The role of finance and intangibles in the financialised pharmaceutical sector

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This thesis is submitted for the degree of Doctor of Philosophy.

0. PREFACE

0.1 Declaration

This thesis is the result of my own work and includes nothing which is the outcome of work done in collaboration except as declared in this preface and specified in the text. I further state that no substantial part of my thesis has already been submitted, or is being currently submitted for any such degree, diploma or other qualification at the University of Cambridge or any other University or similar institution except as declared in this preface and specified in the text. It does not exceed the prescribed word limit for the Sociology Degree Committee.

The *Fortune* 500 data (but not the *Fortune* Global 500 data) was collected in collaboration with Nicholas Pye, for the original purpose of contributing to joint research publications with Larry King and/or Victor Roy. Data collection was initiated by Pye and completed by me. I checked and corrected some of the data, and produced the graphs presented herein. Pye did not contribute to writing any of the text contained herein. I also produced similar but different graphs in Roy & King (2016) and Hawksbee, McKee & King (2022), which make use of the same dataset.

Tables 1-A, 2-A, 2-B, and 2-C reproduce data/content from the World Bank, Auvray et al. (2021), Gleadle et al. (2014), and Lazonick (2010a) respectively. These sources are noted in the relevant captions labelling the tables. The tables have been re-drawn but are substantively identical beyond formatting/presentation. Table 2-A is licenced under the Creative Commons Attribution 4.0 International License. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/. None of the graphs are reproduced from other sources—these are all my own work, based on the data sources noted in the text.

0.2 Abstract

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The last few decades are widely believed to represent a 'new economy': for some, it is a high-tech or 'knowledge-based' economy; for others, one dominated by finance. Finance has certainly exploded, and we have seen huge breakthroughs in high-tech sectors like pharmaceuticals. Meanwhile, these same sectors face intensified public scrutiny, over issues ranging from monopolisation to pricing, product safety, and more. The nature and institutional context of the contemporary pharmaceutical sector affords shareholders major pay-outs, sowing resentment among the public who are forced to pay its rents even in the face of apparently slowed innovation.

This thesis explores and explains how contemporary pharmaceutical business models operate—in particular, how there are shaped by financial considerations and intangible assets. Mixed methods are used, bringing together quantitative analysis of 'big pharma' accounts with a qualitative case study. The former incorporates data from 20 global big pharma firms selected based on their revenue over time and headquartered in 3 regions, spanning the years 1991–2017 inclusive. The latter focuses on Martin Shkreli, (former CEO of 2 notable firms that acquired and hiked the prices of several drugs) and is based on news media reports and other publicly-accessible documents, such as investor presentations.

Financial holdings, engineering and rent-seeking seem less significant to big pharma than other sectors. Big pharma remains committed to innovation, despite its partial commodification and outsourcing through takeovers and markets for intangibles. However, financial thinking does inspire the adoption by some firms of novel and controversial business strategies and models.

These findings challenge influential notions within the literature, such as the perception that big pharma has largely abandoned R&D, or that small start-ups are by their nature innovative. They also strengthen the case for understanding financialisation as an uneven and combined phenomenon, as well as contributing to the process of synthesising the literatures on financialisation and assetisation.

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1. INTRODUCTION

1.1 Overview

1.1.1 The research project

This research project constitutes an attempt to make sense of a historical process of expansion and change in finance, and more specifically how it has affected business models and strategies in the global pharmaceutical sector. This process, in which finance grows in importance and transforms in nature, is generally referred to as 'financialisation'. It has been said to have attendant effects on economic growth, social inequality, public-sector budgets, and so on. Households have become more reliant upon finance in a myriad of forms ranging from major commitments like student loans and private pensions down to momentary interactions like payment processing and currency conversion. Financialisation has not only involved a swelling of financial industries such as banking but also a fundamental shift in ways of doing business in the 'real economy', including the pharmaceutical sector.

It should be noted that throughout the text, the terms 'pharmaceuticals' and 'pharmaceutical sector' are generally used broadly and inclusively, referring loosely to firms primarily active in producing and selling medicines. Many firms—while *primarily* concerned with pharmaceuticals—may be diversified to varying degrees and have major revenue streams from non-pharmaceutical products.[1] This usage eschews pedantic differentiation, reductive generalisations, or erroneous binaries. Most notably, no distinction is drawn between traditional pharmaceuticals and biotechnology; for the purposes of the present argument, it is rarely relevant whether or not a firm's products derive from biological origins. Nevertheless, specific distinctions are made—where warranted—between firms of different sizes, specialisations or performance over time.

A defining feature of the pharmaceutical sector in its present form—encouraged in part by financing pressures—is an ecosystem built on hierarchical division and

[1] E.g. Johnson & Johnson are a household name in part because of their many baby care and beauty products, such as baby oils, powders and soaps, as well as makeup removers and face washes; prior to a phase of disinvestment, GlaxoSmithKline was similarly known for its drinks brands Ribena, Lucozade and Horlicks.

specialisation of function. In particular, leading firms effectively outsource much R&D to smaller or specialist firms. They do this through a combination of buying and licensing individual intangible assets, but also through acquiring other firms outright. These other firms, in turn, adopt business models and strategies accommodating to this hierarchy, often actively seeking acquisition by larger firms or monetising their expertise through selling-on rather than producing. Within this context, intangible assets are seen quite differently than they once were, and their relative value and significance has increased accordingly; this phenomenon has been dubbed assetisation, and linked to financialisation.

In order to holistically develop a better understanding of these phenomena, this research project adopts a mixed-methods, 'narrative and numbers' approach, following Froud et al. (2006) Quantitative analysis is used to demonstrate on a relatively grand scale the ways that established 'big pharma' has and has not evinced transformations in its accounts over time. Qualitative analysis is employed to illuminate in detail and bring to life the concrete realities of what it means for financial logics to reign, especially in smaller and more specialist firms. Taken together, the two quantitative and qualitative empirical data convey how the effects of financialisation are mediated and modulated by context—be it sectoral, national, historical, or otherwise.

1.1.2 Outline of thesis structure

- Chapter 1 introduces and summarises the research project and the core topic it addresses—financialisation, in the context of the pharmaceutical sector. Some basic exposition is offered of first financialisation (in terms of its empirical and conceptual history) and then the pharmaceutical sector. Specifically, this chapter presents evidence for the phenomenon of financialisation, while acknowledging its contested and variegated nature. Three key intellectual traditions are identified as driving forward the theorisation of financialisation, and discussed accordingly: Marxist analyses of monopoly; post-Keynesian theories influenced by Schumpeter, Minsky and Kalecki; and Veblenian institutionalism.
- Chapter 2 constitutes an extensive literature review ranging across the literatures on financialisation and assetisation, as well as the nature and functioning of the pharmaceutical sector. This establishes the scholarly

foundations and influences of the original contribution made herein, and establishes the perspectives against which the empirical data will be compared in the quantitative and qualitative analysis.

- Chapter 3 presents the research design. It reiterates the research questions and outlines the definitions and hypotheses. It documents and justifies the methods used for both the quantitative and qualitative analysis that follow. It also outlines and evaluates the sample used in Chapter 4, the case studied in Chapter 5, and the data sources used for both.
- Chapter 4 presents visualised descriptive statistics and a comparative analysis of quantitative data from big pharma's corporate accounts and draws inferences with reference to the competing paradigms of financial and intellectual rentiership. These paradigms are used to explore how far ideas from the financialisation and assetisation can describe recent trends in big pharma.
- Chapter 5 follows this with a detailed biographical narrative case study illustrating financialisation and assetisation in action. This follows the career of Martin Shkreli from his origins as a financier who developed a specialisation in shorting pharmaceutical stocks through his time as the CEO of several pharmaceutical firms to his criminal conviction and beyond. This chapter examines in particular what the case can tell us about both financial pressures on firms and the cognitive financialisation of corporate management in the pharmaceutical sector.
- Chapter 6 recaps some of the key findings based on both the quantitative and qualitative literature, and offers concluding thoughts on the original contribution this research project makes to the literature. It also discusses some limitations and potential avenues for future research.

1.1.3 Aims and objectives

The main aim of this research project is to both illustrate and analyse the operation of global[2] 'big pharma' over more than two decades in a world increasingly shaped by the transformative growth of finance and intangibles. A secondary aim is to extrapolate more general lessons about these wider transformations in the economy—particularly how they may vary between countries and economic sectors.

The following specific objectives contribute to the achievement of these overarching aims:

- Review the empirical and theoretical literature on financialisation and assetisation, as well as literature relevant to the financialisation of the pharmaceutical sector.
- Determine how to operationalise the colloquial concept of 'big pharma' by using empirical data to identify a group of firms that can convincingly be considered the world's leading well-established pharmaceutical firms.
- Collect financial data on big pharma, including balance sheets, income statements, cash flows and other relevant data.
- Collect narrative data—including from journalistic reports and primary sources—on Martin Shkreli and his career in finance and pharmaceuticals.
- Analyse and summarise the quantitative data on big pharma accounts, commenting on the significance and context of the findings in relation to the conceptual frameworks of financialisation and assetisation.
- Analyse and summarise the qualitative data in the form of a case study, interpreting the case in relation to the conceptual frameworks of financialisation and assetisation.
- Discuss the findings and their relationship to the literature, drawing conclusions and recommendations as appropriate.

