
# What Does the Growth of Intangible Capital Mean for Competition Policy?

*March 7, 2022*

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## Executive Summary

Worried that competition between firms is lessening, many economists and policymakers have called for a return to the more aggressive competition policies of the 1960s and 1970s and for the breakup or nationalization of large business, such as tech platforms. We argue, on the contrary, that changes in interfirm competition are significantly driven by the increasing importance of intangible capital: assets like R&D, brands, software, and organizational development. This has several implications:

- It implies that simply dialing up the intensity of competition policy is the wrong response to the growing gap between leaders and laggards; and
- It raises the importance of competition for consumers' attention.

Finally, we argue that there is a different aspect of the word "competition" that is affected by the shift to intangible capital: competition between individuals. An intangible-rich economy will see an increase in wasteful signaling. Mitigating this rat race should be a policy priority for educators and governments.

## I. INTRODUCTION

It is hard to think of a rich-world government for whom competition is not an economic-policy priority. The growing gap between leader firms and their competitors, the perceived market power of large tech firms, and growing concerns over the cost of living are leading many policymakers to conclude that it is time to toughen up competition policy.

We believe that it is essential to see competition policy in the context of another epochal economic change: the rise of intangible capital. In our 2017 book, *Capitalism Without Capital*, and our forthcoming book, *Restarting the Future*, we document how, over the past four decades, the capital stock in rich-world economies has shifted.[1] Once, most capital was tangible: it took the form of machinery, buildings, vehicles. But over time, we have seen the rise of intangible

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[1] JONATHAN HASKEL & STIAN WESTLAKE, CAPITALISM WITHOUT CAPITAL: THE RISE OF THE INTANGIBLE ECONOMY, (2017); JONATHAN HASKEL & STIAN WESTLAKE, RESTARTING THE FUTURE: HOW TO FIX THE INTANGIBLE ECONOMY, (2022).

capital: durable, valuable investments that cannot be touched, such as R&D, design, branding and marketing, and organizational development. Intangible investment has steadily increased such that, starting around a decade ago, annual intangible investment has exceeded tangible investment.

The rise of intangible investment is significant because intangible capital often has different economic characteristics from tangible capital. We call these characteristics the 4 S's. They are scalability, sunken-ness, synergies, and spillovers.

*Table 1: Four S's of Intangible Capital*

| Property | Meaning | Example |
|---|---|---|
| *Scalability* | An intangible asset can be scaled across an arbitrarily large business. | A ridesharing platform can support ridesharing across many cars and many cities. |
| *Sunken-ness* | An intangible asset often has little salvage value if the firm that owns it fails. | There are thriving secondary markets for tangible capital like buildings, vehicles, and even highly specialized machinery, but markets for brands and IP are rudimentary. |
| *Synergies* | Intangible assets are often unusually valuable when brought together in particular combinations. | The iPhone was revolutionary because of its *combination* of design, R&D, software, and supply chains (both for production and for apps). |
| *Spillovers* | The benefits of an intangible asset often accrue—in part, or even wholly—to firms other than their owners. | Intellectual property notwithstanding, the benefits of R&D and software innovation rapidly spread beyond the innovating firm. |

**Source:** *Restarting the Future: How to Fix the Intangible Economy*

These characteristics—in particular, scalability, spillovers, and synergies—have significant implications for interfirm competition. Some of these effects are highly beneficial for large firms and for incumbents. Scalability means that, all else equal, a large firm will enjoy higher returns from a given intangible investment than a small one will. Synergies have a similar effect: the return on intangible investments will be higher for a firm that already has access to a portfolio of complementary intangibles. Spillovers have a curious effect: if the ability to appropriate spillovers were evenly distributed, this would be good news for challenger firms. But there is reason to suspect this is not the case, and that at least some leader firms are unusually good at getting the benefit of the spillovers of other firms' intangible investments (the management literature sometimes calls this "open innovation"). But intangible capital is not totally bad news for challenger firms. The scalability of intangible capital also means that successful challenger firms can grow very rapidly, and in some cases can overturn the dominance of incumbents with unexpected speed.

## A. The New Anti-Monopolists

We are living, we are told, in an age of monopolies. The days when Standard Oil or U.S. Steel commanded the economy and ran it to their liking may be long gone. But unlock your smartphone and, critics argue, the glowing icons you see represent a group of monopolists every bit as powerful and entrenched.[2] And the problem is not just to do with trillion-dollar technology platforms. A growing gap between the most profitable and productive firms and the laggards can be seen in most countries and sectors, and it troubles many economists and policymakers.

[2] *See* NICOLAS PETIT, BIG TECH AND THE DIGITAL ECONOMY: THE MOLIGOPOLY SCENARIO (2020). Petit argues that big tech platforms should be framed as "moligopolists" that compete aggressively against each other.

For the last decade, there has been a growing groundswell of opinion about the institutional fix needed to deal with the problem of decreasing competition among firms. At its heart, this critique rests on two ideas. The first is that competition policy has been going wrong for four decades, and the problems are now coming home to roost. The second is that tech companies present a new and especially dangerous threat to competitive markets.

The most-proposed remedy to the perceived failure of competition policy is a return to the antitrust principles of the 1960s and 1970s; in particular, it is a greater willingness to intervene when firms enjoy very large market shares. Proponents of this view sometimes describe themselves as neo-Brandeisians, after Louis Brandeis, a trust-busting U.S. Supreme Court justice of the early 20th century. Their critics refer to their movement, with its back-to-the-future vibe, as *hipster antitrust.*

The view that antitrust is failing us, especially in the digital arena, enjoys broad support. A 2019 investigation by the U.S. House Judiciary Committee into digital markets is a prominent example.[3] A report by committee staff called for more vigorous antitrust enforcement that includes breakups of dominant platforms, data-portability requirements, and prohibitions on the abuse of dominant bargaining power. President Joe Biden has appointed Lina Khan, a legal scholar who advised the investigation, as chair of the Federal Trade Commission. The United Kingdom conducted its own special review into digital competition in 2019, led by U.S. economist Jason Furman. The European Union shares this concern regarding digital competition, as exemplified by the Digital Markets Act, which is particularly concerned with large Internet platforms and seeks to regulate and limit their market-shaping ability.[4] Speaking in October 2020, EU Executive Vice-President Margrethe Vestager described digital platforms as "gatekeepers, with enormous power over our lives. They can influence our safety—whether dangerous products and harmful content can spread widely, or whether they're quickly removed. They can affect our opportunities—whether markets respond to our needs, or whether they just work in the interests of the platforms themselves. They even have the power to guide our political debates, and to protect—or undermine —our democracy."[5]

We argue that a different type of institutional reform is needed in a world where intangibles drive economic performance.

## B. The Received Wisdom on Declining Competition

Let's first review the standard argument regarding the problem of interfirm competition, which is most clearly set out in the important research of the economist Thomas Philippon[6] Figure 1 shows cross-country evidence since 2002. *Concentration* (the share of the top firms) is a

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[3] *Investigation of Competition in Digital Markets, Majority Staff Report and Recommendations*, U.S. HOUSE JUDICIARY COMMITTEE SUBCOMMITTEE ON ANTITRUST, COMMERCIAL AND ADMINISTRATIVE LAW (Oct 2, 2020), *available at* https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf.

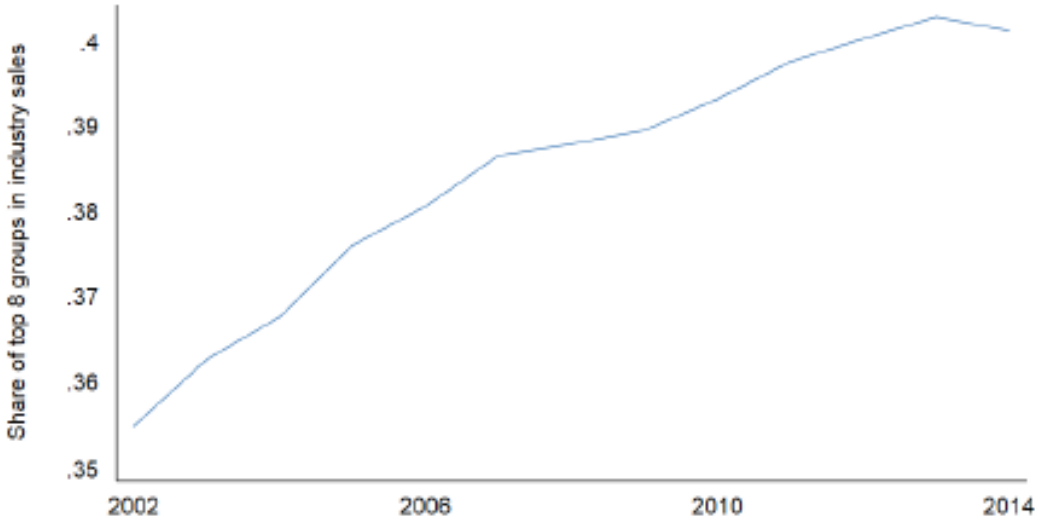
[4] *Proposal for a Regulation on Contestable and Fair Markets in the Digital Sector*, EUROPEAN COMMISSION (2020).

[5] Margrethe Vestager, *Building Trust in Technology*, speech to European Policy Centre webinar (Oct. 29, 2020), transcript *available at* https://ec.europa.eu/commission/commissioners/2019-2024/vestager/announcements/speech-executive-vice-president-margrethe-vestager-building-trust-technology_en.

[6] THOMAS PHILIPPON, THE GREAT REVERSAL: HOW AMERICA GAVE UP ON FREE MARKETS (2019).

standard measure used by competition authorities throughout the world, and Figure 1 shows that it has been steadily rising. If there are a small number of competing firms in a market, most economists start to worry. This situation is often associated with less competition over prices and variety of goods and weaker incentives to innovate.

