot and superstar firm predictions is large heterogeneity of firm distribution in different sectors. This is indeed what De Loecker and co-authors observe, and this generates a positive correlation between markups and firm size **within sectors**.² Ultimately, the large heterogeneity of firm size and markup distributions in each sector casts doubt on how justifiable cross-sector aggregation is. Explaining the sector-specific differences in forces shaping competition would have helped the reader to make sense of some surprising results: for instance AT&T and Apple—two usual suspects in this high markup story—have lower markups than the weighted average in recent years. A firmer theoretical grounding of the paper could have put these findings in perspective.

²Consider the following simple example: there are two firms in manufacturing, and two firms in farming, the farming firms charge markups of 2 and 1.1, and they represent 11 and 9% of all sales in the economy respectively. In manufacturing, the biggest firm charges markups of 1.4 and the smallest 1.04, they weight 60 and 20%.

2. *Inclusion of marketing and management costs.* A key critique of the paper’s methodology concerns the omission of marketing, advertising and administrative costs in the variable cost expenditure term. This point has been initially made by Traina (2018) who notes that if marketing and management costs are included in variable costs, the increase in markups disappear. To see this, one can refer to the measure of markups used by De Loecker et al. (2019) (the appendix provides a summary of the derivation):

$$\mu_{it} = \epsilon_{it}^v \frac{P_{it} Q_{it}}{P_{it}^V V_{it}}$$

De Loecker and co-authors do not include administrative expenses either in the denominator or in the production function used to estimate the output elasticities ϵ_{it}^v . As a result, the ratio of sales to variable inputs and the elasticity are overestimated. Leading to an upward level shift of markups. Furthermore, the share of administrative costs in total costs has increased since the 1950s, so De Loecker and co-authors are not only overestimating the level of markups but also their upward trend. Figure 2 below shows “Costs of Goods Sold” (COGS), the measure of variable costs used by De Loecker et al. (2019) as a share of total expenditures (left) and how aggregate markups change when using total expenditure instead (right).

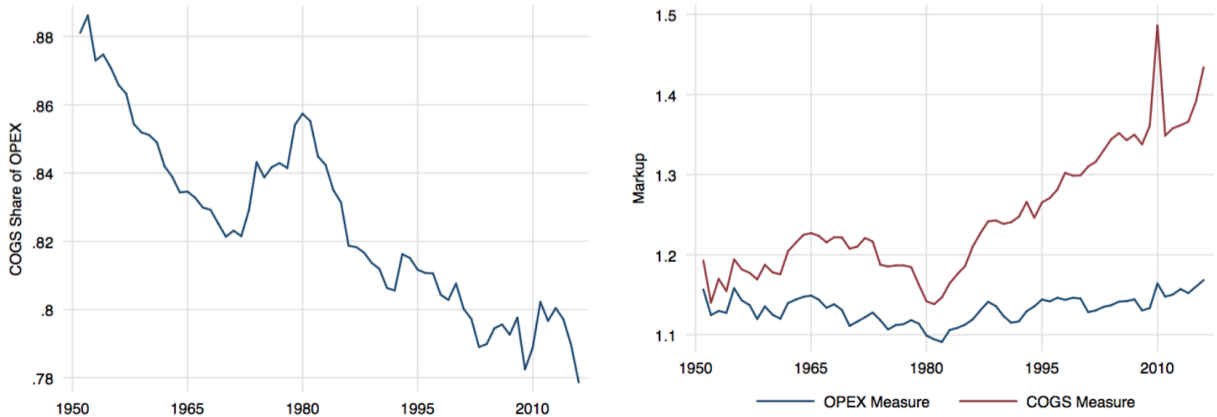


FIGURE 2. Share of “Cost of Goods Sold” in total expenditures (left) & resulting markups (right) (figures 2 and 4 from Traina (2018))

De Loecker et al. (2019) are effectively abstracting from all the costs that are necessary to bring the product to the consumer. The justification of this assumption boils down to what makes a cost variable or fixed. By abstracting from administrative expenses altogether, the authors assume they are fixed costs. This assumption would have deserved more justification and the authors somewhat unconvincingly and partially address it in the paper.³

3. *Representativeness and composition of the Compustat sample.* Compustat only consists of publicly traded firms. This has important implications when considering the welfare consequences of high markups. Back-of-the-envelope calculation can help us get an idea of the magnitude of the phenomenon De Loecker and co-authors are documenting. Firstly, Davis et al. (2006) finds that publicly traded firms represent only 1/3 of US total sales and employment, excluding self-employed and farm workers. Secondly, one of the most striking results of the paper is that markups are only increasing for the top 10% of firms in the markup distribution (Figure 3(b) in the paper). Lastly, 1/3 of this increase in markups is actually due to larger overhead costs and not market power. Assuming that a representative consumer shops a basket of goods reflecting the revenue shares of companies, the three facts mentioned above indicate that the rise in markup

³They argue that the measure of markups that includes administrative costs is not capturing markups but something closer to operation profit rate.

due to market power pertains to $10\% \times \frac{1}{3} \times \frac{2}{3} = 2.2\%$ of consumers' purchases.