[2] Note that big pharma disproportionately serves the US market, deals with US regulators, and locates headquarters in the US. As such, 'global' big pharma as defined herein is in fact primarily US big pharma, with a secondary position occupied by European firms. Both the quantitative and qualitative elements of the thesis present data primarily from the US, but situate these in relation to a wider global political-economic context.

In service to these aims and objectives, this research project will attempt to answer the following research questions:

- How has the significance and role of financial assets, income streams and expenditures within big pharma been redefined?
- How has the significance and role of intellectual property and other intangible assets within big pharma been redefined?
- How has the changing influence and role of finance within the economy exerted pressures on the pharmaceutical sector?
- How has the importation of financial actors and logics affected business models and strategies within the pharmaceutical sector?
- How have the trends observed in financials and intangibles of non-financial corporations varied by region?
- To what extent (and how) are financialisation and assetisation linked in the pharmaceutical sector?
- To what extent (and how) has financialisation taken different forms in different economic sectors?

1.1.4 Motivation and significance

Finance and pharmaceuticals occupy similar and ambivalent positions in public imaginaries and discourse: both are high-flying, politically-connected industries that are subject to special regulatory environments not easily compared with those faced elsewhere in the economy. Despite this, both have had many high-profile scandals and much public outrage over the conduct of these sectors: the 2007–2008 global financial crisis; Bernie Madoff's Ponzi scheme, the 2012 LIBOR scandal and other financial criminality; the unaffordability of drugs for many patients; failures in rolling out the COVID-19 vaccine beyond wealthy countries since 2021. Such experiences have exacerbated pre-existing distrust among much of the population, and both sectors have even been made the subjects of multiple conspiracy theories each. Nevertheless, vast numbers of people remain hopelessly dependent upon these very same suspect industries for something as rudimentary as good health.

Additionally, the proper and actual role of finance within society is a topic that has long occupied scholars, even before the emergence of the literature identifying financialisation in such terms. Many such scholars have belonged to schools of thought built up from seminal social-scientific literature, ranging from Marx to

Keynes. Others including Marx and Veblen have also played foundational roles in developing our contemporary understanding of assets—particularly intangible ones—as capitalist social constructs. This implies significant intellectual value in tracing the contours of these phenomena as they are found in the economy today.

For all of these reasons, there is significant public and scholarly interest in critical accounts of the pharmaceutical sector's operation and how this is influenced by financialisation. Moreover, the particularly unique characters of the two sectors combined with their mutual linkages mean that the pharmaceutical sector is an important as well as idiosyncratic setting in which to explore the theoretical concept of financialisation. On the one hand, it offers many potential interactions and pressures to identify; on the other, the financialisation observed is likely to be distinctive in form and effects.

In particular, there is a growing scholarly interest in what can broadly be called assetisation, a concept that is distinct from—yet related to—financialisation. The context of pharmaceuticals is fertile ground when investigating the possibility that financialisation is not a one-size-fits-all phenomenon but rather syncretic or even synthetic, and the role that financialisation plays vis-à-vis assetisation, and/or vice versa. This approach problematises and complexifies the concepts, understanding each as much more—or perhaps much less—than an unprecedented and totalising rupture resulting in a radically new economy. In so doing, financialisation and assetisation can be better understood, each with regard to the other.

1.2 Finance and financialisation

1.2.1 The financial explosion

In the US, the financial sector's share of GDP roughly doubled between 1980 and 2007. (Philippon 2008) Similarly, the financial share of domestic corporate profits was just 17% in 1980, but had soared to 37% by 2002, and even in 2009 (after the financial crisis) rebounded to 32%; although it has since fallen, it remained as high as 22% in 2021, a level that had never been reached in the entire period from 1948–1990. (U.S. Bureau of Economic Analysis n.d.) In 1980, the securities industry's revenues accounted for less than 1% of GDP, but by 2007 this figure had reached over 4%; most of this growth was in asset management, especially 'alternative' asset

management.[3] (Greenwood and Scharfstein 2013) One of the most widely-cited articles on this topic strikingly demonstrated that the share of all corporate profits going to Finance, Insurance and Real Estate (FIRE) had ballooned from ~10% in 1950 to >40% by 2005. (Krippner 2005)

This growth in financial profits was not limited to the financial sector: major non-financial corporations saw their financial wings/subsidiaries become crucial to their operations. An instructive example is provided by the automobile industry, particularly in the US. (Borghi, Sarti, and Cintra 2013; Carmo et al. 2021; Froud, Haslam, et al. 1998, 2002; Froud et al. 2006; Froud, Johal, and Williams 2002) Ford Finance accounted for around 50% of Ford's overall profits from 1988 (when Ford's financial profits were first disclosed separately) to 2003, as well as the majority of profits in most of these individual years, and 100% of profits in 1991–2 as well as 2001–3. (Froud et al. 2006)

At the extreme end, this trend of financial subsidiaries of non-financial firms growing in significance led to GE Capital being declared a Systemically Important Financial Institution (SIFI) in 2013, though it later lost this designation in 2016. SIFIs are essentially those institutions officially considered 'too big to fail' and therefore targeted for special oversight. The designation of GE Capital (then a financial division of an industrial conglomerate) was unusual in that all other SIFIs were banks, bank holding companies, insurers, or other financial services firms. (Dokic 2017; U.S. Department of the Treasury Financial Stability Oversight Council n.d.) While GE Capital is a unique example, the non-financial corporate sector is a net lender to the rest of the economy in many advanced economies—including the US, UK, Canada and Japan—this is particularly true in the post-crisis period. (Gruber and Kamin 2015)

Households and the public sector borrowed in increasing amounts: between Q1 2000 and Q1 2010, mortgage debt outstanding increased from $6.3bn to $14.3bn; in the same period, the federal debt rose from 57.7% of GDP to 86.5%—clearly the financial crisis drove this latter figure up sharply, but it had already climbed to 64.2% beforehand, and it has not come down again. (Federal Reserve Bank of St. Louis n.d.) Mortgage Equity Withdrawal (MEW) fuelled more than 75% of all US GDP growth from 2003–6, having provided no more than 2% of disposable income for most of the 1990s but risen to >10% at its mid-2000s peaks. (Ritholtz 2009) MEW also made the

[3] 'Alternative' asset management refers here to hedge funds, private equity and venture capital.

difference between negative and positive US GDP growth in 2001–2. Conversely, households have been displaced as major owners of equity and debt securities, replaced by institutional investors.[4] (Mudronova 2013)

This growth in finance is far from unique to the US, even in the US serves as a particularly striking illustration. From 2000–2010, across the world as a whole, a range of indicators all increased (measured as a percentage of GDP): stock market capitalisation, bank private credit, outstanding debt securities, and bank deposits. (World Bank 2012) In the same period, the number of bank accounts per 1,000 adults increased massively from just 10 to 812, while the number of bank branches per 100,000 adults increased from 2.4 to 16.6; volatility in stock prices also increased.

1.2.2 Cutting the red tape

One apparent factor in the financial sector's growing scope and influence is changing regulation over time. The standard narrative is one of sweeping deregulation, and there is some truth to this. The first half of the 1970s saw the emergence of true fiat money following Nixon's 1971 suspension of dollar–gold convertibility; while this is often painted as an accident or necessity, it can also be understood as an intentional and premeditated policy decision rewriting the rules of the global monetary and therefore financial system. (Hammes and Wills 2005; Vernengo 2021; Zoeller and Bandelj 2019) This was followed by further US deregulation through the 1970s and into the 1980s: elimination of fixed minimum commissions in securities markets, a wave of interest-rate deregulation, widening of permitted lending by thrifts. (Fasianos, Guevara, and Pierros 2016; Kroszner and Strahan 2014; Sherman 2009)

In the 1980s the UK played catch-up, in the form of the London Stock Exchange's 'Big Bang': the entrance of foreign firms, abolition of fixed minimum commissions, digital trading and more. (Oren and Blyth 2019; Schenk 2020) This in turn spurred regulatory realignment in the US, where long-standing Glass–Steagall regulations were gradually rendered a dead letter through the 1980s and 1990s,

[4] Note that this does not necessarily represent a shift in the ultimate ownership of the securities, since many of these institutions (such as pension funds) effectively hold securities on behalf of households that would previously have directly held the same assets. It is nevertheless interesting and potentially informative in that it seems to indicate the growth of professional asset managers (who undoubtedly do not always behave the way that their clients would behave—this is often precisely the reason their clients seek them out).

leading up to their formal repeal in 1999. The 1990s also saw the repeal of restrictions on interstate banking and branching in the US. (Kroszner and Strahan 2014; Schenk 2020; Sherman 2009)

This apparent bonfire of regulations had helps to explain the rise of 'the bankers' as privileged but derided figures within the public imaginary. The level of regulation American governments exercise over the financial sector has been shown to correlate inversely with both the relative education and the relative wage of financial-sector workers compared to other workers. (Philippon and Reshef 2012) Changes in wages generally lag changes in regulation and education, suggesting that lax regulation induces the hiring of more qualified workers, who are more highly rewarded—a conclusion also supported by Kneer. (2013) However, education cannot fully explain changes in wages: from the 1990s onwards there is a relative wage premium in finance even after adjusting for this. (Philippon and Reshef 2012)

