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Stock Markets and Competition: What Does A Concentrated Stock Market Tell Us About Competition In The Economy?

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The paper presents analysis of market concentration in Australia's stock market and explores what this might tell us about the state of competition in the real economy. It finds that, on most measures, Australia's stock market is highly concentrated but is becoming less concentrated over time. Many studies, including leading books on competition policy, have used stock market concentration as a proxy for market concentration in the economy, usually due to data constraints. The paper warns against this. Using the stock market for competition analysis incorrectly defines markets and competition, excludes most competitors, ignores important market dynamics and leads to erroneous results. Declining stock market concentration should not be taken as a sign that competition in the economy is improving.

Keywords: competition, oligopoly, market concentration, market structure, size distribution of firms, mergers, asset pricing.

1. Introduction

Market concentration has enjoyed somewhat of a renaissance in recent years. Dismissed for decades by the Chicago School as being largely irrelevant to questions of competition (Triggs & Leigh, 2019),[1] some of the world's top economists (Akerlof, Holden & Rayo, 2018; Blonigen & Pierce, 2016; Wu, 2018),[2] including those from the Chicago School,[3] are now exploring whether high levels of market concentration can help explain some of our most pressing economic conundrums: from low inflation, low investment, low growth and low productivity, to high markups, abnormally high profits and increasing anti-competitive conduct.

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[1]See Triggs and Leigh (2019) for a historical account of the Chicago School's views on market concentration and its influence on policy in Australia.

[2]See Summers (2016), Krugman (2016), The Economist (2016), Philippon (2019), Wu (2018), Loecker and Eeckhout (2018), Autor et al (2017), Blonigen and Pierce (2016), Akerlof, Holden and Rayo (2018),

[3]The Chicago School held a summit on competition and market concentration in 2017. The quipped that "convening a conference supporting antitrust concerns in the Windy City was like holding a symposium on sobriety in New Orleans".

JEL classifications: L10, L11, L12, L13, L22, G34, G12

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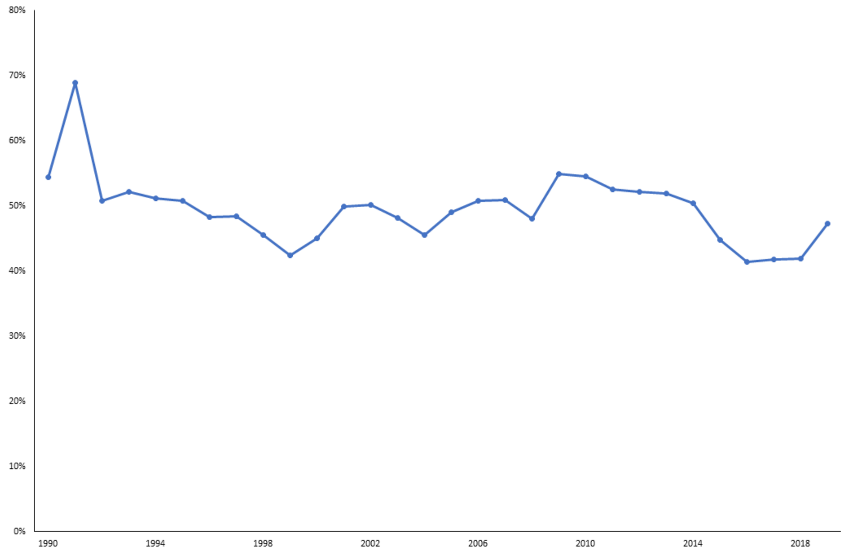

Figure 1. *Combined Market Shares of Australia's Four Largest Listed Firms [Colour figure can be viewed at wileyonlinelibrary.com]*

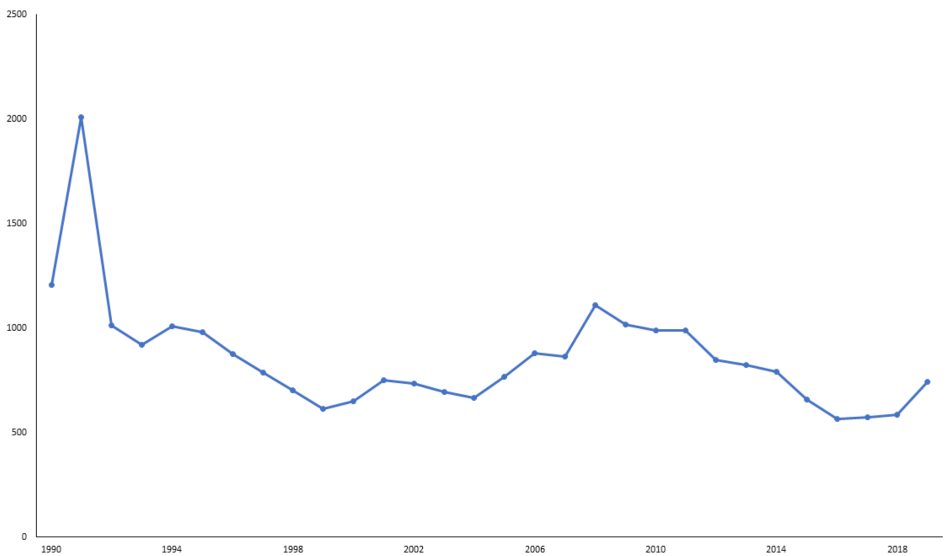

Figure 2. *Herfindahl–Hirschman Index for the Australian Stock Market [Colour figure can be viewed at wileyonlinelibrary.com]*

Some of this analysis, including leading books on competition policy, has used stock markets as a proxy for what is happening in the rest of the economy (Tepper & Hearn, 2019).[4] There is reason for

[4]See Tim Wu (2018), Jonathan Tepper and Denise Hearn (2019), Council of Economic Advisors (2016) and Grattan .

