



Market power and growth: new developments

Since the early 1970s, productivity growth has slowed down in most advanced economies, in particular in the United States. In this country, this slowdown has been accompanied by an increase in the market power of firms and a decrease in the share of labour in national income. A large swathe of macroeconomic literature has attempted in recent years to identify and explain these facts. This article focuses on a technological explanation, in the context of the digital revolution.

Antonin Bergeaud
Microeconomic and Structural Analysis Directorate
External Trade and Structural Policies Research Division

JEL codes
E22, E25,
O33

This bulletin presents the findings of research carried out at the Banque de France. The views expressed in this bulletin are those of the authors and do not necessarily reflect the position of the Banque de France. Any errors or omissions are the responsibility of the authors.

0.7%

average productivity growth in the United States since 2005

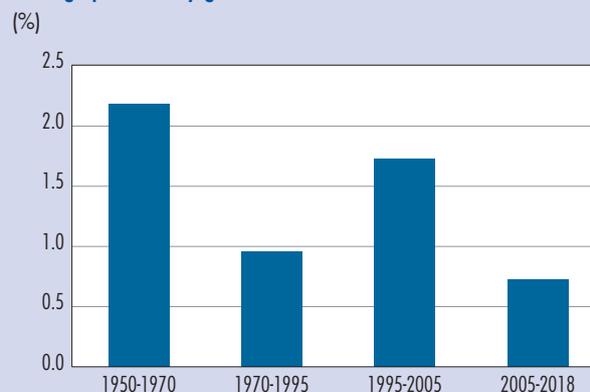
2.2%

average productivity growth in the United States between 1950 and 1970

10 percentage points

the decline in the share of labour in value added in the United States since 2001

Average productivity growth in the United States



Source: Database accessible on www.longtermproductivity.com, linked to the article by Bergeaud et al. (2016).



1 Marked macroeconomic changes over the past twenty years

A slowdown in growth

Economic growth has seen a significant downward trend since the 1970s in most Organisation for Economic Co-operation and Development (OECD) economies. Apart from the United States during the short period between 1995 and 2004, the GDP per capita of advanced countries has slowed, affected by the sharp decline in productivity growth, as shown in Chart 1. Over the most recent period, annual GDP per capita growth has been below 1% per year in the euro area and only slightly higher in the United States, whereas it has averaged 2% since the end of the 19th century (see Bergeaud et al., 2014 and 2016).

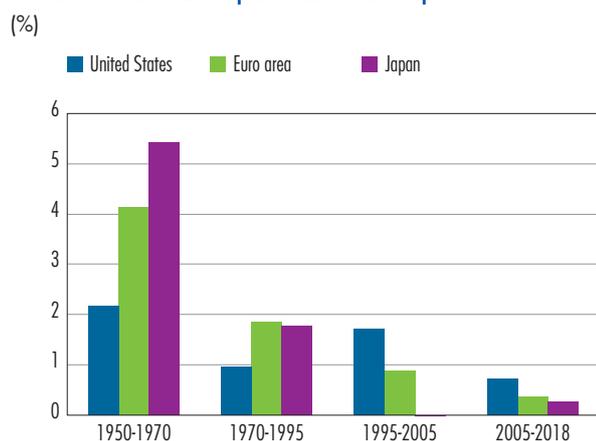
As Fernald et al. (2017) demonstrated, this slowdown precedes the 2008 crisis and is therefore not just a temporary consequence of it. Nor does it appear to be a statistical artefact related to GDP measurement errors as posited by Syverson (2017) and as quantified in

particular by Aghion et al. (2018a and 2019a) as well as Byrne et al. (2016). On the contrary, this slowdown seems to be structural in origin and is the focus of recent debates on the future growth outlook that can reasonably be expected in the more or less long term (see in particular Cette et al., 2016).

A decline in the share of labour in the United States

There are many possible explanations for the slowdown in productivity. In this article, we focus in particular on the fact that in the United States, this has been accompanied by a decline in the share of labour in value added, measured in national accounts by the ratio of the sum of wages to the sum of value added. This result is especially surprising given that the stability of this share over time, around two-thirds, is one of the stylised facts of economic growth described by Kaldor (1957). Chart 2 illustrates this phenomenon using official data from the Bureau of Labor Statistics (BLS) since 1947. Indeed, we observe a relative stability until the end of the 1990s, followed by a net decrease of about six percentage points concentrated over the following decade.

CI Average growth in total factor productivity in the United States, the euro area and Japan in different sub-periods



Source: Database accessible on www.longtermproductivity.com, associated with the article by Bergeaud et al. (2016).

Note: The average growth rate in the United States between 1950 and 1970 was 2.18%.