1.2.3 Deregulation or reregulation

As convincing—or satisfying—as this story is, it omits important details. Rather than the mere removal of restrictions, the period from the 1970s to 2000 was characterised also by various forms of what might be considered 'government intervention' or regulation. In many ways, this is not surprising—even at the time scholars were observing that regulation often performs a useful function even from the perspective of economic efficiency (e.g. ensuring information or competition), and that "deregulation in one area often requires new regulation and oversight in another areas [sic]." (Rose-Ackerman 1990:299)

Various new supervisory/regulatory agencies were created, or existing bodies were given new powers: the US Office of Thrift Supervision was created in 1989; (Chaudhuri 2014; Sherman 2009) the Bank of England took on an important role in overseeing the UK's banking system. (Schenk 2020) US regulators were required to exercise "prompt corrective action" rather than "forbearance." (Kroszner and Strahan 2014:496) Consumers and citizens were protected in new or enhanced ways: against misuse of their data by various data protection provisions, against institutional failures by increasing the limit on deposit insurance from $40k to $100k, and against criminality by the statute of limitations being extended for certain financial offences. (Chaudhuri 2014)

The US state intervened in the market to prop up financial stability: the Federal Deposit Insurance Corporation bailed out the Bank of New England and Continental

Illinois, thrifts were bailed out during the savings and loan crisis, and the Federal Reserve Bank of New York brokered a deal to rescue Long Term Capital Management. (Haubrich 2007; Kroszner and Strahan 2014; Slivinski 2009) Freddie Mac was established, and together with Fannie Mae was legally obliged to buy mortgages from banks (freeing up funds for more lending, to promote home-ownership among lower-income households). (Chaudhuri 2014; Springer, Birch, and MacLeavy 2016)

Given this more complex reality, a simplistic framework of pure 'deregulation' has sometimes been rejected, with terms like 'reregulation' or 'regulated deregulation' sometimes preferred. (Cahill et al. 2018; Ghertman and Ménard 2009; Schwarz 2001; Springer et al. 2016) In rewriting the rules, governments rebalanced power between different financial centres, and reconsidered their own policy priorities. Since the 1970s, UK chancellors' budget speeches have included fewer appearances over time of words like 'manufacturing', 'industrial' and 'export' over time, while phrases like 'banking business', 'financial strategy', 'capital markets' and 'private investor' have become more common. (Davis and Walsh 2015)

1.2.4 Financial inclusion

Another respect in which finance has grown globally is 'financial inclusion'—the extent to which individuals interact with the financial system (e.g. having a bank account). Since 2011, the World Bank has collected data for their Global Financial Inclusion Database. Some excerpts from this data can be seen in the table below.

Table 1-A, Data on financial inclusion:

(Reproduced from the World Bank Global Financial Inclusion Database (World Bank n.d.))

Table removed for copyright reasons. Copyright holder is the World Bank.

From the database it is clear that, on the whole, financial inclusion has increased across countries of all income levels. In fact, low-income countries have proportionately seen the largest increases in many cases, though from initially very low levels. These trends hold for men and women, rich and poor—though women and the poor continue to be less financially included.

Troublingly, however, one figure notably bucks the trends. Rather than rising fastest in low-income countries, the percentage of the population who have "saved any money" has fallen in low- and middle-income countries and risen in high-income countries. The net result has been a fall across the whole world population; at the same time, those who have saved *at a financial institution* have increased, though only slightly outside of high-income countries. This speaks to concerns that have been raised about the equivocal nature of financial inclusion and its potential to facilitate better exploitation of the previously excluded, redistributing wealth upwards.[5]

1.2.5 Long-term perspectives

In fact, the growth of the financial sector appears to be a very long-term trend, at least in certain economies. Philippon has reconstructed the US financial sector's share of GDP from 1860 to 2007, finding a relatively consistent long-term upward trend from around 1880–1930 and a similar trend from around 1945–2007, separated by a sharp decline between these two periods. (Philippon 2008, 2015) A similar pattern is observed when measuring intermediated assets as a share of GDP, and there are also long-term upward trends with a similarly-timed decline (though with some additional volatility) for measures such as household debt issuance and the market value of equities. (Philippon 2015) Krippner (2005) demonstrates that while some indicators of financialisation can be traced back only as far as the 1970s, others date to at least the 1950s.

Philippon (2008) explains most of this growth in terms of the demand for corporate financing, but finds that this cannot explain the period since around 2000. This discrepancy may be due to the globalisation of financial services or an increase in financial services to households, or alternatively "it could be that the financial sector is too large and should be reduced." (Philippon 2008:26) Once again, this

[5] Note, however, that there are now more savers in low-income countries than middle-income countries, which saw a larger proportionate fall.

question of the financial sector being 'too large' reflects anxieties at the heart of the contemporary scholarly interest in financialisation.

This pattern of long-term growth trends pre-dating the 1980s seems to be reproduced in the data for various other countries, including the UK, Canada, Italy, Spain, Australia and the Netherlands. (Philippon and Reshef 2013) Again, some of these countries have also experienced periods of relative stagnation or decline, but all have experienced long-run expansion in the financial-sector share of their economy over decades prior to the period normally identified as the 'big bang' of modern finance.

Furthermore, across a sample of 14 countries, bank loans to non-financial entities as a share of GDP more than tripled between at least 1870 and 1910; the rate of growth during this 'long gilded age' appears to have been even faster than during the post-1980 era (which saw it roughly double by 2008), proportionate to the starting point. (Philippon and Reshef 2013) Similarly, FIRE employment (as a share of the economy, based on full-time equivalents) increased significantly more in the US between 1948 and 1980 than between 1980 and 2021 (and this employment share actually peaked in 1987). (U.S. Bureau of Economic Analysis n.d.)

Several early scholars trying to make sense of this kind of financial growth developed similar accounts of cyclical historical processes in which financialisation was often connected to the hegemonic decline of a previously-dynamic economy. (Arrighi 1994, 1997; Braudel 1977, 1992a, 1992b, 1992c; Phillips 1993, 1994; Silver and Arrighi 2011) Arrighi argues that history has seen a succession of 'systemic cycles of accumulation,' including those in which the Genoese–Iberian, Dutch, British and Americans rose to power and then waned (each time incorporating a process of financialisation as they became degenerate). (Arrighi 1994, 1997; Silver and Arrighi 2011) For Phillips, examples of hegemonic decline included 16th-century Spain, 17th- and 18th-century Holland, and 1920s America. (Phillips 1994)

Braudel is perhaps the earliest and most extensive theorist of these financial cycles. He speaks of intermittent emergence of financial specialisation, giving the examples of the various Italian banking families in Florence and then Genoa from the 13th to 17th centuries, as well as financial centres such as Barcelona, Augsburg, Antwerp, Genoa, and Amsterdam. (Braudel 1977, 1992b) Once again, these foreshadowed decay: financial dominance "never lasted long, as if the economic edifice could not pump enough nourishment up to this high point of the economy." (Braudel 1977:61) Taking this notion to an extreme, some bold suggestions have even

been made that financial expansion might date back 5,000 years, though with considerable variation in form and consequences, and alternating with periods of de-financialisation (Sawyer 2013)

1.3 The term 'financialisation'

1.3.1 Growing usage

The various forms of growth and transformation described above are referred to by the (somewhat vague and open-ended) umbrella term 'financialisation'. Two decades ago, this word was a technical term used exclusively by scholars; since then, it has entered the lexicon of non-specialists such as journalists and politicians. In June 2022, an entry for 'financialisation' was first added to the Oxford English Dictionary website. Definitions remain varied, and sometimes conflicting, but tend to feature a common observation: increased relative significance of finance within the economy, of the kind outlined above.

The growth of usage outside of academic circles occurred almost entirely in the aftermath of the 2007–2008 global financial crisis with its tail of recession, commodity price shocks, European debt crisis, and austerity politics. For much of the world's population, these events drew attention to the characteristics and roles of the contemporary financial sector (including its entanglement with non-financial sectors). The Google Books Ngram Viewer shows a clear inflection point around 2007–2008 in the number of books in their sample that use the word at least 40 times. (Google n.d.) The rate of increase is less for 'financialisation' than for 'financialization'—this may reflect earlier adoption in British English, as the Wikipedia article 'financialization' was first created in November 2007, while 'financialisation' was created in March 2006.

Similarly, a Google News search for usage prior to 2008 returns only results from the Marxist journal *Monthly Review* (hereafter MR).[6] By contrast, a search including more recent results returns articles from the mainstream press such as the *Wall Street Journal*, the *New York Times*, the *Guardian*, the *Baltimore Sun*, the *Globe and Mail*, the *New Yorker*, as well as more entertainment-oriented sites like *Vice*; the business and finance press can be added to this, including the *Financial Times*,

[6] The significance of MR in developing and popularising the concept will be discussed further below.

Bloomberg, *Fortune*, the *Economist* and *Seeking Alpha*; finally, more partisan publications like *Jacobin*, the *New Republic*, *Mother Jones*, the *Morning Star*, and *openDemocracy* join the list.