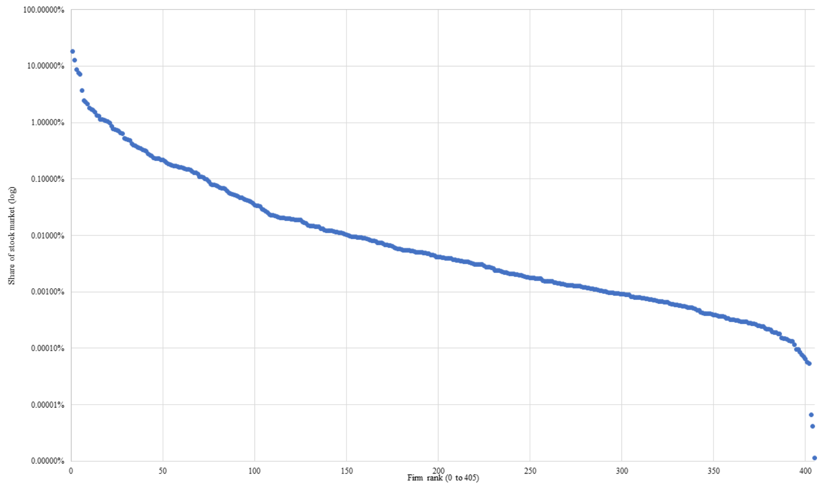

Figure 3. *Australian Listed Firms Ranked from Largest to Smallest by Share of the Stock Market [Colour figure can be viewed at wileyonlinelibrary.com]*

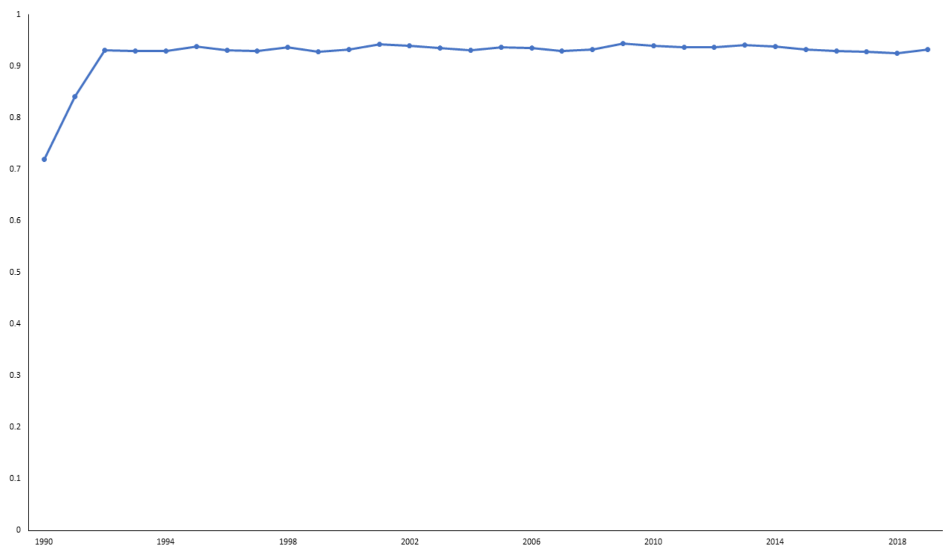

Figure 4. *Gini Coefficient for the Australian Stock Market [Colour figure can be viewed at wileyonlinelibrary.com]*

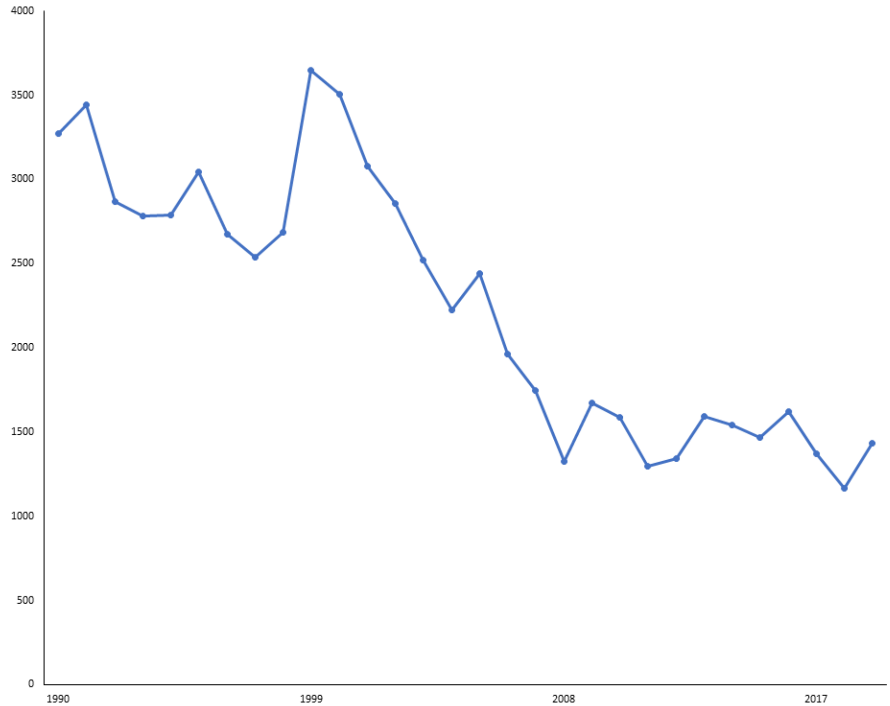

Figure 5. *Energy HHI [Colour figure can be viewed at wileyonlinelibrary.com]*

doing so. Hou and Robinson (2006) show that the structure of product markets affect managers' operating decisions which, to the extent these decisions affect the risk of a firm's cash flows, will impact stock returns. However, the preliminary results in this paper suggest that caution should be taken when using the stock market as a proxy for the rest of the economy in thinking about competition. Using Australia as a case study, the paper shows that the Australian stock market is highly concentrated. Although this concentration is declining over time, it would be unwise to take this as a sign that competition in the rest of the economy is improving. Using the stock market for competition analysis incorrectly defines markets and competition, excludes most competitors and ignores important market dynamics. Such analysis leads to erroneous results.

2. Stock market concentration in australia

The most common ways to measure market concentration are the four-firm concentration ratio and the Herfindahl–Hirschman Index. The Gini coefficient is also insightful in how market shares are distributed across firms.

The four-firm concentration ratio is calculated as the sum of the market shares of the four largest firms. A market is considered to be concentrated if the four largest firms control a third of the market or more.[5] As of 2019, the four largest firms in the Australian stock market held a combined market share of 47 per cent based on market capitalisation. This was down from 55 per cent in 2009 and 69 per cent in 1991 (Figure 1).

[5]See The Economist (2016) for a discussion.