Figure 1: Top 8 Industry Concentration Since 2000




**Note:** *The countries include Belgium, Germany, Denmark, Spain, Finland, United Kingdom, France, Japan, Portugal, Sweden, and the United States. Included industries cover two-digit manufacturing and non-financial market services. Concentration is measured by the share of top eight business groups in the sales of each industry in each country. The figure shows the changes in the (unweighted) mean concentration across country-industry pairs.*

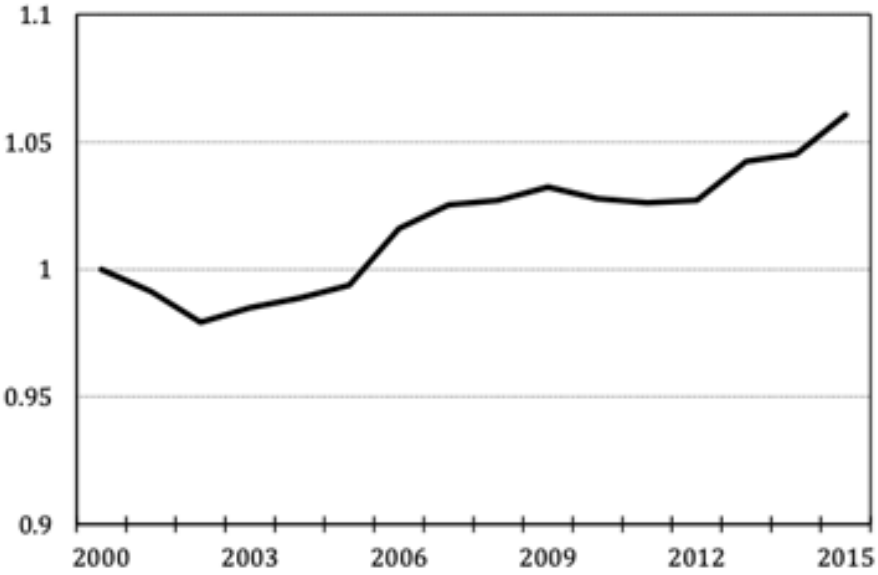
**Source:** *Bajgar, Criscuolo, and Timmis 2021*[7]

A related phenomenon is the rise in what economists call the *mark-up*, the difference between the marginal cost of producing a product and how much that product sells for. Influential research by Jan De Loecker and Jan Eeckhout suggests that mark-ups have been steadily rising since 1980 in the United States and in Europe.[8] This is another red flag for economists. In competitive markets, we would not expect mark-ups to keep rising, because consumers would vote with their feet and shift to buying from competitors with lower prices.

[7] Matej Bajgar, Chiara Criscuolo, & Jonathan Timmis, *Intangibles and Industry Concentration: Supersize Me*, ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, OECD Science, Technology and Industry Working Papers 2021/12 (2021).

[8] Jan De Loecker & Jan Eeckhout, *Global Market Power,* NATIONAL BUREAU OF ECONOMIC RESEARCH, NBER Working Paper 24768 (2018).

Figure 2: Estimated Mark-ups of Prices over Marginal Costs, All Countries




**Source:** *Diez, Fan, and Villegas-Sanchez 2019*[9]

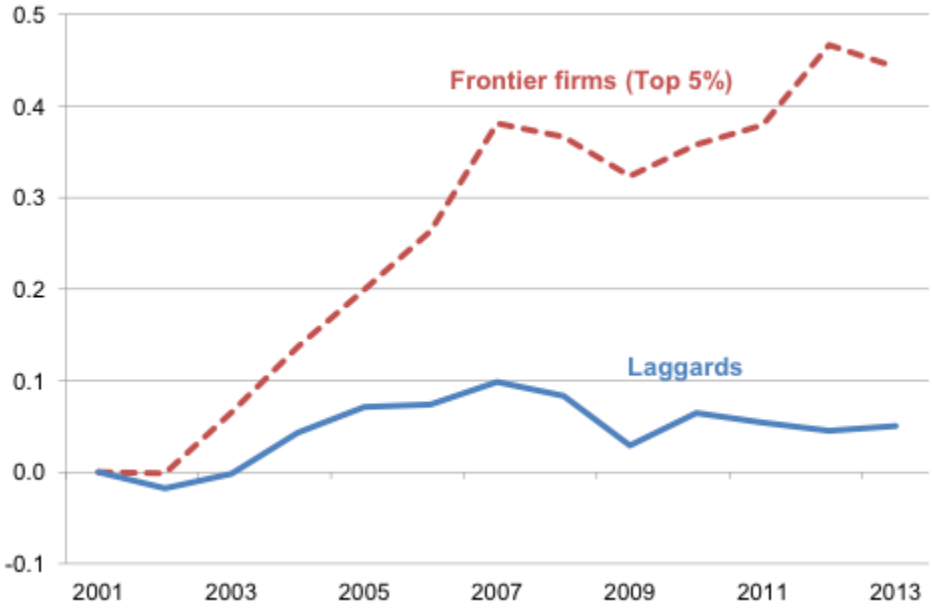
What are the other symptoms of a lack of competition? Several economists have argued that there has been a rise in the share of profits in the economy, particularly in the United States. Also, influential research by a team at the Organisation for Economic Co-operation and Development (OECD), led by Chiara Criscuolo, has found a steady rise since 2001 in the gap between the leading firms in the industry and those lagging. Figure 3 shows the gap between the leaders and the laggards, in this case for business services. The picture looks similar for manufacturing.

To many economists, Figure 3 looks like another symbol of competition gone wrong. After all, the genius of competition is that only firms with the best product will do well in the marketplace. But the best product is subject to continual change, what the economist Joseph Schumpeter called *creative destruction*: "This process of creative destruction is the essential fact about capitalism."[10] In a well-functioning market, we would expect to see laggard firms either exiting the market or replacing the leading firms as their products get better.

[9] Federico Díez, Jiayue Fan, & Carolina Villegas-Sanchez, *Global Declining Competition*, INTERNATIONAL MONETARY FUND, IMF Working Paper No. 19/82 (Jun. 2, 2019), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3397540.

[10] JOSEPH A. SCHUMPETER, CAPITALISM, SOCIALISM AND DEMOCRACY: THIRD EDITION (Harper Perennial Modern Classics 2008), at 83.

Figure 3: Performance Gaps – Business Services




**Note:** *The global frontier is measured by the average of log-labor productivity for the top 5% of companies with the highest productivity levels within each two-digit industry. Laggards capture the average log productivity of all the other firms. Unweighted averages across two-digit industries are shown normalized to 0 in the starting year. The vertical axes represent log differences from the starting year. For instance, the frontier in manufacturing has a value of about 0.3 in the final year, which corresponds to approximately 30% higher productivity in 2013 as compared to 2001. Services refer to non-financial business-sector services.*

**Source:** *Andrews, Criscuolo, and Gal 2017*[11]

For some, another troubling aspect of competition in the modern economy is the overwhelmingly conglomerate nature some of our new firms.[12] Amazon started as a bookseller. It now produces movies and sells webhosting services; Google has moved from search to online advertising to emails to driverless cars. This increasingly conglomerate nature of the economy reminds many of the industrial structure of the 1960s, when large conglomerates dominated many industries. That story did not end well: Conglomerates were sluggish and unproductive, and most ended up being broken up by market forces.

In sum, many people see increased concentration, the increased insulation of the leaders from the laggards, and the trend toward conglomerates as indications of a lack of competition. And, they argue, lack of competition takes the economy to many bad places: low innovation, poor management and employment practices, rent-seeking, and dissatisfied consumers with nowhere else to go.

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[11] Dan Andrews, Chiara Criscuolo, & Peter Gal, *The Best vs the Rest: The Global Productivity Slowdown Hides an Increasing Performance Gap Across Firms*, VOX EU (Mar. 27, 2017) https://voxeu.org/article/productivity-slowdown-s-dirty-secret-growing-performance-gap.

[12] *See*, e.g., Andrew Ross Sorkin, *Conglomerates Didn't Die. They Look Like Amazon*, THE NEW YORK TIMES (Jun. 19, 2017), https://www.nytimes.com/2017/06/19/business/dealbook/amazon-conglomerate.html.

## II. THE EFFECT OF INTANGIBLES ON COMPETITION BETWEEN FIRMS

We believe the rise in intangibles offers an alternative explanation for what has happened to competition.

Consider first the rise in concentration. Here, it is important to consider the difference between concentration in national markets and concentration in local markets. For many goods, national concentration matters a lot less than local concentration. Imagine two different countries. In the first, there are no supermarket chains, and every town has a single, independent supermarket; in the second, there are two supermarket chains, and every town has one store owned by each chain. In the first country, each independent supermarket can act like a local monopolist, because few will travel to the next town for their weekly shop. Measured industry concentration would be massively higher in the second example, but consumers might prefer it, because every consumer has two stores to choose between, and there is likely to be more competition in terms of price and variety.

Research by Chang-Tai Hsieh and Esteban Rossi-Hansberg examined the difference between local and national concentration in the United States since 1977. They concluded that national concentration has risen and local concentration has fallen; Lanier Benkard, Ali Yurukoglu, and Anthony Lee Zang find the same.[13] The reason they identified is a profoundly intangible one: "ICT-based technologies and adoption of new management practices have finally made it possible for firms outside of manufacturing to scale production over a large number of locations." To put it another way, because intangibles are scalable, services businesses with valuable intangibles (such as popular brands, strong management practices, or distinctive product offerings) can spread across many local markets. If that sounds abstract, think of national and international retail chains, which invest heavily in branding; software (for stock control, customer-loyalty programs, and for e-commerce); relationships with suppliers (the secret sauce of "fast fashion"); and new product development—all intangible investments. Think of the pub chain JD Wetherspoons, of the mid-market chains that rapidly grow from successful independent restaurants, of Zara and IKEA. A world with lots of these chains, whose business model relies on intangibles in a way most independent stores do not, is likely to have more intense local competition that does not show up in the national figures.