1.3.2 Synonyms

A variety of other names have been used to describe financialisation or closely-related phenomena. Partly these differences of terminology are the natural consequence of not having a well-established vocabulary in place. To some extent they also reflect different schools of thought (as in the use of 'monopoly-finance capital' by the MR school, or 'finance-led' by the regulation school). Some of the alternative terms that have been used include:

- Financialism (Bichler and Nitzan 2012; Mitchell 2010)
- Finance-dominated capitalism (Hein 2015; Hein, Dodig, and Budyldina 2014)
- Finance capitalism (Edwards 1938; Hansen 2014:201; Hudson 2021; Röper 2018)
- Financial capitalism (Becht and Ramírez 1993; Bjerg 2015; DeLong 1991; Neal 1990)
- Monopoly-finance capitalism (Foster 2006a; Foster and McChesney 2014; Gürcan 2015; Whitehead 2016)
- 'Finance-led' (Aglietta 2016; Boyer 2000, 2005; Guttmann 2008; Paulani 2009)
- Casino capitalism (Giroux 2011; Sinn 2010; Strange 1986)

1.3.3 Origins and semantic change

The term 'financialisation' is widely considered (Epstein 2015; Güngen 2012; Krippner 2005; Sawyer 2013; Suarez-Villa 2013) to have been coined in Phillips' *Boiling Point.* (1993) Interestingly, accounts of the literature frequently begin with Arrighi (1994) (where the word also appears); Arrighi himself both cites and quotes Phillips, so an attentive reader of Arrighi could not be unaware of Phillips' work. It may be that Arrighi has been 'promoted' above Phillips due to a desire to credit a more impressive or respectable scholarly source.[7] In the process, however, scholars appear not to have fully unearthed the origins of the term.

[7] Whereas Phillips was a disillusioned former strategist for the US Republican Party, Arrighi was an influential professional scholar.

In fact, the term ‘financialisation’ saw scattered use by at least the early 1970s, although it originally referred solely to increasing financial inclusion and formalisation. (Looney 1973) This usage occurred primarily in the literature on economic development, and the focus was primarily on household savings, and to a lesser extent remittances. (Ahlburg 1991; Chakraborty 1977; Mahajan 1983; Pandit 1991) Furthermore, financial markets themselves were seen as less or more financialised—in particular, the opening up of futures markets to speculators was described as a process of financialisation. (United Nations Conference on Trade and Development 1982)

These processes saw increasing intermediation of credit alongside households increasingly storing value in the form of financial assets such as bank deposits rather than physical assets such as gold or stored rice. (Abdi 1977; Kaynak 1986) Financialisation in this sense was generally seen as a positive process, since it represented the creation of investment capital that could be pooled and efficiently allocated to productive purposes; this was assumed to lower the cost of capital, stimulate growth and catalyse institutional development, in part through formalising markets. (Cho and Kim 1991; Kaynak 1986; Looney 1973; Naya 1982; Tanzi 1991)

Granting that this prior usage was more restricted, it nevertheless seems related—or at least relevant—to later usage. As indicated above, global financial inclusion and development did not fall away as concerns in later decades. Moreover, corporate savings and inventory-hoarding were sometimes discussed (Gertler and Rose 1991) alongside household savings. Perhaps most significantly, Stonham noted what he called an “increasing ‘financialisation’ of companies,” (1982:135) with reference to the changing balance of capital assets held by firms, away from fixed capital and towards financial assets. This latter observation in particular might just as easily have been taken from a contemporary scholar of financialisation.

The word 'financialisation' had also already been used (though possibly only once, and only in a footnote) to describe a potentially problematic shift towards a more finance-dominated form of capitalism before *Boiling Point*. (Dowd 1989) Equivalent terms had similarly been coined outside of English-language literature, such as the Portuguese ‘financeirização’—this had already appeared in print before *Boiling Point*, translated as ‘financialization’ in the English-language abstract, and apparently carrying more or less the current meaning. (Braga 1993)

1.4 Theoretical prehistory of financialisation

Not only were Phillips and Arrighi not the first to use the term financialisation, they were also not the first to identify the concept they labelled with it. Compare, for instance, "Excessive preoccupation with finance and tolerance of debt are apparently typical of great economic powers in their late stages. They foreshadow economic decline" (Phillips 1993:195) with "At all events, every capitalist development of this order seems, by reaching the stage of financial expansion, to have in some sense announced its maturity: it was a sign of autumn." (Braudel 1992c:246) In fact, some of the characteristic features of the concept—e.g. a historicised view of finance as growing in size and influence, coupled with scepticism regarding its social value and concern about potentially destabilising effects—can be traced back many decades.

1.4.1 Hilferding and the Marxist tradition

Marx analysed the specific phenomenon of money in several places; some treatments were fairly cursory, (Marx 1959; Marx, Engels, and Marx 1978) while others were more extended and detailed. (Marx 2013) Most notably, he wrote at length in *Capital* about various aspects of the financial system such as interest-bearing loans. (Marx 1990, 1991, 1992, 1993) However, none of these contributions have provided much more than a general framework within which Marxist scholars have worked, whether or not they study financialisation in particular.[8] Hilferding's (1981) theory of 'finance capital' appears to have been the earliest precursor of the financialisation thesis, and has been perhaps singularly influential in this regard. According to Kautsky, "In a sense it may be called a continuation of Marx's "Capital."" (1911:326)

Hilferding's theory was shaped in particular by the experience of Austria–Hungary in the late C19th, which saw increasing concentration of big business. Large

[8] Much the same could be said of Keynes, whose 'general theory' made ample space for financial and monetary considerations. (Keynes 2013) Despite this, few of his ideas have been both distinctive and fruitful for the contemporary literature on financialisation. To the extent that he has provided an important general framework for thinking about the economy, this has almost entirely been subsumed into *post*-Keynesian trends that often put more emphasis on figures like Minsky and Kalecki, as will be seen below.

cartels and trusts were created, which banks took a leading role in financing and coordinating. This united industrial and financial capital: bankers became more intimately involved with industrial concerns, while industrialists were subordinate to the financial concerns of their 'parent' banks. Thus banks "become founders and eventually rulers of industry." (Hilferding 1981:226) A series of notable Marxists adopted Hilferding's ideas. (Bukharin 1929; Kautsky 1911; Lenin 1974; Luxemburg and Bukharin 1972) Most famously, Hilferding was a major influence—along with Hobson—on Lenin's account of imperialism. (Lenin 1974)

Generations of Marxists have read Lenin, so the theory of finance capital remains an important reference point for modern heterodox views of finance. (Engelen and Konings 2010; Epstein 2005; Krippner 2005; Lapavitsas 2011, 2014; Sweezy 1994) However, some scholars emphasise transformations that undermine the applicability of the theory to contemporary capitalism. (Bichler and Nitzan 2012; Bryan, Martin, and Rafferty 2009) While the classical model of finance capital is based on the dominance of banks over productivist industrial firms, the current era has been defined more by the internalisation of financial capabilities within non-financial firms, while banks have largely expanded the realm of 'pure finance' (e.g. derivatives for both hedging and speculation, securitisation of assets, and lending between financial firms).

Moreover, when Hilferding wrote, finance was closely associated with imperialism; (Bukharin 1929; Cain 1985; Hilferding 1981; Lenin 1974; Luxemburg and Bukharin 1972; Magdoff 1972) Siemens was quoted as stating that "the one-pound share is the basis of British Imperialism." (Lenin 1974:228) In international trade, the gold standard generally ruled, but was also manipulated to serve colonisers' interests. (Patnaik and Patnaik 2021b, 2021a) Today, by contrast, floating exchange rates have become accepted and the dollar is the world's de facto currency. (Norrlof 2014; Vernengo 2021) Finance remains thoroughly international, but its complexion is more post-colonial than classically imperial. (Magdoff 1972)

Nonetheless, Hilferding's work also influenced the development of monopoly capital theory by what I will call 'the MR school'—Marxists closely associated with MR. (Baran and Sweezy 1966; Foster 2018; Sweezy 1972, 2004; Zoninsein 1990) This later led to early theorisation of a "financial explosion" preceding the 1990s emergence of the financialisation literature proper. (Baran and Sweezy 1966; Magdoff and Sweezy 1987) This analysis has since been taken up by another generation, who more readily use the word 'financialisation' and see it as marking a "new hybrid

phase" (Foster and Magdoff 2009:64) often termed 'monopoly-finance capital.' (Foster 2006a, 2015, 2016; Foster and McChesney 2012, 2014; Gürcan 2015; Magdoff and Foster 2014; Whitehead 2016)

1.4.2 Schumpeterian and post-Keynesian thought

Reading Hilferding has not been the preserve only of Marxists, so another line of thought descends from the same source. Schumpeter was clearly familiar with—and influenced by—Hilferding's work, though he did not agree with all of it. (Schumpeter 1955, 1997) In his analysis, much like Hilferding's, finance—particularly the banking industry—gathers power over time and eventually acquires an organising function within the economy. The figure of the banker, he said, "has either replaced private capitalists or become their agent; he has himself become the capitalist par excellence… He is the ephor[9] of the exchange economy" (Schumpeter 1983:74) and as such, "the money market is always, as it were, the headquarters of the capitalist system." (Schumpeter 1983:126)

Schumpeter held that economic development was primarily a question of productive innovation. (Schumpeter 1983) In particular, 'creative destruction' was central to Schumpeter's understanding of capitalism—it was "the essential fact about capitalism" and "what capitalism consists in." (Schumpeter 1976:83) As such, he emphasised the role of finance in funding this process, understanding that banks could and do create credit—and thus 'purchasing power'—ad hoc in order to finance innovative investment. (Schumpeter 2014) This is, in Schumpeter's view, the main way in which creative destruction is financed: the banker in effect "authorises people, in the name of society" to form new combinations of "productive forces." (Schumpeter 1983:74) The empirical demonstration of a strong connection between financial development and growth later lent significant support to this idea that the rate of creative destruction is dependent upon financing capacity. (King and Levine 1993a, 1993b)

[9] The ephors were elected public figures in several ancient Greek city-states. They had wide-ranging powers: one of their most famous functions was (in Sparta) to officially declare war on the helot slave population every year—authorizing Spartan citizens to keep the numbers of this underclass in check by murdering them without repercussions; at the same time, the ephors also had the power to depose and try the Spartan kings.