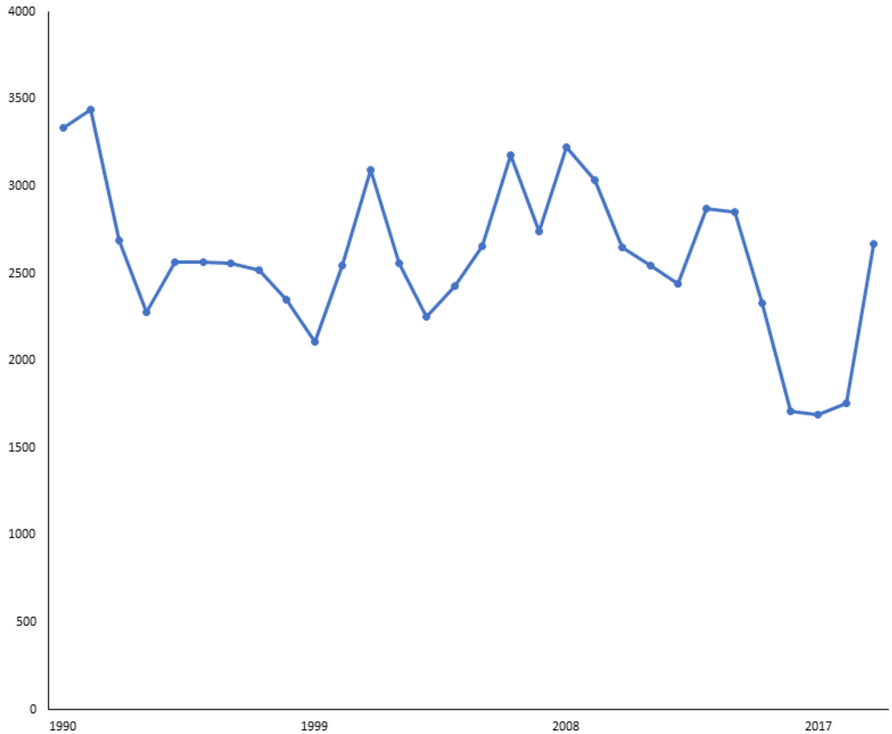

Figure 6. *Materials HHI [Colour figure can be viewed at wileyonlinelibrary.com]*

The Herfindahl–Hirschman Index (HHI) is calculated as the sum of the squares of each firm's market share. The HHI therefore accounts for all firms, not just the largest four, and accounts for the distribution of market shares by giving additional weight to firms that have a larger market share. The HHI ranges from 0 (a perfectly unconcentrated market) to 10,000 (a monopoly) and is interpreted as follows:[6]

- An HHI greater than 2,500 suggests a highly concentrated market.
- An HHI above 1,500 but below 2,500 suggests a concentrated market.
- An HHI below 1,500 suggests an unconcentrated market.
- An HHI below 100 suggests a highly unconcentrated market.

As of 2019, the HHI for the Australian stock market is 741. This implies that the Australian stock market is unconcentrated, contrary to the finding of the four-firm concentration ratio. This is down from 1,100 in 2009 and its highest point of 2,000 in 1999 (Figure 2).

The HHI result is different from the four-firm concentration ratio because the HHI accounts for the fact that, although the stock market is dominated by a few big firms, there are also thousands of smaller firms in the market. Figure 3 shows the market shares of all firms in the Australian stock market ranked by market capitalisation. Ten firms account for almost 90 per cent of the stock market. This highly uneven distribution is evidenced by the Gini coefficient[7] which has been above 0.92 for almost 30 years, implying a highly unequal distribution of market shares (Figure 4).

[6]This is the methodology used by the US Department of Justice (2019).
[7]The Gini coefficient ranges from 0 (perfect equality of market shares) to 1 (perfect inequality of market shares).

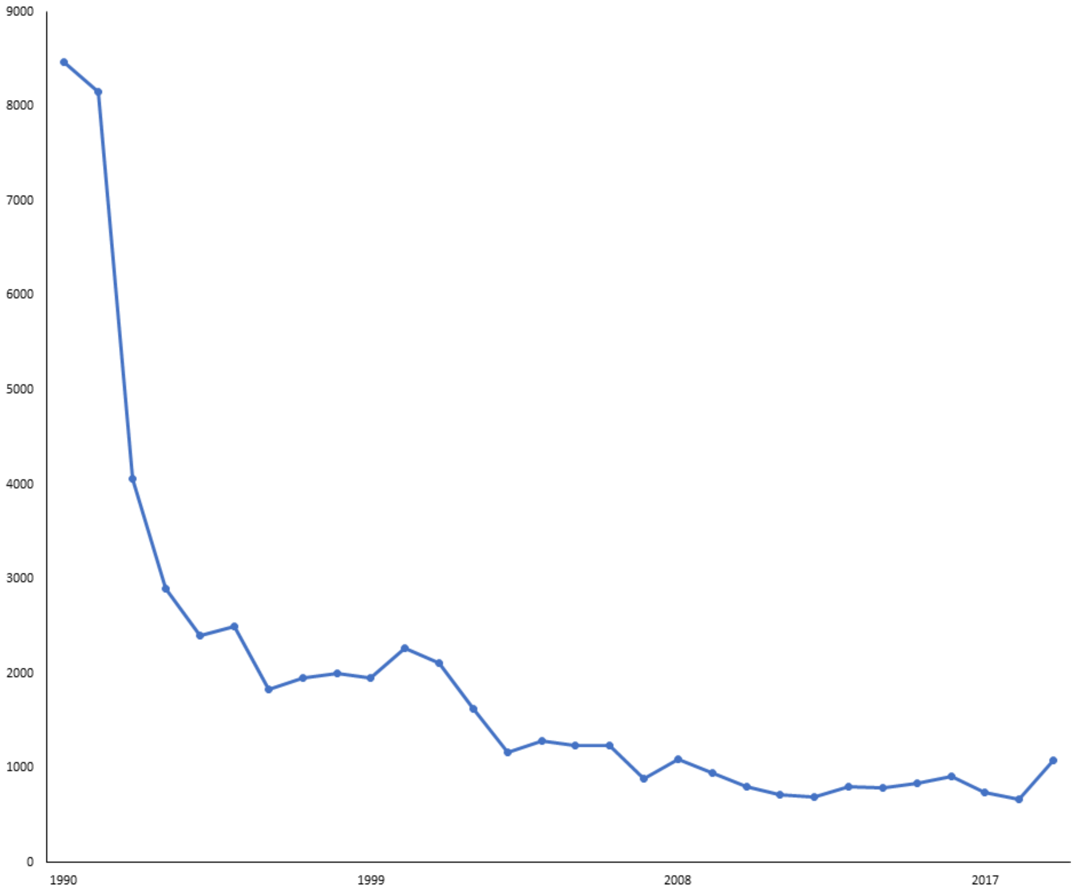

Figure 7. *Industrials HHI [Colour figure can be viewed at wileyonlinelibrary.com]*

3. What does the stock market tell us about competition?

The above analysis shows that the Australian stock market is dominated by large firms, but that market concentration is declining over time. What does this tell us about the state of competition in the Australian economy more generally? Critical considerations are the definition of markets and competition, the competitors included in the analysis and the dynamics of markets.

3.1. Defining the market

In assessing competition, the stock market has been used in many studies as a proxy for the overall economy, usually due to constraints in accessing firm-level time series data (Grattan Institute, 2017).[8] The critical problem with this methodology is that it neglects the importance of market definition.