This idea is also borne out in work by Matej Bajgar, Chiara Criscuolo, and Jonathan Timmis at the OECD, which studied the correlation between changes in concentration and intangible intensity: as we explain above, rises in concentration have been concentrated in the most intangible-intensive industries. Turning to mark-ups and profits, the mark-ups of American firms and total rate of return are mostly unchanged when one accounts for intangibles in firms' capital.[14] To put it another way, the runaway profitability of businesses is at least partly an artifact

[13] Chang-Tai Hsieh & Esteban Rossi-Hansberg, *The Industrial Revolution in Services*, NATIONAL BUREAU OF ECONOMIC RESEARCH, NBER Working Paper W25968 (2019); C. Lanier Benkard, Ali Yurukoglu, & Anthony Lee Zhang, *Concentration in Product Markets*, NATIONAL BUREAU OF ECONOMIC RESEARCH, NBER Working Paper W28745 (2021).

[14] Bajgar, *et al.*, *supra* note 7.

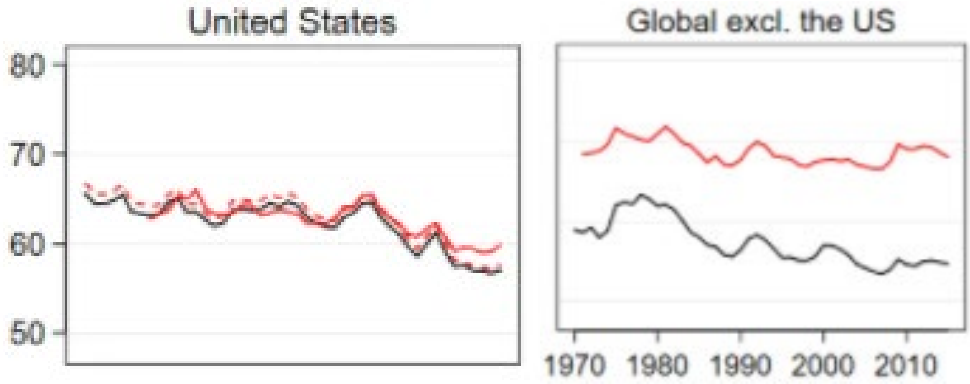
of using the wrong denominator, omitting an increasingly important part of the capital stock that businesses invest in.

We see something similar when we look at profits. Measurement here is fraught with difficulty. Profits are a measure of the return to capital, so it seems natural to turn to national accounts that measures wages and salaries (which are the returns to labor) and profits. Figure 4, which presents the headline figures for wages and profits, shows that both in the United States and abroad, the share of wages has fallen, and hence the share of profits must have risen.

Germán Gutiérrez and Sophie Piton have dug into these data and found a different picture.[15] National accounts break GDP into wages, profits, and payments to the self-employed (which are, in practice, a mixture of wages and profits). Profits are measured by tax returns from corporations. Profits therefore will change for at least two reasons. First, profits will change if the numbers or treatment of the self-employed as corporations changes. Second, national accounts treat buildings as capital, as would be expected, because buildings are durable sources of capital services.

Buildings consist of commercial buildings and *dwellings*, which are residential homes. In the United Kingdom, dwellings are 40% of the total capital stock. It turns out, however, that many corporations own houses. If a commercial corporation owns a stock of houses, then the returns that it makes are part of commercial profits. As Gutierrez and Piton discovered, it turns out that, outside the United States, many houses are classified as "corporations." In fact, in Europe, nearly 20% of non-financial corporations' capital stock is housing. The number is 1% in the United States. When we talk about "profits" as a measure of competition between businesses, we surely want to strip this aspect out. As Figure 4 shows, it turns out to make little difference in the United States: The share of wages has been falling, and so profits have been rising. But, at least outside the United States, the share of profits has been stable.

Figure 4: Labor Shares (Inverse of Profit Shares) In and Outside the US




**Note:** *Black line includes corporation-owned dwellings; red line excludes them.*

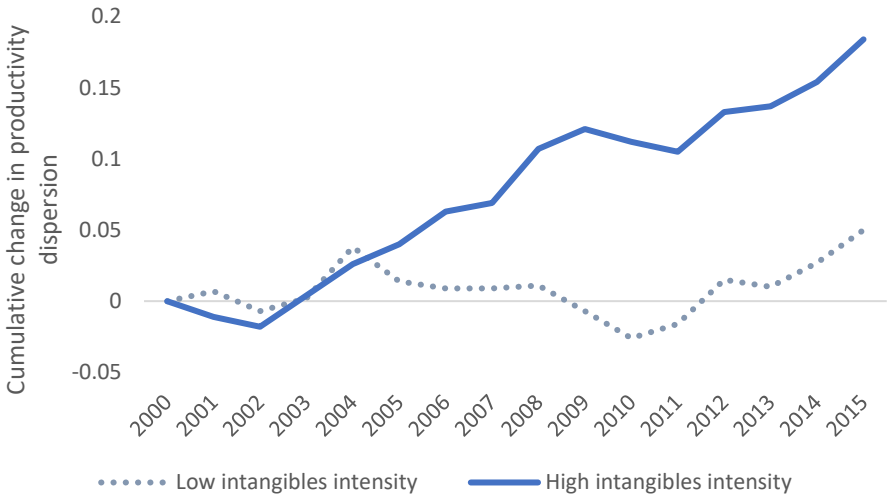
**Source:** *Gutiérrez and Piton 2019*

[15] German Gutierrez Gallardo & Sophie Piton, *Revisiting the Global Decline of the (Non-Housing) Labor Share*, BANK OF ENGLAND, Bank of England Working Paper 811 (2019).

Finally, could the ability of large firms to scale up and exploit synergies explain the growing gap between the leaders and laggards? Alexander Himbert and colleagues find evidence consistent with this suggestion.[16] Figure 5 illustrates that, controlling for many other factors, we see growing productivity dispersion in industries that are more intangibles-intensive, which suggests that intangibles are the main driver of productivity dispersion, an argument consistent with that made by Sam Peltzman.[17]

The implication of all these findings is that intangibles help make sense of the crisis of interfirm competition in three ways. First, including intangibles in some measures of market power (such as mark-ups) reduces or eliminates the apparent increases in market power we would otherwise see in the data. Second, the growing importance of intangibles has underpinned the phenomenon of increasing local competition and falling national competition as intangibles-rich national chains open new local establishments. Third, to the extent that concentration has increased, it seems that it has done so most in intangible-intensive sectors, suggesting that the winner-takes-all characteristics of intangible capital may be to blame, rather than an exogenous deterioration of competition policy.

Figure 5: Evolution of Productivity Dispersion by Intangible Intensity




**Note:** *Additional controls for gross output, capital, and labor inputs, and capital-labor ratios. Country-industries are ranked by their average intensity of intangible investment between 2000 and 2015. Country-industries above the median are classified as "High intangibles intensity." Country-industries below the median are classified as "Low intangibles intensity." Productivity dispersion is measured as the 90-10 difference in multifactor productivity. Countries included are Austria, Belgium, Germany, Denmark, Finland, France, Ireland, Italy, Netherlands, Portugal.*

**Source:** *Berlingieri et al. 2020*[18]

[16] Carol Corrado, Chiara Criscuolo, Jonathan Haskel, Alexander Himbert, & Cecilia Jona-Lasinio, *New Evidence on Intangibles, Diffusion and Productivity*, OECD SCIENCE, TECHNOLOGY AND INDUSTRY WORKING PAPERS, Paper No. 2021/10 (Jul. 8, 2021).

[17] Sam Peltzman, *Productivity, Prices and Concentration in Manufacturing: A Demsetzian Perspective,* UNIVERSITY OF CHICAGO COASE-SANDOR INSTITUTE FOR LAW & ECONOMICS, Research Paper 917 (2020).

[18] Giuseppe Berlingieri, Sara Calligaris, Chiara Criscuolo, & Rudy Verlhac, *Laggard Firms, Technology Diffusion and Its Structural and Policy Determinants*, OECD SCIENCE, TECHNOLOGY AND INDUSTRY POLICY PAPERS, No. 86 (Mar. 5, 2020).

## A. New Competition Concerns Raised by Intangibles

So far, our arguments suggest that, when it comes to interfirm competition, intangibles provide reasons for optimism and for rejecting the concerns of hipster antitrust. Unfortunately, things are not quite so simple. An intangible economy is harder to regulate, requiring changes to the institutions that enforce competition policy.

How does competition affect prices in an intangibles-rich economy? The digital economy goes hand in hand with the growing importance of intangibles (recall that intangible assets include software and databases, for example). There is a lingering suspicion that competition might work differently online. After all, doesn't the information that the Internet now gives consumers benefit only the smart and savvy? Those who seek the variety of supply that competition brings will be the winners. Those who are not quite so savvy, and those without the ability or means to seek such bargains, will surely lose out.

This logic needs careful teasing out. The basic textbook economics model suggests completely the opposite. In that world, smart and savvy consumers spread the benefits of their bargain-hunting out to everybody else. To understand how that happens, start by thinking about the price of milk at your local shop. If you ask people what the price of milk is, most of them are rather hazy about it. Indeed, many politicians get a briefing on the price of milk before they go into the interview room, as it's a standard question that an interviewer might ask in an attempt to embarrass them. (In the United Kingdom right now, the price is about £1 for four pints; in the United States, it's about $3.59 per gallon).

Does a general lack of awareness regarding milk prices mean that supermarkets can simply shade up the price of milk, safe in the knowledge that uninformed consumers will not notice the difference? Not necessarily. Suppose there are some consumers who *do* know the difference. If the supermarket raises the price of milk, those consumers will simply go elsewhere, either by physically walking elsewhere or by clicking a button. And if there are enough of them, then the supermarket knows that it's going to lose out if it raises its milk price. Just how much it loses out depends on the responsiveness of demand to its price. It turns out that supermarkets don't need that many "marginal consumers" to make such a price increase unprofitable. For example, suppose typical mark-ups over variable costs of 50%. Even if 85% of customers remain following a 5% price rise, that price rise is unprofitable.