In turn, Schumpeter's views influenced Minsky—hardly surprising, considering their advisor–student relationship at Harvard.[10] (Wray 2015) Minsky saw 'financial evolution' as central to a Schumpeterian view of economic development. (Minsky 1990) This emphasis may have influenced the development of Minsky's own financial instability hypothesis, which certainly took inspiration from Schumpeter in part. (Minsky 1982, 1992) This theory gained particular currency following the 2007–2008 global financial crisis, when it became a common reference point for scholars seeking to explain the inflation and collapse of financial bubbles throughout the 1990s and 2000s. (Girón and Chapoy 2012; Hansen 2014; Konings 2015; Konings and Adkins 2022; Sotiropoulos, Mēlios, and Lapatsioras 2013)

Minsky sought to combine insights from Keynes with those from Schumpeter, but another important influence came in the form of Kalecki. (Minsky 1982, 1986, 1992, 2013; Wray 2015) For Minsky, endogenously-generated financial crises followed quite naturally from Kalecki's theories. (Minsky 2013) The latter's most well-known contributions were strikingly similar to Keynes' in some regards, though he was also significantly influenced by Marx. Robinson wrote that despite the negative effect this had for Kalecki's reception by mainstream economics, his "system of analysis was as complete as Keynes's and in some respects superior to it." (Robinson 1976:¶14) Where Keynes placed more emphasis on interest rates, Kalecki stressed the importance of profits to the business cycle; he wrote that "Keynes, however, as we shall see later on, does not take sufficient account of the influence of *current* profitability on investment, and therefore he does not analyse this problem at all, which is here, beyond any doubt, the most crucial one." (Kalecki 1990:229)

Perhaps these advantages are why many contemporary scholars of financialisation seem more keen to emphasise influence from Kalecki than Keynes. After all, Minsky wrote that Kalecki's approach was particularly helpful in "understanding economies with sophisticated and complex modern financial structures." (Minsky 2013:96) Post-Keynesians in particular continue to integrate Schumpeterian, Kaleckian and/or Minskian elements into their understanding of financialisation. (Fasianos et al. 2016; Hein 2015; Hein et al. 2014; Hein and Van Treeck 2010; Konings and Adkins 2022; Mazzucato and Wray 2015; Michell and Toporowski 2013; Stockhammer 2019; Toporowski 2020)

[10] Intriguingly, Schumpeter was also closely associated with Sweezy, and thus can be credited with some degree of influence on the MR school. In particular, Schumpeter shared the preoccupation with monopoly that characterised Hilferding and so often exhibited in the pages of MR.

1.4.3 Veblen's influence

Much like the preceding two schools of thought, the Veblenian approach continues to be popular among those studying financialisation and associated adjustments in contemporary capitalism. (Baranes 2017, 2020b; Gagnon 2007; Gammon and Wigan 2015; Klinge, Fernandez, and Aalbers 2020; Marire 2021; Nesvetailova and Palan 2013; Nitzan and Bichler 2009) In recent years some of Veblen's ideas have had a minor renaissance in the form of the Capital as Power (CasP) literature; (Bichler and Nitzan 2012; Di Muzio 2014, 2018; DiMuzio and Robbins 2020; Gagnon 2007; Nitzan and Bichler 2009; Suaste Cherizola 2021) for instance, Veblen's emphasis on capitalisation has provided the core of the CasP theory, and his notion of 'differential advantage' has been adopted in the form of 'differential accumulation.'

One reason for his influence on the financialisation literature is that unlike many scholars, Veblen clearly distinguishes concretely productive activity (which he calls 'industry') from merely 'pecuniary' operations like profit-seeking investment or advertising (which he calls 'business'). (Veblen 1908a, 1908b, 1918, 1924, 2013) While this is not quite the same as the conventional distinction between finance and the 'real economy', it provides a conceptual starting-point for theorizing about the relationships between the financial and the 'real', and Veblen himself does discuss 'business finance' and the 'financiers' who organise it specifically. (Veblen 1908b, 1924, 2013)

Given that much of Veblen's work was written during the period of Hilferdingian finance capital, it also parallels contemporary attempts to come to terms with finance. He speaks, for example, of expanding credit as the "pivotal factor in the business enterprise of this new era," along with the emergence of the investment banker as "one of the essential workday institutions of the business community," "the general staff in charge of the pursuit of business." (Veblen 1924:326–340) Certain passages could almost have been lifted directly from Hilferding himself: "The holding-company and the merger, together with the interlocking directorates, and presently the voting trust, were the ways and means by which the banking community took over the strategic regulation of the key industries, and by way of that avenue also the control of the industrial system at large." (Veblen 1924:338)

Once again, stimulating cross-fertilisation of ideas with above-mentioned theoretical traditions is evident: Ülgen (2017) takes influence from Minsky alongside

Veblen; others have combined him with Kalecki; (Lawson and Lawson 1990) Veblen has also been credited with anticipating Keynesian Q theory. (Medlen 2003) While there has been a significant amount of Marxist engagement with Veblenian theory, Marxist critiques have sometimes been rejected as unfair or shallow. (Mouhammed 2008) However, this itself may be unfair: it has been said that the MR school "relied in various ways on the prior work of Marx, Veblen, Schumpeter, Keynes, Kaclecki, Steindl, and Minsky." (Foster and Magdoff 2009:8)

In fact, following Veblen's death, MR dedicated a special double issue to reviewing his work. (Huberman and Sweezy 1957; Sweezy 1957) Despite their differences, it is clear from this that Sweezy respected Veblen greatly and engaged closely with his work. In his review of two of Veblen's books, Sweezy wrote that "one of the chief aims of these essays is to persuade people, and especially younger people, to read Veblen" (Sweezy 1957:106) and that the reviewed books offer "more inspiration and guidance […] than in all the rest of American social science put together." (Sweezy 1957:112) The editorial for the double-issue concluded that Veblen was "one of the great intellectual figures of the twentieth century" but also that "at heart he was one of us"—an American socialist. (Huberman and Sweezy 1957:75) Sweezy (1958) also compared Veblen to Schumpeter, reinforcing the parallels between these major traditions.

1.5 The pharmaceutical sector

Modern pharmaceutical drugs have been in existence for over a century and have become vital to conventional medicine. They have made major net contributions to increased life expectancy, as well as having less easily-quantifiable benefits for quality of life: reducing the incidence of non-fatal disease; helping patients manage symptoms, including pain; improving performance at various cognitive or physical tasks; even enabling individual choice and 'bio-hacking' (e.g. hormones).

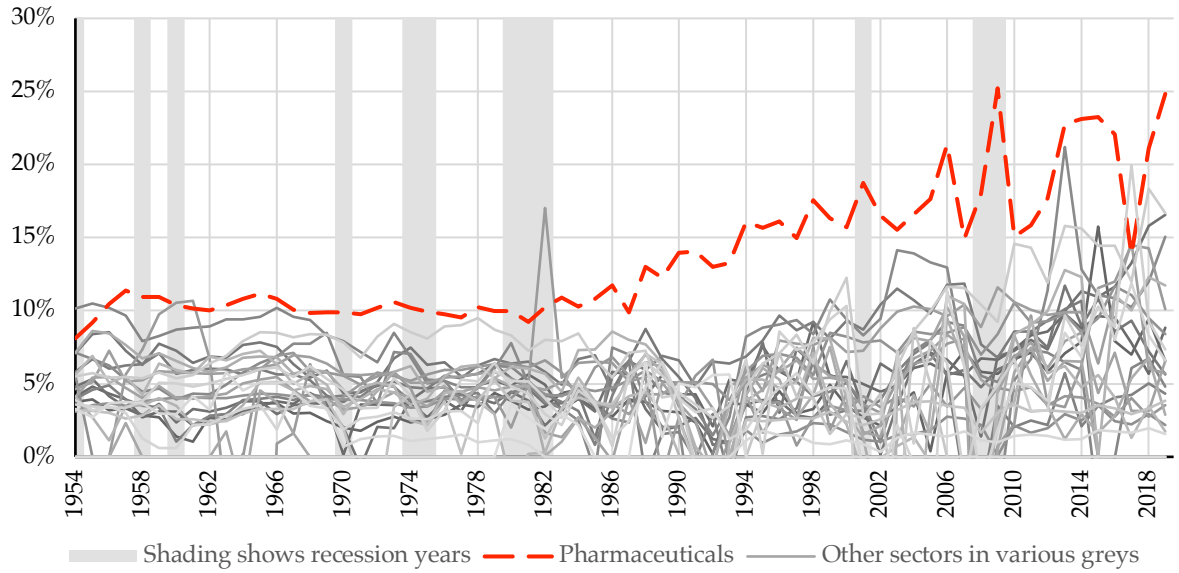
At the same time, pharmaceuticals have also had negative effects: triggering allergic reactions, adverse events or side-effects; producing dependence and tolerance, possibly resulting in withdrawal symptoms or overdose; even causing other new long-term medical conditions to arise (such as opioid-induced hyperalgesia). However, the pharmaceutical sector is of interest to us for reasons beyond either the good or bad of its products from a health perspective—it is a fascinating, unusual, and very significant part of the global economy.