Whether a market is concentrated or not hinges to a significant extent on how that market is defined. A broadly defined market tends to be less concentrated than a narrowly defined market because the former tends to include more firms than the latter. A market defined as “banking in Australia” would be much more concentrated than a market defined as “the Australian economy.”

[8]See Grattan Institute (2017).

Figure 8. *Consumer Discretionary HHI [Colour figure can be viewed at wileyonlinelibrary.com]*

It follows that a market defined as the "the Australian Stock Exchange" is unlikely to tell us much about the state of competition in the economy. It is little wonder that measures which capture the entire market – such as the HHI – suggest the market is unconcentrated (Pavic, Galetic & Piplica, 2016).[9]

One way to see this is to divide the stock market into 11 sectors (Figures 5-15). Although this gives a better picture of the competitive landscape, it is still significantly less than the 482 industries that Australia's economy is typically divided into for robust competition analysis (Leigh & Triggs, 2016).[10] But even at this high level of aggregation, a more nuanced story emerges. Based on their HHI calculations, seven out of these eleven sectors are either highly concentrated or concentrated (Table 1) and market concentration in three of these sectors – financials, healthcare and materials – has been rising, not falling, over the last 10 years. This is the opposite result of the aggregate stock market HHI.

[9]See Naldi and Flamini (2014) and Pavic, Galetic and Piplica (2016) on the differences between the HHI and four-firm concentration ratio.
[10]See Leigh and Triggs (2016).

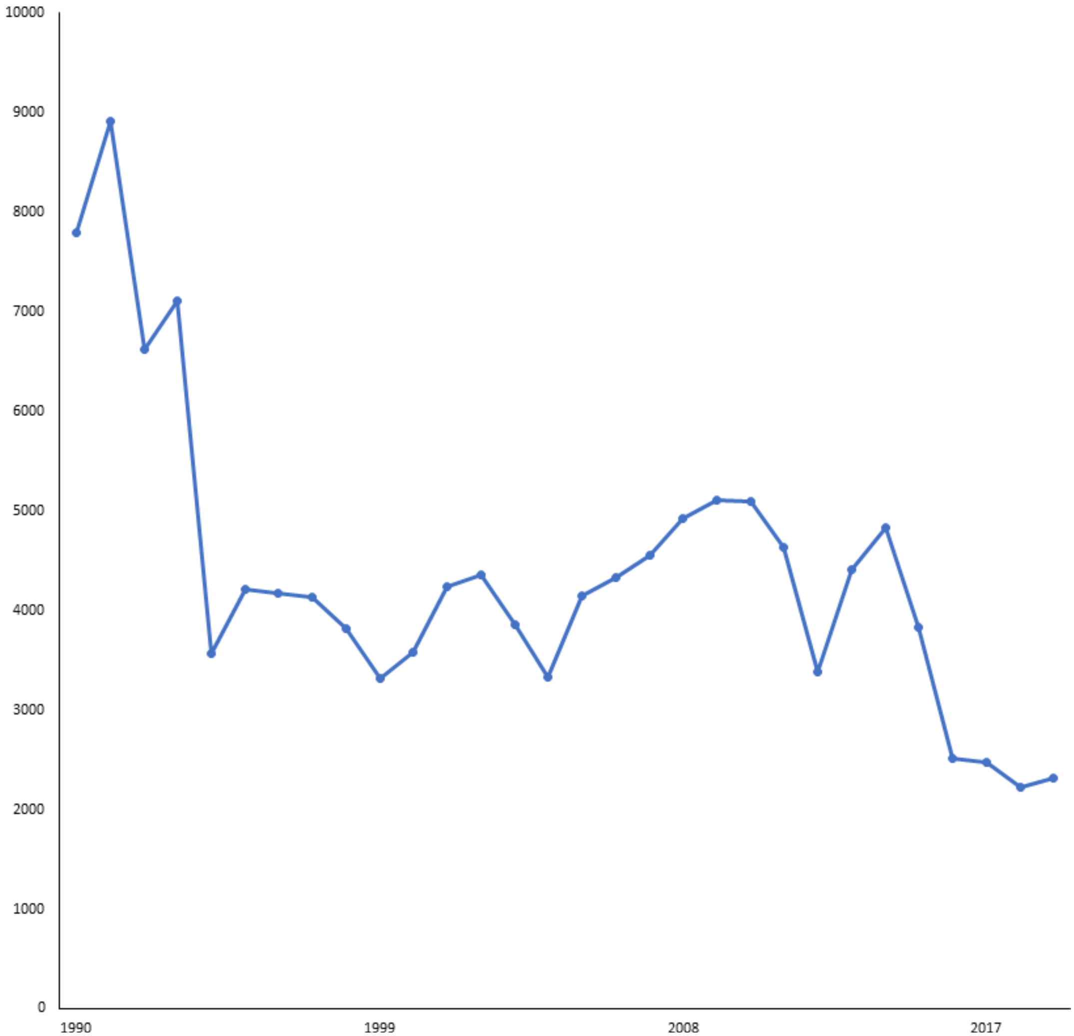

Figure 9. *Consumer Staples HHI [Colour figure can be viewed at wileyonlinelibrary.com]*

3.2. Stock market concentration compared to the rest of the economy

The stock market is also a poor proxy for the economy because relatively few of Australia's firms are listed. For every listed firm in Australia, there are more than 900 firms which are unlisted.[11] Any competition analysis based on the stock market is omitting a great many competitors and is likely missing much of the picture. The impact of these omissions will be larger for large firms and smaller for small firms (Naldi & Flamini, 2017).[12]

[11] Australian Bureau of Statistics, Counts of Australian Businesses, 8165; Australian Stock Exchange, the Official List (Listed Companies).