In recent years, economists have paid close attention to this decline in the share of labour in the United States.¹ In this regard, Karabarounis and Neiman (2014) highlight the decrease in the cost of capital relative to inflation, which is associated with the decline in the price of investment, particularly in information and communication technologies (ICTs).² This decline was greater than that of the cost of labour, and appears to have led to a substitution between these two factors of production. Theoretically, this explanation would imply a substitution elasticity between capital and labour greater than unity, which has been empirically challenged by subsequent studies, in particular that of Lawrence (2015).

Based on this observation, Autor et al (2017 and 2018) propose another explanation: the economy is increasingly moving towards a “winner-takes-most” situation, in which a few companies share an increasingly large market share.

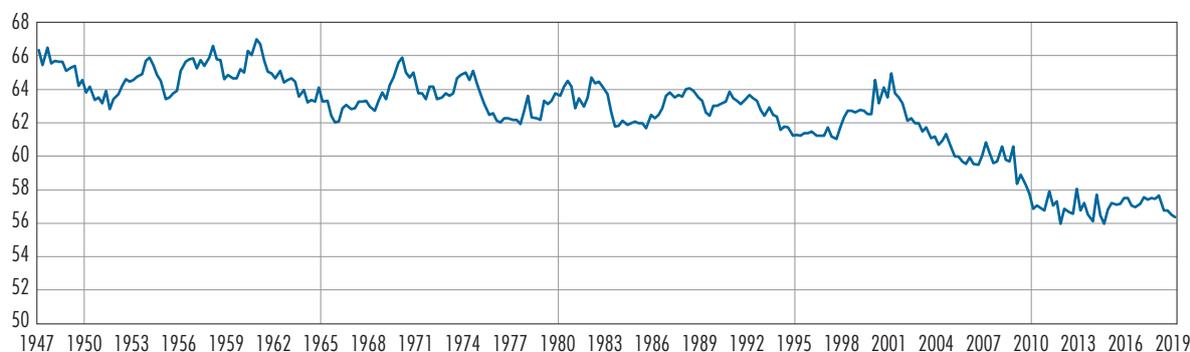
¹ See, for example, Karabarounis and Neiman (2014), Elsby et al. (2013) and Autor et al. (2017):

² See Cette (2014).



C2 Share of labour in value added for the non-agricultural market sector in the United States

(%)



Source: US Bureau of Labor Statistics.

Note: In 1947, the share of labour in value added was 66%; it is 56% in 2019.

These companies, known as superstars,³ have grown very rapidly. However, unlike the industrial champions of the past, they employ relatively few workers and are therefore characterised by a lower share of labour. The analysis of these authors shows that the cost of labour to value added ratio has not decreased for the average firm. In contrast, some large companies, in which the share of labour is low, have become dominant, thus mechanically reducing the share of labour at the national level. The decline in the share of labour in value added therefore stems from a composition (or reallocation) effect and not from one that all firms experience. Many institutions, including the OECD and the IMF, are concerned about this trend and believe that it is linked to the increase in inequality, as discussed in Aghion et al. (2018b).

An increase in sectoral concentration

One of the implications of Autor et al.'s model (2018) is that the existence of "superstar" companies would explain the decline in the labour share. The examples of Apple and Amazon – two companies with a valuation

of more than USD 1 trillion in 2018 – reflect a more general phenomenon of growing sectoral concentration.

In the United States, for instance, most economic sectors have seen a significant increase in the market share of the largest companies over the past 30 years. For example, Autor et al. (2017) show that, in the retail sector, the four leading companies, which in 1980 represented only around 15% of total sales, accounted for over 45% in 2015. According to Grullon et al. (2019), 75% of the sectors have seen greater concentration in the United States since 1990. This is important because, unlike what we are observing today, while some specific sectors were highly concentrated⁴ in the past, it was not the case for the rest of the economy.

This suggests that there is a structural origin to this phenomenon of increased market power. Examples of this include: the digital revolution and the widespread use of e-commerce platforms, the nature of technological change that limits the dissemination of technology between the best companies and others, demographics (see Hopenhayn et al., 2019), lower interest rates and

³ Autor et al. (2018) show that Walmart, Exxon and Apple are the three companies with the highest turnover in 2015, reaching nearly USD 1 trillion in sales between them.

⁴ Examples include General Motors in the automotive sector, IBM or Microsoft in the IT sector, or even in an earlier period Standard Oil in the energy sector.



changes in competitive regulations with a high degree of temporal and spatial heterogeneities (see Gutiérrez and Philippon, 2018).