The consequences of this market behavior are important. When only 15% of consumers are responsive, milk prices stay low. Thus, the 85% of consumers who either have little idea of milk prices or pay no attention whatsoever get the benefit from those active 15%, and the benefits of competition cascade beyond just those savvy consumers. The actions of a few hold prices low for everyone, supporting the textbook model that predicts widely spread benefits of competition.

Another example is hotel minibars.[19] These minibars, with their very high prices, seem to be a prime example of preying on thirsty and hungry consumers (or perhaps those with less

[19] Mark Armstrong, *Search and Ripoff Externalities*, 47 REV. INDUS. ORG. 273 (2015).

self-control). But it's worth remembering that hotels offer minibars to everybody. If the hotel believes that at least some fraction of its guests is going to purchase items from the minibar, it will reduce the base price of its hotel rooms to attract more minibar users. The hotel therefore ends up reducing prices for everyone, and the non-minibar drinkers get the advantage of those who yield to such temptation (who may, in any case, have good reason to want to pay a premium for a cold drink that is available in their room). Payments for checking in baggage at airports work on a similar principle. Savvy consumers who do not incur these costs are subsidized by those who end up paying.

Matters are different, however, if everybody pays a different price. If the supermarket could engineer price changes in such a way that prices stay low for the price-sensitive customers but get shaded upward for the price-insensitive customers, then it might successfully be able to raise prices, even in the face of competition. Such a strategy is difficult to pull off. First, the supermarket must know who is price-sensitive and who is price-insensitive. And it would have to know that not only for the price of milk but also for the price of meat, bread, and the thousands of other products that supermarkets usually stock. Second, the supermarket would have to find a way of segmenting the market and holding prices low just for the more responsive.

In the pre-Internet days, coupons were used for exactly this purpose. Sensitive customers snipped coupons and got price reductions for which insensitive customers were ineligible, allowing supermarkets to segment the market. But coupons were an inaccurate method of segmentation and, while the customers bearing coupons revealed themselves to be the sensitive customers, coupons didn't typically use customers' purchasing histories.

Today, in the Internet era, segmentation can be accomplished much more easily. Shops (especially online shops) have detailed information about individuals, their shopping habits, their responsiveness to prices, and other contractual details—from online accounts, or from loyalty cards for in-store purchases. So, the cost of information, which the market-segmentation strategy crucially requires, seems to have come down, which raises an interesting hypothesis. Perhaps in earlier years, with less personalized pricing and less segmentation in markets, the vast bulk of uninformed consumers unknowingly benefited from the actions of informed consumers. As far as prices were concerned, we were really all in it together. With the move to the Internet and increased information in the economy, perhaps the situation has completely changed. Shops can target offers at specific customers. Consumers are now faced with an assault on their attention that the digital economy brings, and uninformed consumers are failing to get any benefit from informed consumers. In this digital marketplace, therefore, we are decidedly not all in it together. There are, of course, countervailing forces: the same digital technologies that make it easier for firms to understand, segment, and target their customers also make it easier for competitors to try to lure those customers away with rival offers, or for platforms to arise offering price comparison services in return for a margin.

It turns out to be harder than you might think to find widespread evidence of "personalized" pricing. One standout case is Internet dating. A 2016 mystery-shopping exercise organized by WISO, a German consumer organization, revealed that a dating portal used personalized price segmentation—that is to say, offering different prices to different customers.

Parship—a large German provider of online-dating services that boasts setting up 55,000 relationships since 2001—uses its detailed sign-up questionnaire to determine the client's monthly membership fee.[20] These fees differed by salary, among other characteristics. A female tester with a fictional annual income of €100,000 was asked to pay a €44.93 monthly fee, while another tester with a lower fictional annual income of €15,000 was offered the membership for €30.02 per month. A male user with an equally low income was offered a lower fee than the female user—only €26.45 per month.

While Parship extensively uses personal information to charge personal prices, less sophisticated efforts are more common. The economists Aniko Hannak and colleagues[21] document several cases where companies inferred higher ability to pay from the type of computer that the buyer used. For example, researchers found that Mac users can spend up to 30% more than PC users for the same room on the U.S. online booking portal Orbitz. In other cases, Staples, a large U.S. office-supply chain, charged different prices based on the location of its online shoppers. Search effort can also make a difference; for example, users searching for flights more intensively by using Google Flights always paid less.

*Price steering*, a close cousin of individualized pricing, changes the order of search results, presenting those results based on what the retailer already knows about the customer from previous visits to its sites. A good analogy is the way that Netflix presents content to its users. Over the course of time, Netflix learns about its user preferences, allowing it to tailor suggested content better and better from visit to visit.

Whether these practices are common or not, the rationale and effectiveness of intervention in this marketplace are very complicated. Taking steps to raise competition typically helps all customers. But many suggested interventions in these marketplaces—regulating minibar prices, for example—are steps to change not all prices, but rather, the structure of prices. Capping minibar prices might help those customers who want a drink or a snack, but it might harm other customers if the general level of prices rises to recover the loss in profits from the minibar. Michael Grubb and Matthew Osborne examined the U.S. Federal Communications Commission's (FCC) 2013 introduction of "bill-shock" regulation.[22] In response to the worries of mobile-phone users who went over their allotted minutes and received enormous bills, a law was passed requiring mobile operators to send a text alert to consumers who are about to go over their free text/call limit and so incur "overage" charges. And, indeed, this law did reduce the number of consumers who incurred overage charges. But simulations suggested that the operators, which were competing in other parts of the market, regained profits by increasing their standard charges for everyone. Overall, consumers became worse off. What should we

[20] *The Market Power of Platforms and Networks*, BUNDESKARTELLAMT, Working Paper B6-113/15 (June 2016), *available at* https://www.bundeskartellamt.de/SharedDocs/Publikation/EN/Berichte/Think-Tank-Bericht-Zusammenfassung.pdf?__blob=publicationFile&v=4.

[21] Aniko Hannak, Gary Soeller, David Lazer, Alan Mislove, & Christo Wilson, *Measuring Price Discrimination and Steering on E-commerce Web Sites*, In PROC. 2014 CONF. INTERNET MEASUREMENT CONF. 305-318, (November 2014).

[22] Michael D. Grubb & Matthew Osborne, *Cellular Service Demand: Biased Beliefs, Learning, and Bill Shock*, 105 AM. EC. REV. 234 (2015).

conclude? Interventions that end up changing the *structure* of prices are fraught with problems and need to be considered very carefully.

Furthermore, there are situations in which differential pricing improves things for both firms and consumers, particularly when it comes to some intangibles-intensive businesses whose products have fixed costs but near-zero marginal cost, such as software, data, music, or video games. Setting prices for businesses like these is tricky; they need to find a way of covering their fixed costs. One way to do this is to allow businesses to charge different prices to different consumers (often for different versions: free and paid-for Zoom, for example). Consider the market for video games, where sales, deals, bundles, and so forth likely help companies set different prices for many different types of customers (most notably, those willing to wait versus those unwilling to wait). Charging different prices probably increases the number of games sold compared to what would happen if firms had to set a single price high enough to cover their fixed costs, and it means that more consumers get a game at a price they are willing to pay.

Another issue relates to how we encourage *business dynamism*. There has been a welcome trend in competition policy away from monitoring simple concentration metrics toward ensuring that it remains possible for new firms to enter a market. The entry of new firms is particularly important as the importance of intangibles increases, to the extent that threats to large, intangibles-rich incumbents often come from new entrants. But ensuring that market entry is easy becomes harder in a world of intangibles-intensive businesses. Tangible capital tends to be heterogeneous: One idea, one brand, one operating process is usually not like any others. One consequence of this heterogeneity is that the tactics that intangibles-rich businesses use to maintain competitive advantage—what Warren Buffett would call the "moats" around their business model—are also highly varied and tend to require bespoke analysis.

For example, when one of the authors worked on intellectual-property policy for the U.K. government, a controversial issue was the rivalry between online platforms and the owners of content, such as music videos and sporting rights. The issue was, in a broad sense, one of competition and market dominance. But the specifics were very specific indeed. For example, how quickly should content platforms such as YouTube be required to take down pirated content? The answer to this question matters because the faster a platform is required to remove the offending content, the less likely it is to have a permanent "reserve army" of illegal content available to users, which in turn weakens their bargaining position in negotiations with rightsholders over how much money the rightsholders receive each time their content is viewed. It may come as no surprise that this issue was dealt with, not by the normal regulatory processes, but rather with a high-touch negotiation conducted across two government departments.

Another issue is mergers. Critics decry Facebook's purchase of WhatsApp on the basis that the purchase might have stopped future competition. But the prospect of being bought out

by another company might be the only way that new intangibles-intensive businesses will start in the first place, especially if they trouble raising finance through conventional channels.[23]

These examples are just some of the almost infinite varieties of market-dominance questions that regulators might be called on to resolve for intangibles-intensive businesses. Each question presents its own technical challenges, and it is hard to resolve them using the kinds of rules-based procedures that work for assessing market dominance in discrete industries dominated by bricks-and-mortar assets. Crucially, these policy questions are not ones that would usually be considered to fall into the realm of competition policy or antitrust policy. A whole host of regulatory questions affect business dynamism, so if business dynamism becomes a more important lever of competition policy, it will require a wider range of government competencies to make it work.

### B. Institutions for Competition in an Intangible Economy

The many different types of market-dominance problems in an intangible economy, and the way online platforms change the marginal consumer's effect on pricing decisions, both have implications for the way we regulate competition. Our guiding principle should remain consumer welfare. Ensuring that markets are contestable should remain an important means to achieve consumer protections. However, understanding a wide variety of new business models, market-access dynamics, and the impact of digital technologies on pricing requires significant knowledge on the part of regulators.