[12] See Naldi and Flamini (2017)

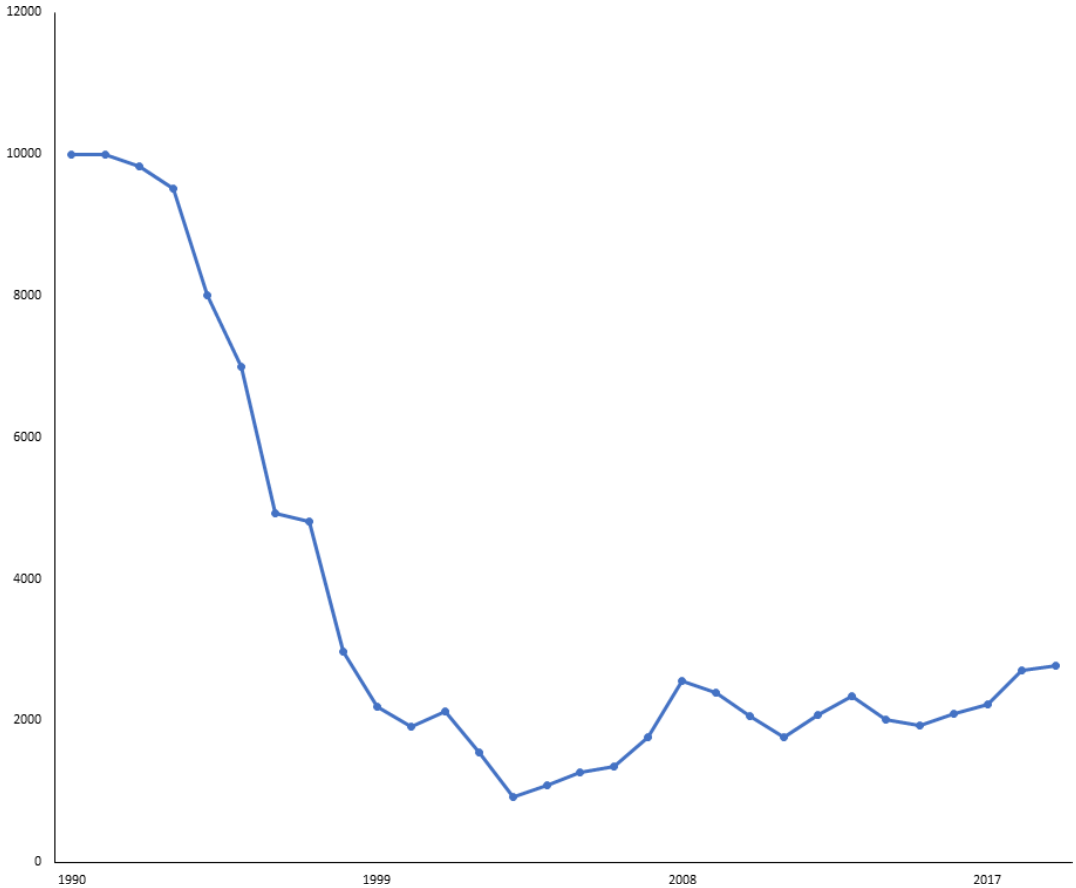

Figure 10. *Healthcare HHI [Colour figure can be viewed at wileyonlinelibrary.com]*

Another way to assess whether stock market concentration is an indicator of economy-wide market concentration is to assess how closely the two move together throughout time. The absence of publicly available time series data on market concentration in the Australian economy makes this difficult. But cross-sectional data on market concentration at particular points in time suggest that the two do not always line up. One study found that the four-firm concentration ratio for the Australian economy in 2015 was 36 per cent whereas the same indicator based on the stock market was more than a quarter larger (Leigh & Triggs, 2016).[13]

The stock market-based finding that market concentration is declining is similarly at odds with other economic trends. Market concentration is driven to a large extent by the rate at which new businesses are created and the rate at which existing businesses are merging. The rate at which new businesses are created has fallen from 14 per cent in the early 2000s to 11 per cent today[14] while the rate of mergers and acquisitions has quintupled from 1992 to 2017, rising from 394 to 1,960 per year

[13]See Leigh and Triggs (2016).
[14]See Quinn (2019).

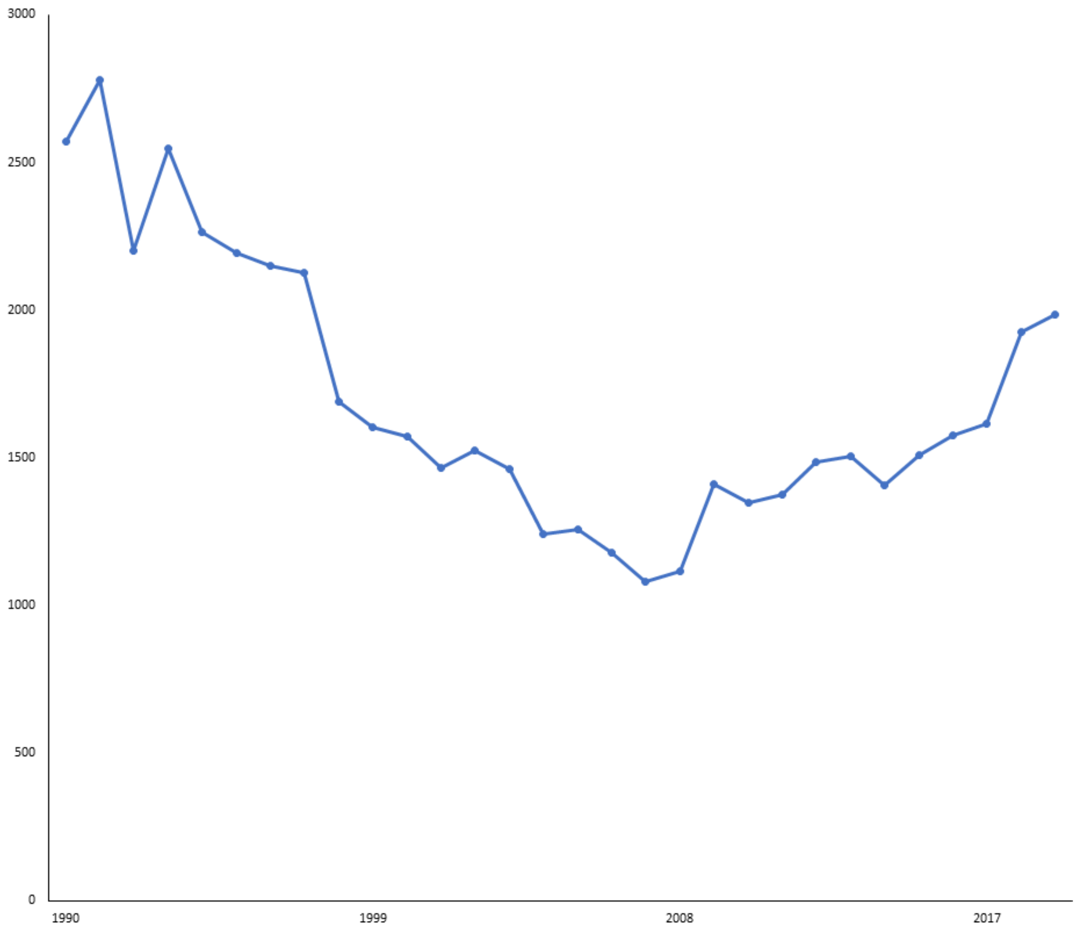

Figure 11. *Financials HHI [Colour figure can be viewed at wileyonlinelibrary.com]*

(Mergers, Acquisitions and Alliances, 2019).[15] Both suggest market concentration is rising, not falling. This has been confirmed in economy-wide analyses of market concentration in Australia (Leigh & Triggs, 2016.[16]

3.3. Capitalisation versus concentration

Finally, in the unlikely event that all competitors in a given market are listed firms, there are reasons to question whether a high market capitalisation necessarily implies a large market share in the real economy. Tesla's market capitalisation is triple that of Ford's despite its share of global car sales being 93 per cent smaller.[17] Further research comparing product market shares to stock market shares for each of Australia's 482 industries would reveal how closely the two are correlated, particularly given time lag effects since stock values incorporate

[15]Institute for Mergers, Acquisitions and Alliances (2019).
[16]Bakhtiari (2019) and Leigh and Triggs (2016)
[17]Data from Statistica (2020).