1.5.1 *Big pharma's performance*

The pharmaceutical sector is a uniquely research-intensive sector, with high spending on R&D projects that can last more than a decade. (European Federation of Pharmaceutical Industries and Associations 2014) Most of the world's leading drug companies are based in the US, as will be seen in Chapter 3—this is hardly surprising considering that it is also the world's largest market, making up 41% of global sales in 2013. (European Federation of Pharmaceutical Industries and Associations 2014) For these reasons, much of the data in what remains of this chapter (and following chapters) will be sourced from the US. However, it should be remembered—and will be reiterated—that the US is peculiar in various respects; the question of how much and in what ways the pharmaceutical sectors of other countries differ under conditions of financialisation is an important one that will be addressed in later chapters.

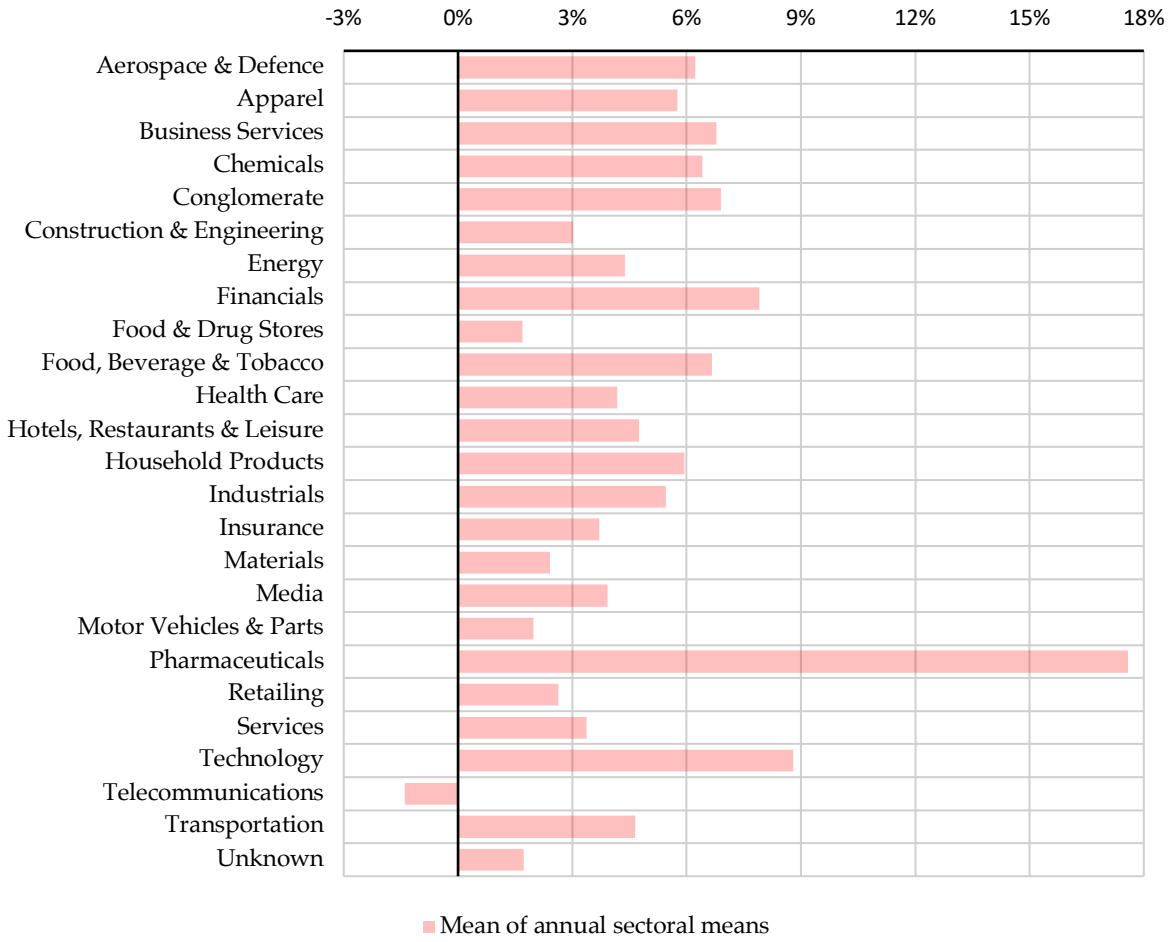
Regardless, US big pharma has significantly outpaced other sectors, as can be seen in the *Fortune* 500 (hereafter F500) data presented below.[11] (Fortune n.d.-a) Note that graph 1-A aggregates the data, calculating the margin for the whole sector rather than averaging the margins of individual firms—this will be discussed further in Chapter 3, but essentially treats each sector as a single firm by pooling data.

Graph 1-A, F500 sectoral aggregate profit margins:



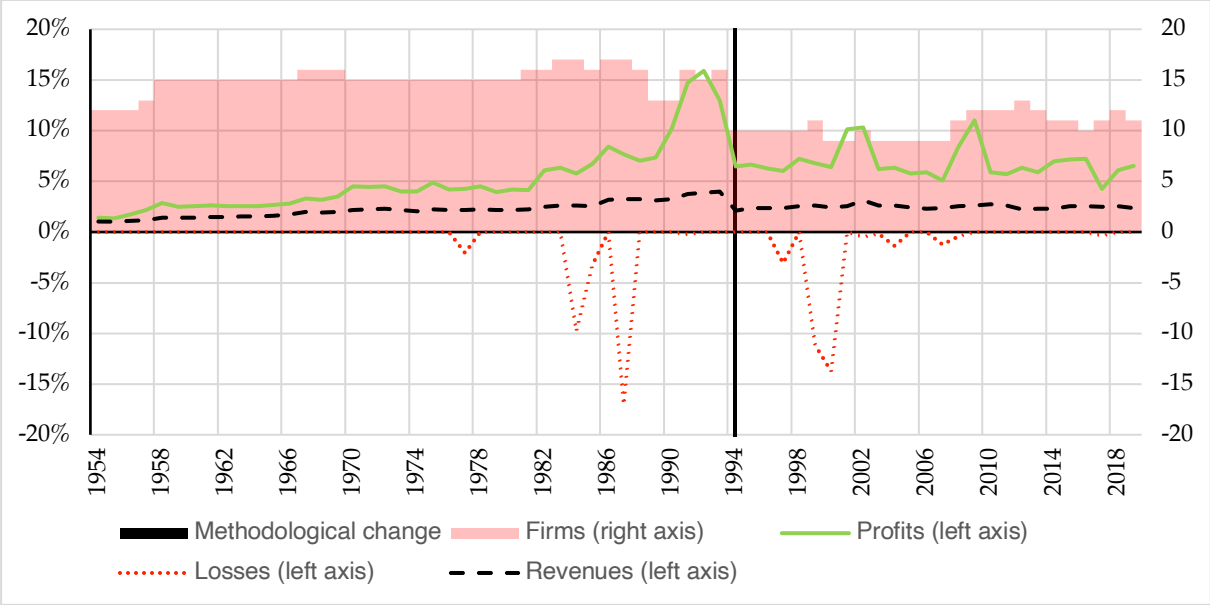
[11] As declared in the preface, the F500 data was collected in collaboration with Nicholas Pye, who did not contribute to the production of graphs or the writing of any of the text concerning the F500.

Graph 1-B, F500 sectoral mean profit margins (1990–2019):



The aggregate net profit margin of the pharmaceutical sector has been higher than that of any other sector in almost every year since at least 1954 (the first year covered by the F500 data). For the first few decades this margin was relatively consistent at ~10%, but from the mid-1980s a new trend emerged, with a rising profit margin reaching ~25% by the end of the period. From 1990–2019, only the tech sector had an average even half as high.

Graph 1-C, Pharma share of F500 net profits, net losses, revenues & firms:



Correspondingly, big pharma firms within the F500 very rarely make losses, as can be seen above. Of the losses that were made, most belonged to a single firm: A.H. Robins. The firm marketed the Dalkon Shield, a contraceptive device that was found to cause infections, resulting in legal liability towards hundreds of thousands of patients and incurring costs in the billions of dollars. (Roepke and Schaff 2014) In particular, large payments were made into a fund—established to cover settlements and compensation—in 1984 and 1987, resulting in annual profit margins of -73% and -191% respectively.