The economist John Fingleton, former chief executive of the U.K. Office for Fair Trading, has proposed an "n+1" regulator who might sit across all sectors of the economy and aim to support new companies with innovative business ideas that existing laws or regulations cannot accommodate.[24] The "n+1" name signifies that the regulator would be responsible for radically new business models that do not sit well in the established market framework of the industry; recent examples that an n+1 regulator might have looked at include peer-to-peer finance businesses or telematic car insurance, both of which faced regulatory challenges. The idea is that the regulator would grant five-year licenses to new companies whose business models conflict with existing regulations—the next Uber, for example—and allow the companies to operate for this period, whether they are in breach of existing law or not. The companies would be required to take out liability insurance, or in some cases the regulator itself may offer insurance (at a price) if the private sector will not insure an innovative business.

This approach already exists in health care, where treatments that haven't received regulatory approval are allowed to be used under certain circumstances.[25] It also exists, to some

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[23] *See*, e.g., Geoffrey A Manne, Sam Bowman, & Dirk Auer, *Technology Mergers and the Market for Corporate Control*, 86 MISSOURI L. REV., 1099 (2021). ("There are several problems with describing this kind of behavior as harmful. The first is that killer acquisitions (and other mergers) could *increase* innovation by boosting the returns to innovation, as acknowledged by Cunningham *et al.*")

[24] *See* Sam Bowman & Stian Westlake, *Reviving Economic Thinking on the Right, Full Report*, REVIVING ECON. THINKING ON THE RIGHT (2019), https://revivingeconomicthinking.com/full-report.

[25] *E.g.*, compassionate-use regimes for experimental drugs. See *Compassionate Use* (n.d.), EUROPEAN MEDICINES AGENCY, https://www.ema.europa.eu/en/human-regulatory/research-development/compassionate-use.

extent, in fintech (innovations in the financial and technology crossover space).[26] The regulator would have two responsibilities here. First, it would allow into the market innovative companies that would otherwise be blocked by regulation. Second, it would be responsible for negotiating with the sector regulators to change the rules, so that those innovative new companies can continue to operate in the long run. This approach dovetails nicely with our earlier framework. It solves a collective-action problem in institutional reform, namely that many individual companies might want to change regulations (those that block entry for many, for example), but none of these individual firms benefit from spending the effort required to change the regulations.[27]

In addition, we might reform sectoral regulation so that sector regulators deal with activity rather than industry—for example, on-access charges for all utilities rather than access charges on a utility-by-utility basis. This idea is somewhat complementary to Fingleton's plan in that expertise on an issue from one area can be brought to bear in another encouraging innovation. Reformed sectoral regulation might also help to avoid industry-specialist regulators being captured by the industries they regulate. It would also provide a forum for thinking about how to regulate intangibles-intensive platform businesses, such as food-delivery firms. The expertise required to assess whether it makes sense to compel open access to a utility network could also be applied to networks such as Deliveroo or Uber Eats.

Turning to broad competition questions in the intangible economy and particularly in the digital economy, we are cautious. Sometimes regulators encourage rivalry by intervening in a market, thereby improving its general functioning, and encouraging rivalry and entry in the whole market. On other occasions they intervene in only part of the market (often following lobbying from politicians). Interventions around the *structure* of prices, rather than general market functioning, can have unforeseen consequences. As we saw in the bill shock case, these efforts may backfire.

Further, we think the intangibles lens helps better evaluate some policy questions. Large companies might very well be a good thing if their scale and synergies, which abound in the digital economy, benefit consumers—providing, for example, a wide network or indirectly encouraging entrants with the prospect of mergers. Breaking up Amazon, for example, might dissolve synergies and scale, which might end up being a net loss for consumers if a broken-up firm cannot use them.

Does this possible outcome mean that we should do nothing in the digital space? Not necessarily. First, there might be some harm if large search engines dominate the digital-advertising market, in which case action might be taken in that particular market (but even then, the "harm" to the economy of having expensive advertisements would have to be calibrated). Second, rather than treating intangibles as a bug, competition authorities should treat them as a feature. The obvious example is the widespread use of online price-comparison websites, used by

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[26] *Regulatory Sandbox*, U.K. FINANCIAL CONDUCT AUTHORITY (Oct. 5, 2015), https://www.fca.org.uk/firms/innovation/regulatory-sandbox.

[27] It is also a counterbalance to the influence costs that might otherwise be incurred by incumbent firms lobbying widely to protect their status.

85% of U.K. consumers with Internet access, according to the U.K. Competition and Markets Authority (CMA), and accounting for 40% and 60% of home and car insurance sales, respectively.[28] The CMA Digital Competition Tools inquiry found that 64% of consumers used multiple comparison tools when shopping around. Making sure competition between these sites is strong would be a good use of limited regulatory time. Finally, competition regulators need to keep an eye out for unintended competition consequences of other measures in the digital economy, such as privacy.[29]

These institutional changes are less dramatic than the aggressive upgrading of antitrust rules that many advocate. Indeed, some might call them downright boring, because they involve investing in the skills and capacities of regulators—never a rousing political argument. In many cases, they have little to do with competition authorities. But the key point is that, in a world of intangibles-intensive businesses that have strong economies of scale and that may often obtain temporary dominance over markets, the best weapon is new firms. Making sure new, innovative businesses have a fair chance to enter markets and dethrone today's monopolists is more effective than the traditional metrics and tools of antitrust.

### C. Competition for Attention

As we have seen, digital companies are getting bigger and more conglomerate. But how then are we best to think about these markets and what's right and wrong with them? It's crucial to start by figuring out correctly what "market" these digital companies are in. Facebook will tell you that they are in the leisure business and so compete with TV shows, football matches, and going out to eat. No monopoly there. Privacy campaigners will tell you these companies are in the market to simply devour your data and that you shouldn't let them. But searchers on Google may ask: what can be wrong with a service giving you efficient access to the world's knowledge that comes for free?[30]

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[28] *Digital Comparison Tools Market Study, Final Report*, UK COMPETITION AND MARKETS AUTHORITY (Sep. 26, 2017), *available at* https://assets.publishing.service.gov.uk/media/59c93546e5274a77468120d6/digital-comparison-tools-market-study-final-report.pdf.

[29] Guy Aridor, Yeon-Koo Che, & Tobias Salz, *The Economic Consequences of Data Privacy Regulation: Empirical Evidence From GDPR*, NATIONAL BUREAU OF ECONOMIC RESEARCH, NBER Working Paper 26900 (May 2021), http://www.nber.org/papers/w26900. The authors studied the competition consequences of GDPR—the EU regulation that, among other things, requires people to actively accept the use of cookies on websites. They found a 12% reduction of cookie use. It turned out, however, that most people opting out were people who had previously been using ad-blocker or privacy devices, which randomized their ISP address. Opting out gave rise to an interesting effect. For a firm collecting information across *all* users, some of them using the ad-blocker technology and others not, the ad-blocker randomness generated a lot of noise, reducing the value of these data. Once those consumers who had previously been using ad blockers opted out, no information about their ISP at all was given to the firm. That made the remaining customers *more* easily trackable and identifiable. Thus, while GDPR might have helped with the privacy of the people opting out, it decreased the privacy of the remaining parties even more.

[30] *See*, e.g., *Adults' Media Use and Attitudes Report, 2020/21*, U.K. OFFICE OF COMMUNICATIONS (Apr. 21, 2021), *available at* https://www.ofcom.org.uk/__data/assets/pdf_file/0025/217834/adults-media-use-and-attitudes-report-2020-21.pdf. OFCOM reports mixed evidence on whether consumers really understand the risks and what they are exchanging their information for, at 25-29. 87% of users said they were confident to use the Internet. 78% knew that cookies were a way of collecting personal information. 60% of adults realized search results marked "Ad" were paid for.

As David Evans points out, the right way to think about these firms is that they are in the market for attention.[31] But this market is a rather peculiar one. Let's understand why.

Consider the case of FreePC. FreePC was a company that gave away free computers to consumers, but with a lock on them so that the consumers were unable to turn off advertisements. The enterprise turned out to be a failure because the advertisers decided that consumers who were so sensitive to the price of computers would be undesirable people to whom to advertise. So FreePC failed because, although they solved the problem of being attractive to consumers, by giving away a free computer, they didn't solve the problem of being attractive to advertisers.[32] So what does it take to be a successful digital platform?

## III. THE MARKET FOR ATTENTION

Making a market needs willing sellers and buyers. Starbucks coffee has coffee to sell. Buyers need their coffee fix. The task of matching of those buyers and sellers is easy: set up a shop. But matching buyers and sellers is not always so easy. Before eBay there were sellers of second-hand bikes and buyers. But matching them was not so easy: the local paper for example. The invention of the Internet drastically lowered the transactions costs of making such a match.

Matching those who know they want to buy and sell their bike is now easy. But many market participants don't quite know what they want: quite where to go on holiday, or which restaurant to order from. Those consumers would value some information to help them choose. And firms, or their advertisers, would like to provide such information. But how are they to be matched? Both sides would value meeting: the consumers to get the information and the sellers to provide it. So, there is a trade to be made. The problem, however, is that transactions costs get in the way. It's very costly for the advertiser to identify exactly the consumer for whom there is a beneficial exchange. Even if they could match, and the consumer is potentially interested, there is no guarantee that the advertiser can ensure that the consumer would pay attention to the information. One way to solve this problem is to go out and shout, and/or to put ads on as many buildings as one can find. This was oft used in medieval times and, as literacy improved, in mid-19th century London.[33]

A more elegant method is to create a platform that matches information on the two sides. As David Evans points out, the emergence of newspapers in the 18th century substituted for those noisy advertising methods and created just such a platform.[34] Newspapers published news and entertainment for their readers. Having gotten their readers' attention, businesses were then very willing to pay for advertisements alongside those articles. Although newspapers charged for each copy, by the end of the 18th century, Evans reports that newspapers made money mostly from advertisements.