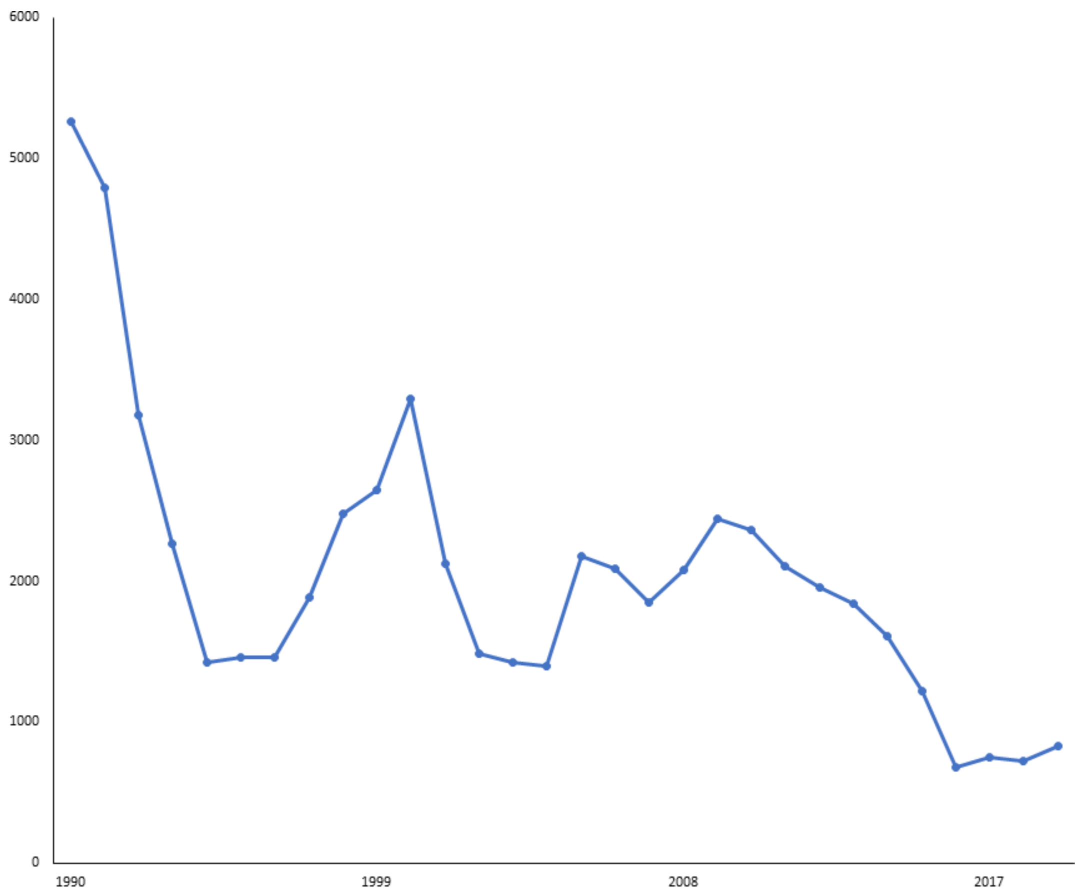

Figure 12. *Information Technology HHI [Colour figure can be viewed at wileyonlinelibrary.com]*

expectations of future cash flows. But there are at least theoretical reasons to question whether the two move together, particularly given that share prices are based on more information than product market shares alone, implying that stock market concentration may be an unreliable proxy for product market concentration.

4. Conclusion and questions for further research

This paper presented some preliminary analysis of market concentration in Australia's stock market and explored what this might tell us about the state of competition in the real economy. Under most measures, Australia's stock market is highly concentrated, but this concentration is falling over time. Should this be taken as a sign that competition is improving in the economy? Some studies have reached this conclusion from using the stock market as a proxy for the overall economy, usually due to constraints in accessing firm-level time series data. The preliminary results of this paper suggest this is unwise.