The general trend over the period 1954–2019 has been for the sector to capture a gradually mounting share of the F500's revenues and profits; moreover, due to the sector's high profit margins and low losses, it captures a larger share of profits than it does of revenues. However, the size of the sector has not been growing in terms of the number of firms: after taking into account the fact that firm eligibility for the list changed in 1994, there does not appear to be any noticeable long-term trend in how many firms make up the sector within the F500.

At risk of oversimplifying, this can all be reduced down to a single significant statement: since the F500's inclusion of service firms in 1994, there have been on average fewer pharma firms within the F500, but they have captured a larger share of the total revenues received and profits made by F500 firms. Unsurprisingly, pharmaceutical CEOs are rewarded handsomely for the sector's success. In 2015, only 2.2% of F500 firms were drawn from the pharmaceutical sector, whereas 13% of the 100 most highly compensated CEOs in the US were. (Equilar 2015)

1.5.2 *Political economy of pharmaceuticals*

Pharma faces distinctive challenges that make it more like the market for software than that for food or fuel, despite the end product being a concrete consumable good. It faces relatively low marginal costs but high investment costs—i.e. it costs little to manufacture a pill but a great deal to discover and test the active ingredient in the first place. Sales must therefore recover these investments over long periods of time, so prices are unlikely to be close to marginal cost for many years. (Cutler 2020; DiMasi 2014; DiMasi et al. 1991; DiMasi, Grabowski, and Hansen 2016; DiMasi and Grabowski 2012; Ledley et al. 2020) That said, the true cost of this R&D and its relationship to price has been repeatedly challenged. (Light and Lexchin 2004; Light and Warburton 2005, 2011; Mazzucato 2016; Morgan et al. 2011; Schlander et al. 2021; Wouters et al. 2022; Wouters, McKee, and Luyten 2020)

Heated debates around pricing have arisen and intensified in recent years, especially in the US. It should be noted that overall, Americans were actually paying less (in real terms) for their prescriptions in 2018 than they were in 1980; (Hayford and Austin 2022) however, this is not a like-for-like comparison, in the sense that it incorporates the price effect of cheaper generic drugs being substituted for brand-name products in greater numbers over time. Over the same period, real-terms list prices increased substantially when only brand-name drugs are included; (Hayford and Austin 2022) in fact, real-terms prices rose by 60% just from 2007–2018, even after deducting rebates, discounts and other reductions from list prices. (Hernandez et al. 2020)

To some extent, generics have been exempted from this: the average price of a generic prescription drug in the US actually decreased from 2009–2018, at least for Medicare Part D and Medicaid. (Hayford and Austin 2022) However, there have been some notable exceptions, with drugs as common as salbutamol (for asthma) or hydrocortisone (for a range of common conditions including eczema). (Keown 2022) Significant price hikes in generic or otherwise out-of-patent drugs have often attracted some of the stiffest criticism. Presumably, this is because people generally feel that once a patent has expired the manufacturers have 'had their chance' and should now face sufficient competition to bring prices much closer to the cost of production. This problem has not been limited to the US; there have been concerns around the cost to the NHS in the UK, for example. (Wickware 2020)

These are simplistic headline figures—the reality is much more complex, since there is no single price for drugs (even ignoring rebates). Within the pharmaceutical

sector, price discrimination is common: price levels will be different between national economies, but also drug companies often charge different prices within the same national market to state welfare programs, private insurers, and uninsured individuals). (Berndt 2000; Patricia M. Danzon and Chao 2000; Hayford and Austin 2022; Hernandez et al. 2020; Ravvin 2008; Squires and Anderson 2015) Even different parts of the same public-sector healthcare systems may pay different prices, as in the US where Medicare Part D and Medicaid report different pharmaceutical prices. (Hayford and Austin 2022)

The proportion of US healthcare costs borne by insurance providers has been on the increase for decades, and higher insurance coverage seems to affect drug prices. For instance, prices for branded drugs have been shown to correlate with co-payments, since these expose patients more directly to price. (Pavcnik 2002) Similarly, increased Medicare market share has been linked to increased private-payer prices, likely because the former is set based on the latter and Medicare demand is inelastic. (Duggan and Scott Morton 2006) On the other hand, insurers represent 'pooled' payers which—with sufficient market concentration—can gain a degree of monopsony power and negotiate discounts or otherwise bargain down prices. (Berndt 2002) Prices also fell—at least in the short term—after the introduction of Medicare Part D; (Duggan and Scott Morton 2010) however, drugs with fewer than two substitutes have not seen the same fall in price as those with two or more—this demonstrates the difficulty of negotiating price reductions in a more monopolistic environment. (Duggan, Healy, and Morton 2008; Duggan and Scott Morton 2010)

The pharmaceutical sector is also unique institutionally; the constant threat posed by generics manufacturers to innovative firms makes intellectual property (IP) protections such as patents and drug brand names indispensable; the potentially dangerous nature of the goods produced necessitates unusually high levels of government regulation and oversight in both manufacturing and marketing practices; a small number of state institutions and/or large private insurers are often responsible for most of the drug purchases in a given country. Thus pharmaceutical firms and markets provide a valuable context within which to understand various important phenomena: the effects and shortcomings of regulation; the benefits and pitfalls of monopoly power arising from IP and the exploitation of regulatory loopholes; the nature and significance of innovation and the human capital central to it; the monopsony power of small numbers of large institutional buyers.

Big pharma is one of the few sectors in which legal monopoly is the norm rather than the exception—albeit only for a limited period. Patents represent guarantees enforced by states that firms will be able to produce particular technologies without competition for particular periods of time. In the context of pharmaceuticals, patents are often intended to protect drugs; however, patents may also be awarded for a specific use of the drug, or for something peripheral to the actual drug, like a delivery system—sometimes to de facto extend a patent in a practice known as 'evergreening'. (Faunce and Lexchin 2007; Midha 2015)

That states not only allow but intentionally protect such monopolies is unusual and represents a major privilege offered as an incentive for innovative research. However—as mentioned above—pharmaceuticals can be harmful to individuals and society, and cutting-edge drugs are also little-understood drugs whose safety has not necessarily been proven; the state therefore also imposes substantial regulatory barriers preventing firms from simply marketing whatever new product they desire. Generally states will only allow onto the market drugs that have been approved by regulatory bodies established for this safeguarding purpose. Among such regulators, the FDA in the US is largely hegemonic, with other regulators often largely dependent upon their standards, evidence and analysis in order to reach their own conclusions.

Substantial numbers of scholars have raised the issue of public funding of medical research and the basic science on which it is often built. Some have investigated and assessed the processes by which the public sector is involved in pharmaceutical innovation, and the outcomes its involvement yields. (Cockburn and Henderson 2003; Stuart, Ozdemir, and Ding 2007; Unsal 2020) Others have taken a more critical stance, emphasising the (apparently unfair) balance of burdens and benefits between the public and private sector, calling for the state to both receive more of the gains and also take a greater role in directing innovation. (Gagnon 2013; Lazonick and Mazzucato 2013; Mariana Mazzucato 2013; Mazzucato 2021; Ravvin 2008; Roy 2017) It has also been asserted that pharmaceutical firms misrepresent some spending as being at their own expense, rather than funded by public subsidies, in order to downplay their profits and improve their public image. (Light and Warburton 2005; Mazzucato 2016; Roy 2017)

Pharmaceutical lobbying is a major force in politics, in part because of the extensive interface between the sector and the state via the latter's protection and limitation of IP, enforcement of regulation on both the industry itself and insurers,

funding of research through various means, and of course purchasing of products. Such lobbying is big business, and has been linked to success in innovation. (Unsal 2020) From 1998–2022, 'pharmaceuticals/health products' had the highest total lobbying spending of 100 industries, as well as the highest spending for each individual year since 1999; in 2022, pharma firms and their industry bodies specifically accounted for more than half of this spending. (OpenSecrets n.d.)

While much of the sector's lobbying spending comprises efforts by individual firms, industry groups—most notably the Pharmaceutical Research & Manufacturers of America and the Biotechnology Innovation Organization—were responsible for more than 10% of spending by the pharmaceuticals/health products sector. (OpenSecrets n.d.) This wider category includes non-pharmaceutical firms, as well as non-profits such as Minorities for Medical Marijuana, so organized lobbying on shared interests clearly represents a significant share of pharmaceutical lobbying specifically. Pharmaceutical lobbying efforts have also been shown to involve less transparent means, such as informal persuasion and seemingly-independent 'front' groups. (Ozierański, McKee, and King 2012; Vilhelmsson and Mulinari 2018)

1.5.3 Financialising the pharmaceutical sector

By viewing the pharmaceutical sector through the lens of financialisation, the latter can be seen in action within a particular sector of the 'real economy'. This is also an opportunity to study elements of the relationship between two of the largest and most profitable sectors, which have a great deal in common. Like pharmaceuticals, finance also exhibits high profitability, high levels of human capital, high wages, high levels of regulation, and high levels of lobbying. In addition to these similarities, the nature of the pharmaceutical sector provides a mess of linkages and synergies through which it is intertwined with the financial sector, such as financing pressures, health insurance and medical debt.