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[31] David S. Evans, *The Economics of Attention Markets*, SSRN (Apr. 15, 2020), https://ssrn.com/abstract=3044858.

[32] Quite a few companies have had this problem. When OpenTable started in 1998, they tried to sign up as many restaurants as possible. They came to the point of failure and had to change by signing up as many restaurants in a specific local area as possible. Again, until this change, they were unattractive to both side of the markets.

[33] Evans, *supra* note 31.

[34] *Id.*

The economist Hal Varian has pointed out that the profitable niche for newspapers has often been publishing supplements on, say, gardening, which are particularly valuable for advertisers.[35] That is, advertising slots among the main features of news have never been especially valuable in newspapers.

But could you get a better match via a better correlation? Google realized early on that a search engine was a perfect source for a very close match (if you were searching for swimsuits, you probably didn't want to see advertisements for winter coats). So, modern search engines focus precisely on that piece of the market for attention. Just as desirable content in a newspaper attracts attention from readers who then see advertisements, desirable content in the form of a search result attracts attention from searches who are then exposed to ads on the page. In many ways, this is a particularly desirable outcome. It delivers efficient market segmentation at a fraction of the cost that it would take a newspaper or magazine to print a special edition. It provides content that consumers like and attention that advertisers are willing to pay for.

Viewed in this way, we can form a better opinion about whether the competitive strategies employed by such firms are or are not beneficial to consumers.

### A. Content

As David Evans argues, content must be good, or else consumers will switch.[36] A few examples will help. Google has policies on what is and isn't allowed for advertisements; infringement of those policies means ads are withdrawn.[37] This can be incredibly costly for firms: BMW.de was more or less stripped from Google following an infringement, and traffic collapsed.

The history of Myspace is also extremely instructive in this regard.[38] Before Facebook, social media was dominated by Friendster.com, which was then displaced by Myspace. Friendster started in 2002 and grew to more than three million users by 2003. However, it became extremely popular for users to generate fake profiles. At the beginning, this attracted more users. After this initial increase, however, the management of Friendster realized that these fake accounts placed a burden on those who wanted to network reliably. The attempt by management to rid the site of these fake users led many of them to migrate to Myspace. Myspace adopted an extremely lax policy regarding reliable information, and rapidly overtook Friendster. Unfortunately, it quickly attracted the underage and the criminal element (additionally, it did little to discourage prurient content).

When Facebook started, it was much more careful about those who could come join its network. Crucially, advertisers deserted Myspace when they realized that they did not want to be

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[35] Hal Varian, *The Economics of the Newspaper Business*, speech given in Milan, Italy, at the awards ceremony of È Giornalismo, (Sep. 23, 2013), transcript *available at* https://www.journalismfestival.com/news/hal-varian-on-the-economics-of-the-newspaper-business.

[36] Evans, *supra* note 31.

[37] *Google Ads Policy*, GOOGLE ADVERTISING POLICY CENTER, https://support.google.com/adspolicy/answer/6008942.

[38] Evans, *supra* note 31.

associated with low-quality content. Thus, to a large extent, platforms have an in-built incentive to make sure their content is of good quality.

### B. How Do Consumers Decide?

Daniel Kahneman's influential book suggests humans engage in two types of cognitive processes: System 1 being fast, automatic, and unconscious, and System 2 being slow, deliberative, and conscious.[39] Consumers with limited bandwidth might be more inclined to use System 1 and thus might be more likely to accept default suggestions, rely on rules of thumb, etc. As the economist Amelia Fletcher puts it: "This in turn means that consumers may be more likely to make mistakes if they are given too much information (information overload), too much choice (choice overload) or too little time to make a decision."[40]

A fascinating example of the impact of informational overload is found in a 2010 field study from South Africa.[41] In this experiment, a consumer-lending company sent letters to 53,000 former clients offering loans. Crucially, each letter differed by both interest rate, but also letter format. By varying both the letter format and offered loans, the researchers were able to find out how much changes in letter format were "worth," in terms of how much more or less consumers with different letters were willing to pay.

The results were striking. For example, in this experiment, less was more. Showing *one* example loan in the letter, instead of four, *increased* loan take-up by as much as a price reduction of 25%. Likewise, a picture of a smiling woman on the letter made male customers willing to pay around 25% more. They argued that advertising content works exactly through triggering System 1 intuitive behavior (triggered by a photo, for example, or having different numbers of example loans) rather than System 2 deliberative behavior (trigged by comparisons with outside prices, for example).

One can, of course, always quibble with the generalizability of field experiments (and the authors themselves are careful to say that context is extremely important). In this case, for example, some of the framing effects were much more powerful than price changes. Does that mean that all firms can forget about price as a strategic variable, and simply get their customers to pay a high price by framing the product in the right way? One problem with this study is that it was sent to clients who had previously taken out loans from the company. Cash borrowing is often subject to strong persistence effects, as consumers want to build up a reputation with that lender.[42] Thus, in this case, it might be that the influence of borrowing rates on whether the consumer took out the loan might be understated. At any rate, the field study is a compelling

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[39] DANIEL KAHNEMAN, THINKING, FAST AND SLOW (2011).

[40] Amelia Fletcher, *The Role of Demand-Side Remedies in Driving Effective Competition*, CENTRE FOR COMPETITION POLICY (Nov. 7, 2016), *available at* https://www.regulation.org.uk/library/2016-CCP-Demand_Side_Remedies.pdf.

[41] Marianne Bertrand, Dean Karlan, Sendhil Mullainathan, Eldar Shafir, & Jonathan Zinman, *What's Advertising Content Worth? Evidence from a Consumer Credit Marketing Field Experiment*, 125 Q J ECON. 263-306 (February 2010), https://doi.org/10.1162/qjec.2010.125.1.263.

[42] *Id.*

example of how much cognitive load matters for consumers via, in this case, the framing effect of the advertisements that they see.

If there is competition for attention that consumers find difficult there will be an incentive for the market to provide "simplification" services. And consumers will potentially value those services. The leading examples of such services are price-comparison websites (PCWs), which are a special case of the more general class of digital comparison tools (DCTs). PCWs also have an incentive to provide good services since that's how they get paid. Providers of information will be paid when consumers switch providers via their website. They therefore have an incentive to make the information easy to access in order to get consumers to switch. The CMA generally finds that DCTs have strong incentives to make comparisons easy and that they are generally better at it than regulators.[43]

And indeed, consumers do use such tools. As mentioned earlier, the CMA's report on DCTs (including PCWs) found that 85% of U.K. consumers with access to the Internet have used a DCT. The top four or five largest DCTs, however, account for almost all DCT sales.[44]

### C. Ensuring the Attention Market Works Well

With this in mind, what can policymakers do? First, behavioral economics often casts behavior generated by System 1 thinking as a deviation from a "rational" path, and the job of regulators is to get consumers back onto such a path by, for example, giving them more information or giving them more choices (choosing among Internet browsers, for example, or whether to opt into or out of cookies).[45] The evidence from field studies is not necessarily that consumers want more information, but that they want more easily digestible information.[46] This fits with the ideas in John Kay and Mervyn King's book, *Radical Uncertainty*, that behavioral "biases" are best seen as optimal responses to "radical" uncertainty (i.e., outcomes you cannot put probabilities on).

Redesigning platforms to fit what regulators *believe* are consumers' preferences, however, is a difficult task, to say the least. One way to see this is to consider examples of some PCWs that were *de facto* created by regulators.[47] In an early intervention, the CMA (then called the Competition Commission) mandated that home-credit providers to put information onto the web to allow comparisons. The PCW that was mandated (LendersCompared.org) was, it turned out, only used by 2% of the market each month. One reason was that, while the site showed

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[43] CMA, *supra* note 28.

[44] *Online Platforms and Digital Advertising: Market Study Final Report*, UK COMPETITION AND MARKETS AUTHORITY (Jul. 1, 2020), *available at* https://assets.publishing.service.gov.uk/media/5efc57ed3a6f4023d242ed56/Final_report_1_July_2020_.pdf.

[45] Browser-choice remedies, however, have not been successful in the past, which casts doubt on their appropriateness. *See*, e.g., Geoffrey A Manne, & Dirk Auer, *Antitrust Dystopia and Antitrust Nostalgia: Alarmist Theories of Harm in Digital Markets and Their Origins*, 28 GEORGE MASON UNIV. LAW REV. 1281 (2021), at 1385. ("[T]he browser choice screen remedy was so ineffective that, when Microsoft illegally stopped implementing it, it took authorities and consumers a full fourteen months to notice.").

[46] JOHN KAY & MERVYN KING, RADICAL UNCERTAINTY, DECISION-MAKING BEYOND THE NUMBER (2020).

[47] Fletcher, *supra* note 40.

comparative prices, there was no functionality to click through and get a quote. A second example is the PCW that was mandated by regulators to enable consumers to compare extended warranties. Only three suppliers chose to be on the website CompareExtendedWarranties.co.uk, which has rules about what information to provide and likewise does not enable click-through functionality.[48]

This suggests that if the market helps provide consumers with information via DCTs, it will be particularly important to make sure these tools actually function reasonably well. The CMA's DCT inquiry found that 64% of consumers used multiple DCTs when shopping around, but much lower numbers actually got a quote (30% and 11% of consumers got a quote from more than one site for car and home insurance, respectively). The CMA noted that more quotes would help.[49]

Third, are network effects (and data possession) good or bad? It's often said that network effects are a natural barrier to entry and firms with developed networks (or much data) are unlikely to be challenged. Yet, it is easy to overstate this case. As David Evans and Richard Schmalensee argue, the network effects typically come from matching different types of customers (YouTube benefits from people uploading videos, but if the only people who watched were those doing the uploading, it wouldn't be very valuable).[50] Matching different types of customers is much harder than matching the same customers and so building the network in the first place is likely costly: high returns are likely due, in part, to those high costs. Equally, network effects can work in reverse (see Myspace) and so can be a powerful force for replacing firms.