However, we should be cautious when attempting to find a single explanation for this increased concentration. On the one hand, while some studies show that concentration is also increasing in Europe (Bajgar et al., 2019), this increase is not necessarily linked to a rise in market power (and in particular not necessarily linked to changes in the labour share, see Gutiérrez and Philippon, 2018, or Cette et al., 2019). Rossi-Hansberg et al. (2018) identified an a priori contradictory fact: even in the United States, where concentration has increased significantly, local concentration has decreased. That is to say, when considering the share of the largest companies in each sector, and only at the regional or city level, this share has in fact continuously decreased, whereas the same exercise carried out at national level leads to the opposite result. To explain this phenomenon, Rossi-Hansberg et al. (2018) show that the opening of a new establishment by a top firm is accompanied for seven years by a positive effect on the entry of competitors at the local level. Aghion et al. (2019b) observe changes in the number of establishments per firm and show that the largest companies are those which open the most establishments (firms with more than 10 thousand employees in 1990 have on average 50% more establishments in 2015 than in 1990). The increase in national concentration therefore stems more from a rise in the magnitude and geographical distribution of a few very large firms than from the existence of geographical clusters whose size has arguably grown significantly in recent years.

A rise in markups

The rise in sectoral concentration discussed above is often interpreted as an increase in the market power of certain firms, i.e. their ability to influence prices through their dominant position. In order to measure this market power, the economic literature generally uses the markup, defined as the ratio of the price to the marginal cost of

production. De Loecker and Eeckhout (2017) propose a method for estimating these markups and find that they have increased in the United States (see also Baqaee and Farhi, 2017, and Hall, 2018), like in other developed countries (Calligaris et al., 2018). These different studies also conclude that this increase is due to the rise in the size of firms with high markups, i.e. to a composition effect, in the same way as the labour share.

2 A technological explanation

For several years now, the literature has tried to identify a common driver behind these stylised facts⁵ and to show how these phenomena were interconnected. Among the most frequently considered factors, the digital revolution related to the development of information and communication technologies (ICTs) since the 1960s, and its acceleration in the 1990s, seems to have played a major role in the structural changes observed recently.

Many models consider in one form or another that the decline in ICT prices has given a comparative advantage to some firms, namely those which have invested most in these intangible assets earliest (Crouzet and Eberly, 2019). This type of investment allows them to maintain a significant lead over their competitors, and therefore to grow more. We are of course referring to the GAFAs (Google, Amazon, Facebook and Apple) which have a considerable technological lead over other players in the sector. However, this phenomenon also concerns companies outside the technological sector, such as Starbucks or Walmart, which, thanks to their investments, can manage their stocks and logistics, giving them a significant advantage over their competitors.

From a theoretical point of view, the challenge is to reconcile these differences in ICT investment with the stylised facts described above. Aghion et al. (2019b) thus propose a theory whereby digital technologies have made it possible to reduce the cost of managing and supervising different types of products and services (overhead costs).

⁵ Others have been identified in the literature, some of which contradict Kaldor (1957): rising inequality, falling investment, declining firm dynamics or falling interest rates.



These authors develop a model in which the most productive companies benefit from this reduction in costs. In doing so, they invest more in research and development (R&D) in order to expand by replacing other firms through a classic Schumpeterian creative destruction process. As these firms are more productive, they have a higher markup and employ relatively fewer workers than others. This first expansion phase gives them a higher market share and leads to a situation in which the concentration and average markup in the economy increase while the share of labour decreases. These dynamics can therefore only be attributed to a composition effect, consistent with the empirical factors described above.

Moreover, during this phase, economic growth increases since these highly productive firms, even if they are few in number, innovate with several types of products. According to the authors, this phase corresponds to the period from the mid-1990s to the mid-2000s in the United States. As Bergeaud et al. (2016 and 2017) have shown, this period indeed corresponds to a wave of productivity in the United States that can be ascribed to the expansion of ICTs. Similarly, Fernald (2015) shows that this wave is mainly driven by sectors that use digital technologies more intensively.

Once this period of expansion is over, the most productive firms have a significant market share. The model of Aghion et al. (2019b) converges towards an equilibrium in which growth and firm dynamics slow down. It then becomes more difficult and less attractive for productive firms to innovate in order to expand even further: the productivity of their competitors improves in turn, which results in a decrease in the profit that existing firms could make from their investments.

Thus, with few assumptions and a relatively simple model, Aghion et al. (2019b) show how a reduction in management costs resulting from new technologies can lead to structural changes in the market such as those

identified in the literature. In particular, their theoretical framework shows an economic slowdown preceded by a short wave of growth. It also illustrates that this slowdown is accompanied by a decline in the share of labour and an increase in markups, both due to a composition effect. Lastly, their model explains the structural decline in firm and employment dynamics observed in many countries. Based on a quantitative analysis, the authors highlight the important role played by the digital revolution in explaining these structural changes.