To show that the rise of markups is an economy-wide trend, the authors provide some helpful comparisons of their measure of markups estimated on various Censuses of firms. Unfortunately, the results are not entirely convincing. The authors estimate markups that go up to 40 times the marginal cost for the 90th percentile of retail firms (Figure 6 in the paper). Instead of strengthening their results, this questions the validity of their method. Moreover, the downward trend in the wholesale sector directly contradicts their earlier analysis.

Theoretical concerns.

The fall in labour share. High-markup firms tend to have lower labour shares. This follows mechanically from the firm's optimisation problem that higher markups lead to lower expenditure on inputs like labour. Combining this observation with their increased sales-weight in the US economy can allow us to make sense of the secular decline in the labour share. This echoes the findings of [Autor et al. \(2019\)](#) and [Kehrig and Vincent \(2017\)](#). The authors argue that increased market power is the cause behind the rise of markups and the diminution of the labour share of income.

The only issue with this argument is that the timing of their rise in markups does not correspond 1-to-1 to that of the fall in the labour share. The labour share drops relatively sharply in the 2000s but is rather stable before, yet their markup measure increases from the 1980s onward. Figure 3 shows the fall in the labour share in the United States.

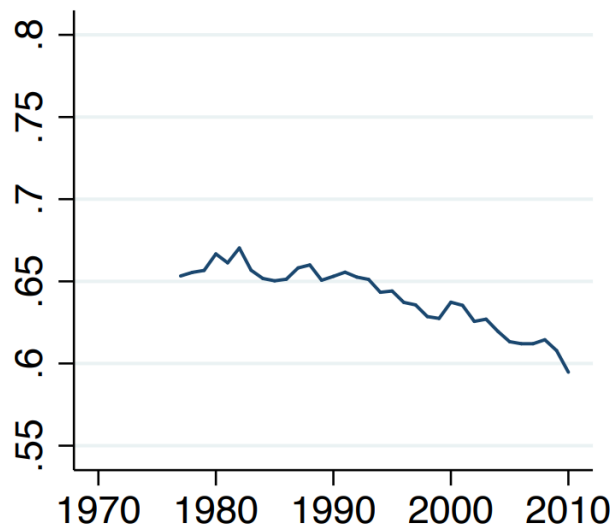


FIGURE 3. Ratio of labour compensation to gross value-added in the US (Figure 1 from [Autor et al. \(2019\)](#))

CONCLUSION

Ultimately, this article is a rather convincing piece of evidence that market power is rising in the American economy. As this question is multifaceted and hard to assess, the evidence documented by De Loecker and co-authors needs to be considered along with other bits of evidence that market power is rising. This includes increased market concentration ([Autor et al., 2017](#)), rising profits ([Barkai, 2019](#)), decreased investment ([Gutierrez and Philippon, 2017](#)), and large decreases in labour share in concentrated markets ([Azar et al., 2017](#)).

The novelty of the methodology pioneered by the authors is what makes both the strengths and the weaknesses of the paper. It would be helpful to see more research being done using this approach on better

quality data to confirm its findings. The timeliness of the paper and the discussion it has already generated make it a landmark piece of research.

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APPENDIX

Summary of the method. The authors rely on a method pioneered by [Hall \(1988\)](#) and refined by [De Loecker and Warzynski \(2012\)](#): the **production approach**. It consists in backing out markups from the variation in the share of a variable input expenditure to total revenue and the output elasticity of this input.

To compute markups, researchers need to get an estimate of marginal costs. When using the production approach, this is made possible by stating the problem of the firm as a cost-minimisation one.⁴ The marginal cost thus naturally appears as the Lagrange multiplier in the cost-minimisation problem. Manipulating the first order condition of the firm allows one to express markups as a function of the revenue share of variable inputs and the output elasticity of variable input:

$$\mu_{it} = \epsilon_{it}^v \frac{P_{it} Q_{it}}{P_{it}^V V_{it}}$$

A crucial component of this formula is thus the output elasticity ϵ_{it}^v . These elasticities are sector- and time-specific. In this paper, they are estimated using a variant of the technique introduced by [Olley and Pakes \(1996\)](#) to estimate production functions without imposing the assumption of constant return to scale.

A contentious part of the paper pertains to how firm-level markups are being aggregated. they calculate aggregate markups as

$$\mu_t = \sum_i m_{it} \mu_{it}$$

where m_{it} is the weight of firm i at t . The authors use the sales share of firms as weights. But they show that if input weights are used instead, the rise of markup still holds, but the rise is less pronounced. This result is consistent with the theory: if market power increases, quantities sold and inputs used decrease, but total sales increase through higher prices. Thus using input shares understate the magnitude of markups.

⁴The cost-minimisation assumption is not entirely standard. Most importantly, if a firm is minimising costs taking input prices as given, this implicitly assumes that firms do not have any wage-setting power. Recent evidence from the US economy show that this assumption may not be totally innocuous ([cea Council of Economic Advisers, 2016](#))