Similarly, having different kinds of data is often very valuable, but expensive to obtain. For a new entrant to compete, it will often need an innovative approach, which is a good thing. To say that one firm has a lot of data and thus another cannot enter the market is rather like saying one firm has a lot of oil wells already dug: it will be expensive for a new firm to enter, but the incumbent likely had to incur at least some expense to get to that stage.[51]

Fourthly, rivalry might be helped via *ex ante* regulation; to prevent, for example, the purchase of firms who might be future competitors. As the Furman report recently suggested, to police this area would involve premerger inspection of the market, fast action, and an intimate

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[48] *See* Auer & Manne, *supra* note 44, at 1385. (As part of a remedy package agreed with the European Commission, "Microsoft did sell a version of Windows without the media player: 'Windows XP N.' 418 During the first nine months following its introduction, Microsoft sold just 1,787 copies of this version (compared to 35.5 million copies of the regular version)").

[49] CMA, *supra* note 28.

[50] David S. Evans & Richard Schmalensee, *Debunking the Network Effects Bogeyman*, 40 REGULATION, 36 (2017), *available at* https://www.cato.org/sites/cato.org/files/serials/files/regulation/2017/12/regulation-v40n4-1.pdf.

[51] *See* Auer & Manne, *supra* note 44, at 1362 ("As we have shown, unlike oil, data is ultimately a form of information and as such is non-rivalrous and, in many cases, non-exclusive. Moreover, the value of a given dataset hinges critically on the expertise that firms can bring to bear in order to analyze the data. … As we have discussed, firms routinely build successful businesses without having access to pre-existing data. Instead, they hope that a strong product on the user side of the market will eventually translate into substantial revenues, notably by leveraging the data that is eventually generated on the platform.").

knowledge of market trends.[52] Our framework suggests why this is so hard: preventing mergers might help with rivalry and so with future innovation, but it also might hinder current innovation and entry if firms were entering and innovating in the hope that they would be bought up by incumbents.[53] The Digital Competition Expert Panel suggested setting up a special unit in the competition authorities to monitor this area, which would consist of a forum of regulators plus industry experts. There is, of course, a natural worry then about the lack of representation from people who are not in the industry yet. So, this would have to be designed extremely carefully and is another example of the need for state capacity to make this successful.

## IV. INTANGIBLES AND THE RAT RACE

While antitrust has typically concentrated on falling competition between firms, the rise of intangible capital has had a notable effect on another type of competition: that between individuals and workers—e.g., competition for schools, jobs, and status. Particularly concerning is what appears to be an increase in zero-sum competition among workers, increasing the risk of malinvestment in unnecessary degrees and meaningless credentials. Our institutions currently have very little immunity to this trend, and fixing it is a priority. But unlike the hot topic of interfirm competition, it has received relatively little political consideration.

In the words of legal scholar Daniel Markovits, "Today's elite workplace fetishises extreme skill and effort. Super-skills (and hence also the education and degrees that provide and mark skill) become increasingly important not just to securing high incomes and high status but also to avoiding low incomes and low status."[54] The rat race does not affect only elites. Many lower-paid services jobs are increasingly subject to surveillance, enforced work discipline, and the punishment of slacking. However, high-status and/or high-skill workers are better placed to win the rat race and to claim a disproportionate share of the rewards.

Anecdotes abound of how the rat race, especially in education, has become pervasive. The Federal Bureau of Investigation's "Operation Varsity Blues" in 2019 revealed a network of Wall Street and Hollywood personalities paying to get their children into various universities, via bribery of officials and inflation of exam results.[55] Wealthy families in New York are reported to pay vast sums to get three-year-olds into preschool and five-year-olds into kindergarten in the hope of then getting them into a high school for which they will then pay further vast sums, and so on.

More prosaic, but no less remarkable, academic research has documented the huge difference to life prospects from failing at various academic hurdles, adding surely to the pressures on parents and children. The economists Stephen Machin, Sandra McNally, and

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[52] Jason Furman, *Unlocking Digital Competition: Report of the Digital Competition Expert Panel*, DIGITAL COMPETITION EXPERT PANEL (March 2019), available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/785547/unlocking_digital_competition_furman_review_web.pdf.

[53] *See,* also, Manne, Bowman, & Auer, *supra* note 22.

[54] DANIEL MARKOVITS, THE MERITOCRACY TRAP (2019).

[55] *See,* e.g., Emma Jones, *Operation Varsity: How the Rich and Famous Cheated the US University System*, BBC NEWS (Mar. 18, 2021), https://www.bbc.co.uk/news/entertainment-arts-56427793.

Jenifer Ruiz-Valenzuela look at the consequences of failing to obtain a C grade in GCSE (General Certificate of Secondary Education) English in the United Kingdom. [56] The GCSE is an externally marked exam taken by all school students in England at age 16. It is marked on a scale from 0 to 300 and the information summarized in a letter grade from A* to U. The authors compared pupils with marks just above and below the grade C line (within 10 points). It turns out that such students have drastically different outcomes. Those who narrowly miss a C grade have much lower chances of achieving any further qualifications and a much higher chance of dropping out altogether. The probability of dropping out of education at age 18 for the narrow-miss pupils rises by about four percentage points. This is a large number when compared with the national dropout average, which is about 12%.[57]

Such findings are backed by employer surveys. A 2013 survey shows that GCSEs are important shortcuts for employers when hiring. Of those surveyed, 43% use GCSEs in English and math as a filter.[58] Hiring managers did not see applicants with grades below level C regardless of the applicants' other achievements. Contrast this with the blue-collar hiring practices at Ford in the 1960s reported by Daron Acemoglu.[59] In the words of one of Ford's managers, "If we had a vacancy, we would look outside in the plant waiting room to see if there were any warm bodies standing there. If someone was there and they looked physically OK and weren't an obvious alcoholic, they were hired."[60]

To some extent, the rat race is a first-order consequence of the growth of intangible capital. One subset of intangible capital is the software and management systems that enable businesses to track staff performance, reward the high performers, and punish the low performers, whether the workplace is an Amazon warehouse or a corporate law firm. The other aspect of intangibles is that they allow the talented workers to create eye-watering amounts of value, increasing the returns to being the best footballer, quantitative trader, or industrial designer. No wonder, then, that in an intangibles-intensive society, these aspects of the rat race are intensified.

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[56] Stephen Machin, Sandra McNally, & Jenifer Ruiz-Valenzuela, *Entry Through the Narrow Door: The Costs of Just Failing High Stakes Exams*, 190 J. PUBLIC ECON, 190 (2020).

[57] It is interesting to investigate what causes students to underachieve in high-stakes exams. *See*, e.g., Robert Metcalfe, Simon Burgess, & Steven Proud, *Students' Effort and Educational Achievement: Using the Timing of The World Cup to Vary The Value Of Leisure*, 172 J. PUBLIC ECON, 111-126 (2019). (The authors find that students taking GCSEs during a World Cup year underperform significantly. These students are 12% less likely to achieve Cs in at least five subjects, compared to those taking GCSEs during a non-World Cup year. The problem is even worse for boys from a poor background, whose grades suffer by as much as a third). In addition, transitory spikes in air pollution significantly lowered long-term school achievement among pupils in Israel, and high summer heat lowers exam scores among New York high-school students, with impacts on graduation status. *See* Avraham Ebenstein, Victor Lavy, & Sefi Roth, *The Long-Run Economic Consequences of High-Stakes Examinations: Evidence From Transitory Variation in Pollution*, 8 AM ECON J APPL ECONS 36-65 (2016); R. Jisung Park, *Hot Temperature and High Stakes Performance*, J. HUM. RESOUR. (2020).

[58] *New GCSE Grades Research Amongst Employers*, BMG RESEARCH (October 2013), *available at* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/529390/2013-11-01-bmg-research-with-employers-on-new-gcse-grades.pdf.

[59] Daron Acemoglu, *Changes in Unemployment and Wage Inequality: An Alternative Theory and Some Evidence*, 89 AM ECON REV. 1259-1278 (1999).

[60] *Id.*, at 1270.

The inequality caused by these first-order effects of intangibles is significant, but in some sense, it is familiar and can be addressed by familiar policies and institutions. Redistributive taxation, minimum wage laws, and employment rights are endlessly contested, but there is nothing institutionally new about them. To the extent that the search for great rewards incentivizes people to develop useful skills, it also has a positive effect, and passing an exam must say *something* about the student.

But the Daniel Markovits quote also reveals a less obvious, second-order effect of an intangibles-rich economy. As Markovits observes, modern workplaces don't just value skills; they "fetishise" them.[61] Educations and degrees are valuable not just because they confer skills, but because they "mark" them. In other words, an intangible economy is likely to reward what economist call *human-capital signaling*: acquiring credentials not because they are inherently valuable but because they are a credible way to prove that a worker is skilled.

Signaling matters because it is hard for employers to distinguish skilled workers from less skilled workers. Gaining an elite qualification, such as a university degree, may be valuable not just because it teaches valuable skills, but also because it is a credible signal that a prospective employee is conscientious and intelligent.[62]

To be credible, a signal must be costly, either in cash terms or in terms of the time and effort it takes to obtain; otherwise, anyone could get one. This requirement creates a problem. A dollar or hour of work spent gaining a useful qualification does not just create value for the person who earns it; by making that person more productive, it also creates value for the economy as a whole. It is a positive-sum proposition. In contrast, spending the same dollar or hour on a qualification whose only benefit is signaling is a different matter. It creates a private return to the people who earn the qualification, but it does not give them skills that create any additional value. Instead, it merely allows them to get a job that someone else might have got. It is zero-sum investment, or near enough.