Similarly, Akcigit and Ates (2019) test different assumptions using a very general Schumpeterian growth model. They argue that the increase in market power and the decline in firm dynamics in the United States are due to the intrinsic nature of digital technologies as they limit the dissemination of technology between the most technologically advanced firms and the rest. For example, the dominant position of a company like Uber, and hence the magnitude of its market value, stems partly from its algorithms for matching supply and demand to determine the price of a trip. These algorithms have been built using massive amounts of data collected by the company over the years. It is therefore very difficult for a competitor without access to this wealth of data to gain a foothold in Uber's market.⁶

The macroeconomic structural changes observed over the past few years in the United States, and to a lesser extent in the other OECD countries,⁷ have been the focus of much attention in the recent economic literature. Many models have been developed to show how technological changes could explain these new stylised facts. Other explanations have also been put forward, such as demographic changes, lower interest rates, ideas themselves that are becoming increasingly expensive and difficult to find, competitive policies, etc. In all events, it is essential to better understand the origin and implications of these changes in market structure in order to implement the right responses in terms of economic policy.

⁶ Lashkari et al. (2019) also propose a model in which the non-homothetic nature of production functions implies that the initially most productive firms are also those that benefit most from the relative decline in ICT investment prices.

⁷ The findings of a few rare international studies (Bajgar, 2017, or Cavalleri et al., 2019) conclude that most of the stylised facts discussed in this article do not apply to euro area countries, although country-specific analyses would be necessary to understand the mechanisms in place in this region.



References

Aghion (P.), Bergeaud (A.), Boppart (T.) and Bunel (S.) (2018a)

"Firm dynamics and growth measurement in France", *Journal of European Economic Association*, Vol. 16, No. 4, pp. 933-956.

Aghion (P.), Akcigit (U.), Bergeaud (A.), Blundell (R.) and Hémous (D.) (2018b)

"Innovation and top income inequality", *Review of Economic Studies*, Vol. 86, No. 1, p. 145.

Aghion (P.), Bergeaud (A.), Boppart (T.), Klenow (P.) and Li (H.) (2019a)

"Missing growth from creative destruction", *American Economic Review*, Vol. 109, No. 8, August, pp. 2795-2822.

Aghion (P.), Bergeaud (A.), Boppart (T.), Klenow (P.) and Li (H.) (2019b)

"A theory of falling growth and rising rents", *Working Paper 2019-11*, Federal Reserve Bank of San Francisco, August.

Akcigit (U.) and Ates (S.) (2019)

"What happened to US business dynamism?", *Working Paper 25756*, National Bureau of Economic Research (NBER), April.

Autor (D.), Dorn (D.), Katz (L.), Patterson (C.) and Van Reenen (J.) (2017a)

"Concentrating on the fall of the labor share", *American Economic Review: Papers & Proceedings*, Vol. 107, No. 5, May, pp. 180-185.

Autor (D.), Dorn (D.), Katz (L.), Patterson (C.) and Van Reenen (J.) (2017a)

"The fall of the labor share and the rise of superstar firms", *Working Paper 23396*, National Bureau of Economic Research (NBER), May.

Bajgar (M.), Berlingieri (G.), Calligaris (S.), Criscuolo (C.) and Timmis (J.) (2019)

"Industry concentration in Europe and North America", *OECD Science, Technology and Industry Working Papers*, No.18, OECD Editions (Organisation for Economic Co-operation and Development), January.

Baqaei (D.) and Farhi (E.) (2017)

"Productivity and misallocation in general equilibrium", *Working Paper 24007*, National Bureau of Economic Research (NBER), November.

Bergeaud (A.), Cette (G.) and Lecat (R.) (2014)

"Le produit intérieur brut par habitant sur longue période en France et dans les pays avancés : le rôle de la productivité et de l'emploi", *Économie et Statistique*, No. 474, Institut national de la statistique et des études économiques (Insee), pp. 5-34.

Bergeaud (A.), Cette (G.) and Lecat (R.) (2016)

"Productivity trends in advanced countries between 1890 and 2012", *Review of Income and Wealth*, Vol. 62, No. 3, September, pp. 420-444.

Bergeaud (A.), Cette (G.) and Lecat (R.) (2017)

"Total factor productivity in advanced countries: a long term perspective", *International Productivity Monitor*, Vol. 32, pp. 6-24.