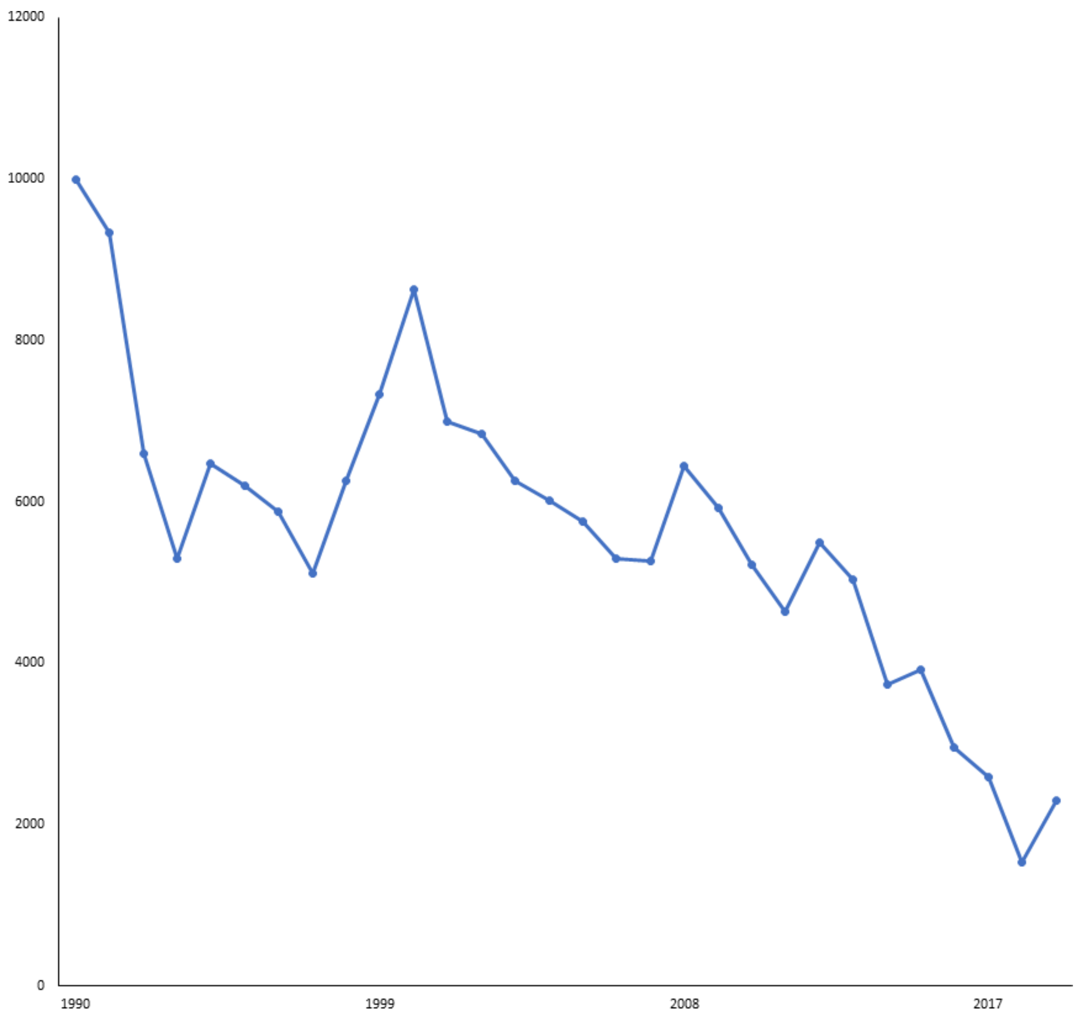

Figure 13. *Communication Services HHI [Colour figure can be viewed at wileyonlinelibrary.com]*

To be effective, competition analysis should focus on competitors. The Australian stock market includes thousands of firms which are not necessarily competitors. This makes the stock market a poor choice for competition analysis. The aggregate HHI suggests the Australian stock market is not concentrated and is becoming less concentrated over time. But dividing the stock market into 11 sectors, which gives a marginally better indication of firms which might be competing with one another, shows that most sectors are either concentrated or highly concentrated, and that concentration has been growing in almost a third of them.

The stock market is also a poor proxy for the rest of the economy because it excludes most competitors. For every Australian business that is listed on the stock market, more than 900 are not listed.

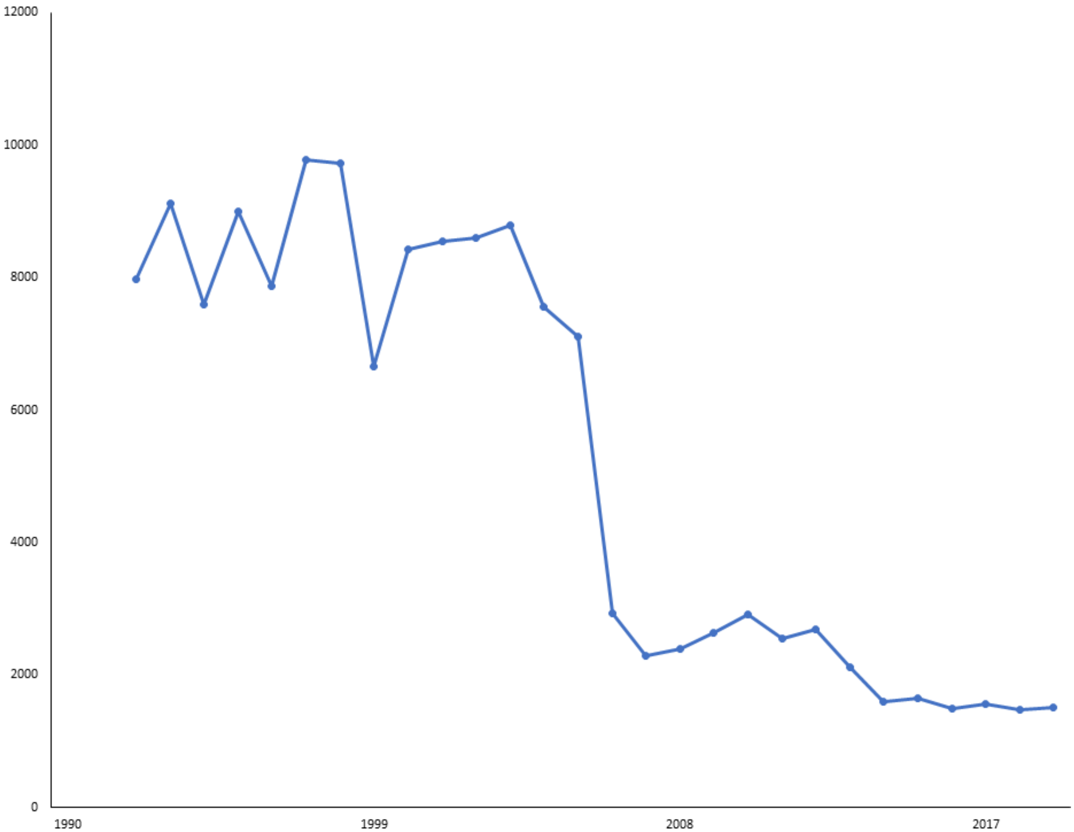

Figure 14. *Utilities HHI [Colour figure can be viewed at wileyonlinelibrary.com]*

The finding that Australia's stock market is becoming less concentrated over time is also inconsistent with what is observed in other parts of the economy – such as the declining rate at which new firms are being created and the increasing rate of mergers and acquisitions. Estimates at specific points in time show that the stock market and the real economy are not often aligned in terms of market concentration, and there are reasons to question whether stock market capitalisation tells us much about competition.

These are preliminary results, and further research is required. The robustness of these conclusions could be tested by comparing Australia's experience to the experiences of other countries, further disaggregating the stock market into industrial groupings and comparing listed firms' share of the stock market to their shares of product markets to see if they correlate. But what is fundamentally required is publicly available time series data on economy-wide concentration. Until then, researchers may be left to rely on poor substitutes.