Unfortunately, none of the participants in a typical educational transaction have a strong incentive to distinguish between real human-capital formation and signaling. From an employer's viewpoint, it does not matter much why a degree and certificate are useful, so long as they are. When John Paul Getty was asked why he chose men with classics degrees to run his companies, he replied: "Because they sell more oil." It was irrelevant to him whether Greek and Latin were useful in the oil business or simply that talented people tended to get classics degrees. Similarly, employees care only about their private return; a higher income is a higher income, whether it comes from education that increases one's human capital or simply from having sent a better signal. Even schools, universities, and training establishments have mixed motives. On the one hand, they have, we hope, a strong intrinsic motivation to ensure that what they teach is rigorous and in good faith; on the other hand, they have little incentive to make themselves redundant by probing too deeply the nature of the benefit they provide.

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[61] *See* Markovits, *supra* note 52.

[62] BRYAN CAPLAN, THE CASE AGAINST EDUCATION: WHY THE EDUCATION SYSTEM IS A WASTE OF TIME AND MONEY (2019).

What is more, it may not be easy for educational establishments to provide real human-capital formation even if they want to. Paul Lewis, a political economist who has studied advanced technical skills, interviewed people at dozens of high-tech British firms. They reported that even well-intentioned education providers had trouble providing the right skills for technical recruits. The synergies between intangibles such as R&D and worker skills can often be difficult to realize, requiring close interaction between providers of education and employers (or their integration, in the form of apprenticeships or on-the-job training).

In a world where the returns to skills are high and rising but the ability to judge talent is imperfect, and where it is hard for colleges and universities to predict employer needs, we would expect to see a boom in signaling. There is some evidence of such a boom. It is widely observed that a college degree is becoming a prerequisite for many jobs that were once done by non-graduates. Prestige employers who once recruited candidates with undergraduate degrees are now choosing between candidates with a master's degree or doctorate. These changes might reflect genuine increases in skills, but they might not. Especially in the United States, many jobs that once required no qualifications now require certification or occupational licensing,[63] ostensibly on skills and safety grounds. If more and more jobs are requiring a degree as a way of sorting between potential employees, this could help explain why graduate wage premiums in the United Kingdom have fallen for recent cohorts: Graduates born in 1970 enjoyed an average wage premium of 19% over non-graduates, compared to only 11% for graduates born in 1990.[64]

How much evidence is there for educational signaling? Bryan Caplan has been a vocal proponent of the view that college wage premiums in the United States are significantly about signaling. His main argument is that dropping out one year before graduating involves a large wage penalty, but it seems unlikely that the one additional year is so productivity raising as to justify that wage rise.[65] Thus, the graduation status is signal and not productivity. Noah Smith has argued that passing exams is a difficult enough hurdle to justify such wage rises. Further, he argues, firms are likely to learn about skills when they employ workers.[66] If educated workers were not productive, then the high return to education would decline as firms learnt about their workers' actual abilities: If those kids failing their GCSEs are doing worse for extended periods, then their failure must convey some underlying information about their productivity. Caplan counters with U.S. evidence that employers seem to learn fast about college-educated workers, but remarkably slowly about non-college educated workers.[67] In a study of U.S. high-school graduates, Peter Arcidiacono, Patrick Bayer, and Aurel Hizmo suggest that employers have not

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[63] *Occupational Licensing: A Framework for Policymakers*, U.S. TREASURY DEPARTMENT OFFICE OF ECONOMIC POLICY, the COUNCIL OF ECONOMIC ADVISERS, & the U.S. LABOR DEPARTMENT (July 2015), *available at* https://obamawhitehouse.archives.gov/sites/default/files/docs/licensing_report_final_nonembargo.pdf.

[64] Gianna Boero, Dan Cook, Tej Nathwani, Robin Naylor, & Jeremy Smith, *The Return to a Degree: New Evidence Based on the Birth Cohort Studies and the Labour Force Survey,* HIGHER EDUCATION STATISTICAL AGENCY (Oct. 22, 2019), available at https://www.hesa.ac.uk/files/Return_to_a_degree_main_report.pdf.

[65] Caplan, *supra* note 60.

[66] Noah Smith, *College Isn't a Waste of Time*, BLOOMBERG (Dec. 11, 2017), https://www.bloomberg.com/opinion/articles/2017-12-11/college-isn-t-a-waste-of-time.

[67] Bryan Caplan, *Reply to Noah on The Case Against Education*, ECONLOG (Dec. 18, 2017), https://www.econlib.org/archives/2017/12/reply_to_noah_o.html.

learnt about underlying productive attributes of those graduates even after 12 years of employing them.[68]

It is presumably even harder for employers to learn when non-cognitive skills become more important. If such skills are crowded out by teaching to the test, then it might be that employers look even harder at student background, raising the scope for wasteful signaling.

One proposed solution is to make the education market work better. If students spent their own money on education, then providers—public or private—would compete to offer courses that really do improve employability and offer something useful. This intuition has been the main thrust behind much of the last 30 years of higher-education reform in the United Kingdom, in which university education has gone from being entirely state-funded (with student numbers capped, and places limited to those with the best examination results) to a system of relatively high fees and subsidized loans provided by the government. The government has produced detailed data sets on the future salaries of graduates in different disciplines, along with frameworks and rankings that try to provide this evidence to prospective students in a salient way. The U.S. system has, of course, gone much further down this road, with most students incurring large amounts of private debt to pay for their studies.

Gallons of ink have been spilled over the merits and demerits of marketizing the university system. Critics argue that it is reductionist, increases inequality, and ignores the value of education to the extent it does not translate into a higher graduate salary, and that many of the metrics used to assess courses and universities are statistically unsound.[69] But neither side of the argument seems to have much of an answer to the question: "How do you discourage wasteful signaling?" Even if market reforms fully achieve their goal of giving prospective students very strong incentives to choose only courses with very high returns, the problem remains that an individual student is indifferent as to whether that return comes from real human-capital formation (that is to say, learning actually useful knowledge and skills) or whether it acts as a signal that they are more intelligent and conscientious than other people.

Another marginal improvement is to expand subsidies to cover more than just university education. The U.K. government announced in 2021 that it was extending its loan subsidies to non-university vocational education, a move that was widely welcomed by people worried about the dominance of universities in the British system.[70] American critics of universities point to short, vocational-coding schools like Lambda School as possible models for the future and imply that it would be better if more young people took this route for post-secondary education.

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[68] Peter Arcidiacono, Patrick Bayer, & Aurel Hizmo, *Beyond Signaling and Human Capital: Education and the Revelation of Ability*, 2 AM ECON J APPL ECON, 76-104 (2010).

[69] For a recent and widely read U.K. example, *see, e.g.*, Harry Lambert, *The Great University Con: How the British Degree Lost Its Value*, THE NEW STATESMAN (Aug. 21, 2019), https://www.newstatesman.com/long-reads/2019/08/the-great-university-con-how-the-british-degree-lost-its-value.

[70] *See* Luke Sibieta, Imran Tahir, & Ben Waltmann, *Big Changes Ahead for Adult Education Funding? Definitely Maybe*, INSTITUTE FOR FISCAL STUDIES (April 2021), *available at* https://ifs.org.uk/uploads/BN325-Big-changes-ahead-for-adult-education-definitely-maybe.pdf.

But this route also has risks associated with it. The United Kingdom's historical experience of a freer education market in which students have access to cheap loans is not encouraging. In September 2000, the government introduced an "Individual Learning Accounts" scheme, a sum of money that people over 19 years old could spend on education. An education provider could enroll a student, get the student's account number from the enrolled student, and then claim the student's allowance from the government. To encourage entry by new education providers, the government allowed any institution to enroll students. A host of new "providers" enrolled students and obtained the subsidy. But following fears that bogus providers were walking away with the money, the scheme was scrapped just 15 months later. It was later found that lack of reporting meant that the government was unaware that just 13 providers had registered over 10,000 accounts.[71]

The real problem here is that the institutions that govern education and training have relatively few defenses against credentialism and signaling. For the most part, government policy sees more education as better, and relatively little consideration is given to what to do about signaling. It is assumed that education providers, employers, and learners have a strong incentive to make sure that education is useful. But, as we have seen, there is no real incentive for any of these groups to prefer real human-capital formation over signaling alone. In addition, making policy on this subject is hard. Governments are not well-placed to differentiate between degrees or qualifications that generate real skills and those that merely signal. At most, they make very broad-brush attempts to promote science and math degrees—which could involve more human-capital formation but could equally also involve signaling—or focus on student earnings, which could also be the result of signaling.

We believe that policymakers need to invest time and money into studying this problem. If we gathered more data and conducted more experiments, we could understand more about post-secondary education and what types of licensing generate real value, rather than signaling. Equipped with this information, we hope, governments will take the idea of wasteful competition through signaling much more seriously and design the education system to discourage it. The idea that funneling ever-increasing numbers of students into higher education is sufficient to solve the skills problem is a quantity view, but the solution might be to provide more variety in truly useful skills (quality) rather than just sheer numbers.

## V. SUMMARY

The growing gap between leader and laggard firms in the economy seems to be caused to a great extent by the increasing importance of intangibles, rather than by businesses distorting competition regulation. Maximizing competition in the economy requires us to increase dynamism, to give challenger firms the best possible chance of dislodging incumbents, rather than embarking on a new wave of trustbusting policy, as some have proposed. It also suggests that it can be helpful to think about competition, especially in digital services, as competition for attention. And the growing importance of intangibles has also increased competition among

[71] *Individual Learning Accounts: Report by the Comptroller and Auditor General*, NATIONAL AUDIT OFFICE (Oct. 25, 2002), *available at* https://www.nao.org.uk/wp-content/uploads/2002/10/01021235.pdf.

workers and encouraged an increase of signaling in fields like education, which is wasteful, costly, and stressful. Policymakers have done little to understand this, let alone to reduce it: That should change.