Byrne (D.), Fernald (J.) and Reinsdorf (M.) (2016)

"Does the United States have a productivity slowdown or a measurement problem?", *Brookings Papers on Economic Activity*, spring, pp. 109-182.

Calligaris (S.), Criscuolo (C.) and Marcolin (L.) (2018)

"Mark ups in the digital era", *OECD Science, Technology and Industry Working Papers*, No. 2018/10, OECD Editions.



Cavalleri (M. C.), Eliet (A.), McAdam (P.), Petroulakis (F.), Soares (A.) and Vansteenkiste (I.) (2019)

"Concentration, market power and dynamism in the euro area", *Working papers series*, No. 2253, European Central Bank (ECB), March.

Cette (G.) (2014)

"Presidential conference does ICT remain a powerful engine of growth? ", *Journal of Political Economy* , Vol. 124, No. 4, pp. 473-492.

Cette (G.), Lecat (R.) and Ly Marin (C.) (2016)

"Long-term growth and productivity projections in advanced countries", *Working Paper*, No. 617, Banque de France, December.

Cette (G.), Koehl (L.) and Philippon (T.) (2019)

"Labor shares in some advanced economies", *Working Paper*, No. w26136, National Bureau of Economic Research (NBER).

Crouzet (N.) and Ebergly (J.) (2019)

"Understanding weak capital investment: the role of market concentration and intangibles", *Working Paper*, No. w25869, National Bureau of Economic Research (NBER).

De Loecker (J.) and Eeckhout (J.) (2017)

"The rise of market power and the macro-economic implications", *Working Paper*, No. w23687 National Bureau of Economic Research (NBER).

Elsby (M.), Hobiijn (B.) and Şahin (A.) (2013)

"The decline of the US labor share", *Working Paper* 2013 27, Federal Reserve Bank of San Francisco, September.

Fernald (J.) (2015)

"Productivity and potential output before, during, and after the Great Recession", *NBER Macro-economics Annual*, Vol. 29, National Bureau of Economic Research (NBER), pp. 1-51.

Fernald (J. G.), Hall (R. E.), Stock (J. H.) and Watson (M. W.) (2017)

"The disappointing recovery of output after 2009", *Working paper*, No. w23543 National Bureau of Economic Research (NBER).

Gullon (G.), Larkin (Y.) and Michaely (R.) (2019)

"Are US industries becoming more concentrated?", *Review of Finance*, Vol. 23, No. 4, July, pp. 697-743.

Gutiérrez (G.) and Philippon (T.) (2018)

"How EU markets became more competitive than US markets: a study of institutional drift", *Working paper*, No. w24700, National Bureau of Economic Research (NBER), June.

Hall (R.) (2018)

"New evidence on the markup of prices over marginal costs and the role of mega-firms in the US economy", *Working paper*, No. 24574, National Bureau of Economic Research (NBER).

Hopenhayn (H.), Neira (J.) and Singhania (R.) (2018)

"From population growth to firm demographics: implications for concentration, entrepreneurship and the labor share", *Working paper*, No. 25382, National Bureau of Economic Research (NBER), December.

Kaldor (N.) (1957)

"A model of economic growth", *The Economic Journal*, Vol. 67, No. 268, December, pp. 591-624.

Karabarbounis (L.) and Neiman (B.) (2014)

"The global decline of the labor share", *The Quarterly Journal of Economics*, Vol. 129, No. 1, pp. 61-103.

Lashkari (D.), Bauer (A.) and Boussard (J.) (2019)

"Information Technology and Returns to Scale", *Working Paper*, No. 737, Banque de France.



Lawrence (R.) (2015)

"Recent declines in labor's share in US income: a preliminary neoclassical account", *Working paper*, No. 21296, National Bureau of Economic Research (NBER).

Rinz (K.) (2018)

"Labor market concentration, earnings inequality, and earnings mobility", *Center for Administrative Records Research and Applications (CARRA) Working Papers*, No. 2018-10.

Rossi-Hansberg (E.), Sarte (P. D.) and Trachter (N.) (2018)

"Diverging trends in national and local concentration", *Working paper*, No. w25066, National Bureau of Economic Research (NBER).

Syverson (C.) (2017)

"Challenges to mismeasurement explanations for the US productivity slowdown", *Journal of Economic Perspectives*, Vol. 31, No. 2, pp. 165-186.

Published by

Banque de France

Managing Editor

Gilles Vaysset

Editor-in-Chief

Françoise Drumetz

Editor

Caroline Corcy

Translator

Anthony Dare

Technical production

Studio Creation

Press and Communication

ISSN 1952-4382

To subscribe to the Banque de France's publications

<https://publications.banque-france.fr/en>

"Subscription"