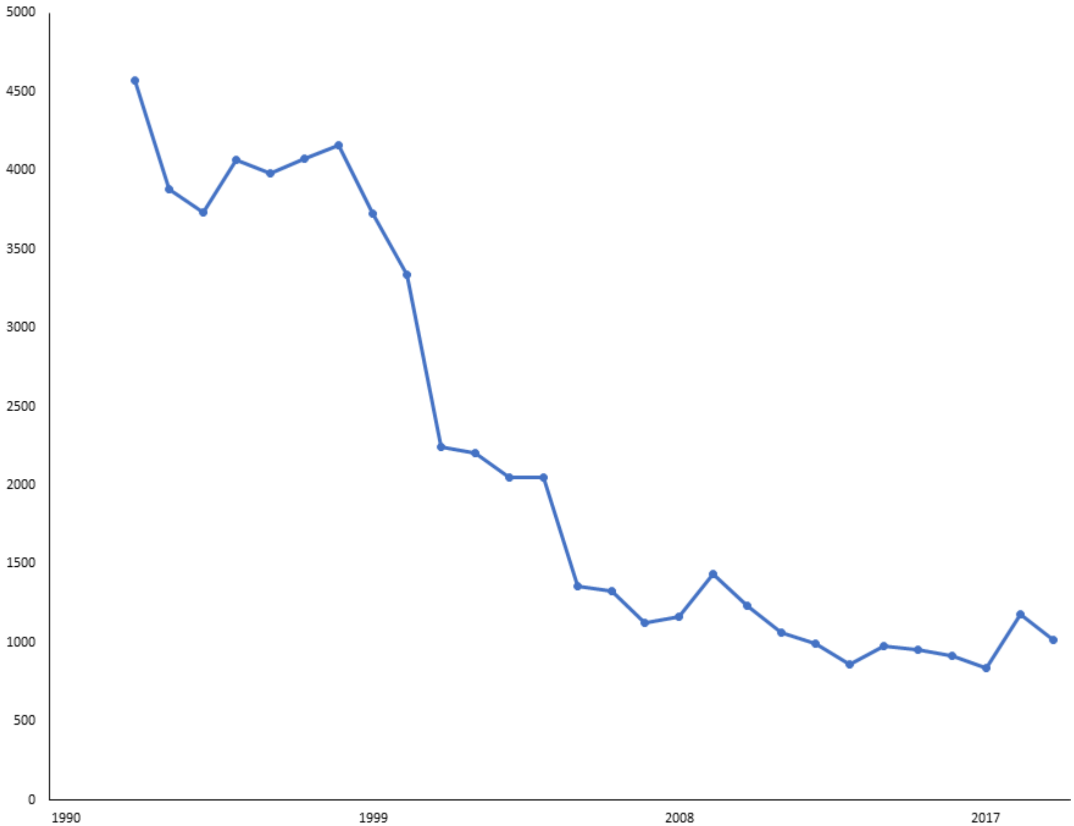

Figure 15. *Real Estate HHI [Colour figure can be viewed at wileyonlinelibrary.com]*

Table 1. *HHI Analysis of the 11 Sectors of the Australian Stock Market*

Highly concentrated (HHI> 2,500)	Concentrated (HHI> 1,500)	Highly concentrated (HHI < 1,500)	Highly concentrated (HHI < 100)
Materials	Energy Consumer staples Healthcare Financials Communication services Utilities	Industrials Consumer discretionary Information technology Real estate	Nil

Source: Author analysis of Morningstar database (2020).

REFERENCES

Akerlof, R., Holden, R. and Rayo, L. (2018), Network Externalities and Market Dominance. Working Paper, 10 April 2018.

Autor, D., Dorn, D., Katz, L., Patterson, C. and Reneen, J.V. (2017), The Fall of the Labor Share and the Rise of Superstar Firms. National Bureau of Economic Research. Working Paper No 23396, May 2017.

Bakhtiari, S. (2019), 'Entrepreneurship Dynamics in Australia: Lessons from Micro-Data', *Economic Record*, **95** (308), 114–140.

Blonigen, C. and Pierce, J. (2016), Evidence for the Effects of Mergers on Market Power and Efficiency, NBER Working Paper No 22750, October 2016.

Council of Economic Advisors (2016), Benefits of competition and indicators of market power, Council of Economic Advisors Issues Brief April 2016.

Grattan Institute (2017), Competition in Australia: Too little of a good thing? Grattan Institute Report No 2017-12, December 2017.

Hou, K. and Robinson, D. (2006), 'Industry Concentration and Average Stock Returns', *The Journal of Finance*, **61** (4), 1927–1956.

Krugman, P. (2016), Robber baron recessions. New York Times, 18 April, p. A21.

Leigh, A. and Triggs, A. (2016), 'Markets, Monopolies and Moguls: The Relationship Between Inequality and Competition', *Australian Economic Review*, **49**(4), 389–412.

Loecker, J. and Eeckhout, J. (2018), Global Market Power. National Bureau of Economic Research. Working Paper No 24768, June 2018.

Mergers, Acquisitions and Alliances (2019), Institute for Mergers, Acquisitions and Alliances', M&A Statistics by Countries (online) https://imaainstitute.org/mergers-and-acquisitions-statistics.

Naldi, M. and Flamini, M. (2014), Correlation and Concordance between the CR4 Index and the Herfindahl-Hirschman Index. September 29, 2014. Available at SSRN: https://ssrn.com/abstract=2502764.

Naldi, M. and Flamini, M. (2017), 'Censoring and Distortion in the Hirschman-Herfindahl Index Computation', *Economic Papers: A Journal of Applied Economics and Policy*, **36**(4), 401–415.

Pavic, I., Galetic, F. and Piplica, D. (2016), 'Similarities and differences between the CR and HHI as an indicator of market concentration and market power', *Journal of Economics, Management and Trade.*, **13**(1), 1–8.

Philippon, T. (2019), *The Great Reversal: How America Gave Up on Free Markets*. Harvard University Press, Harvard.

Quinn, M. (2019), Keeping pace with technological change: the role of capabilities and dynamism. Speech. OECD Global Forum on Productivity, Sydney.

Statistica (2020),Global car sales 2019. (online) https://www.statista.com/statistics/380104/global-vehicle-sales-of-ford/.

Summers, L. (2016), Corporate profits are near record highs. Here's why that's a problem. Washington PostWonkblog. 30 March.

Tepper, J. and Hearn, D. (2019), *The Myth of Capitalism: Monopolies and the death of competition*. John Wiley & Sons, Hoboken.

The Economist (2016), Too much of a good thing. 26 March.

Triggs, A. and Leigh, A. (2019), 'A Giant Problem: The Influence of the Chicago School on Australian Competition Law, Economic Dynamism and Inequality', *Federal Law Review.*, **47**(4), 696–714.

US Department of Justice (2019), The Herfindahl–Hirschman Index. US Department of Justice. Visited 27 January 2020. https://www.justice.gov/atr/herfindahl-hirschman-index.

Wu, T. (2018), 'The Curse of Bigness: Antitrust in the New Gilded Age. Columbia Global Reports.