Drug discovery and development are highly capital-intensive: one widely-cited claim is that it costs nearly $3bn to develop a successful drug. (DiMasi et al. 2016) Moreover, this R&D generally takes a significant amount of time compared to some other high-tech sectors: FDA review alone took an average of more than 3 years in 1983, though this had reduced to under 1 year by 2017. (Darrow, Avorn, and Kesselheim 2020) As such, firms rely to a significant extent on financial activities and sources—including forms relatively rare in other sectors, such as venture capital—to raise investment both in the quantities needed and over the time periods involved.

On top of this, healthcare costs are often unpredictable, and may be sudden and/or extreme: nobody knows when they might be unlucky enough to suffer a traffic accident or discover a cancerous growth. This makes healthcare an obvious candidate to be funded through insurance schemes, and health insurance—either public or private—has become a central factor in the affordability of healthcare in various countries. Health insurance is a financial activity that offers revenue streams extracted from wage packets, as well as integrating individuals into financial circuits and logics. The US has a particularly strong private health insurance industry: in all other OECD countries, the sum of public spending and out-of-pocket spending is in the range of 80–95%, whereas in the US it amounts to only 58%, suggesting that well over a third of all healthcare spending is funded through private insurance. (Squires and Anderson 2015) For those who are uninsured or (more likely) underinsured, they face a choice between not accessing healthcare or incurring medical debt. (Doty, Edwards, and Holmgren 2005; Zeldin and Rukavina 2007)

Indebtedness from unaffordable healthcare is another means through which financial firms extracting value from households as a result of their medical expenses; this debt may additionally be sold on to collection agencies or securitised and circulated through the financial sector as tradeable assets. Medical debt appears to be the most common form of debt in collections, more than all other forms combined; (Kluender et al. 2021) it is also the main reason for consumer bankruptcy. (Austin 2014) While many industries feed demand for consumer credit, such debt is rarely so obviously and so severely coercive: consumers have comparatively little choice to 'take or leave' medical treatment that may be necessary to avoid death, pain, or incapacity when compared to choices like getting onto the property ladder, buying a new car, or financing higher education.

The role of the financial sector in providing medical insurance and credit are of course particularly evident in the US. Among OECD countries, the US has the highest total healthcare spending both in purchasing-power-adjusted per-capita terms and as a percentage of GDP; adults also take more prescription drugs in the US. (Squires and Anderson 2015) These drugs make up ~10% of total healthcare costs in the US. (CMS n.d.) These drugs are also more expensive in the US than anywhere else in the OECD (at least if they are in-patent). (Squires and Anderson 2015) Unfortunately all of this spending and prescribing does not translate into impressive health outcomes—every other OECD country has a higher life expectancy. (Squires and Anderson 2015)

The wealth of regulation around pharmaceuticals is another important factor in determining its interactions with finance. Such regulations—and the loopholes they contain—make the sector the perfect breeding ground for new financialised commercial strategies which seek to measure and monetise abstract phenomena. For instance, alienable vouchers that can be used to speed up regulatory review (as explained in Chapter 2) are effectively a means to trade time. Similarly, derivatives in particular may prove to be important means of managing the uncertainty and risks involved in drug innovation.

1.6 Summary

This chapter has provided a brief synopsis of this thesis, including the nature of and motivation for the research project, as well as an indication of the structure of the text. The concept of financialisation has been historically contextualised and substantiated, and the usage of the term clarified. The various strands of thought that have played important roles in shaping scholarly engagement with the idea of financialisation have also been catalogued and surveyed. Finally, an attempt has been made to provide a rough outline of the pharmaceutical sector itself: some of its important and distinctive features have been noted, and some reasons that it is worth considering it in terms of financialisation have been explored. The following chapter will build on this by more thoroughly reviewing a range of literature on financialisation, the related concept of 'assetisation', and the pharmaceutical sector.

2. LITERATURE REVIEW

2.1 Overview

This chapter reviews a broad variety of literature on financialisation, assetisation and the pharmaceutical sector, providing context that anticipates much of the empirical investigation to come in later chapters. It argues that the literature on financialisation brings together divergent schools of thought, which largely concur in associating financialisation with trends like increased short-termism, outsourcing of core functions, and prioritisation of shareholder interests. Scholars focused on contemporary financialisation have frequently connected it to neoliberalism, and more recently to the emerging research agenda of 'assetisation', often understood as either a basis for or a form of financialisation. Given what is understood of the pharmaceutical sector generally, as well as an existing body of literature on pharmaceutical financialisation, it is suggested that the pharmaceutical sector has indeed undergone some form and degree of financialisation. It is hypothesised that this should be observable through declining in-house R&D spending, increasing M&As and IP acquisition, and growing financial assets and operations.

2.2 Financialisation

2.2.1 Summary

Financialisation has been studied theoretically and empirically, quantitatively and qualitatively, at different scales or levels of analysis (macro-, micro-, meso-), in relation to different actors (states, firms, households), and in different historical and national contexts. Overall, the literature on financialisation has become increasingly difficult to digest and catalogue, and in recent years has become "so rich and idiosyncratic as to defy summary;" (Toporowski 2020:151) "it has become almost impossible to discuss the literature in its totality," (Klinge, Fernandez, and Aalbers 2021:2) and literature reviews quickly become dated. (Lapavitsas and Soydan 2022)

"Financialization has become the go-to term among a growing field of scholarship that studies the vastly expanded role played by finance in contemporary politics, economy and society." (Mader, Mertens, and van der Zwan 2020:1) Theoretical literature has largely attempted to clarify the definition and nature of

financialisation, explicate how it fits into relevant major theoretical frameworks, and consider its possibilities and limits. Empirical work of various kinds has attempted to establishing the existence of the phenomenon and investigate its effects, providing thick descriptions of financialisation processes in action or establishing and measuring its relationship with other trends in the economy and society.

It seems clear from the diversity of empirical findings in particular that financialisation takes no universal form across time, space or sector. Despite this, some particularly influential or important studies can be identified. Some of the most-cited publications on the topic are monographs or edited volumes, often providing broad overviews of the topic, or at least one strand of thought within it. (Epstein 2005; Froud et al. 2006; Krippner 2011; Lapavitsas 2014; Martin 2002; Palley 2013) Additionally, several helpful literature reviews have been published, though some are recent and have not been widely cited as of yet. (Aalbers 2015a; Davis and Kim 2015; Epstein 2015; Klinge et al. 2021; Qi 2019; Wang 2019; van der Zwan 2014) There are also some widely-cited empirical studies (Krippner 2005; Lin and Tomaskovic-Devey 2013; Orhangazi 2008a; Stockhammer 2004) and theoretical contributions. (Boyer 2000; Dore 2008; Lapavitsas 2011)

The literature is interdisciplinary, with contributions from political economists, accountants, sociologists and geographers, among others. There is, however, a noticeable disciplinary divergence: geographers have been more sceptical about the accuracy and fruitfulness of the concept on various grounds (Christophers 2012, 2015b, 2015a; Ouma 2015), although critics of the literature have also emerged from other disciplines; (Michell and Toporowski 2013; Poovey 2015) by contrast, some have suggested that the concept of financialisation has a particular grip on sociologists. (Karwowski, Shabani, and Stockhammer 2020; Rabinovich 2019)

2.2.2 *Sectors*

Different sectors have been examined and compared in relation to financialisation, often within or across different national economies:

- The automotive sector has received much attention, due to the emergence of business models based around vehicle manufacturers lending consumers the funds to purchase vehicles, with financial operations ultimately becoming seen as more profitable than the 'core business' of making vehicles. (Borghi et al. 2013; Carmo et al. 2021; Froud, Haslam, et al. 1998, 2002; Froud et al. 2006; Froud, Johal, et al. 2002; Sacomano Neto et al. 2020)
- On the other hand, the financialisation of land—and housing in particular—is more about the proliferation of real estate as an investment class, and has been studied in various national contexts. (Aalbers 2017; Evans and Herr 2016; Fernandez and Aalbers 2020; Fields and Uffer 2016; García-Lamarca and Kaika 2016; Wijburg, Aalbers, and Heeg 2018)
- Some scholars have addressed the financialisation of water, noting how privatisation goes hand in hand with the trading of increasingly complex water-related financial instruments, as well as takeovers by private equity. (Ahlers and Merme 2016; Allen and Pryke 2013; Bayliss 2014; Loftus, March, and Purcell 2019; Williams 2021)
- Energy markets (both fossil-fuel and renewable) have also been increasingly integrated with financial markets, in part via financial innovations such as energy derivatives and indexes, although this has been geographically uneven. (Evans and Herr 2016; Gkanoutas-Leventis and Nesvetailova 2015; Klagge and Nweke-Eze 2020; Knuth 2018; Rizvi et al. 2022)
- The dynamics of the tech sector over the last several decades have been related to financialisation, especially via the role of venture capital in supporting cash-burning firms in hopes of stumbling upon the next 'unicorn', and the extent to which broader financial conditions (such as historically low interest rates and government policies) have facilitated the creation of investment bubbles. (Barns 2020; Birch and Cochrane 2022; Brenner 2003, 2009; Li and Qi 2022; Staab 2018; Zhang and Yuan 2022)
- Finally, the financialisation of pharmaceuticals has been explored in various ways—this will be discussed in great detail later in this chapter.

2.2.3 *Scholars*

Certain scholars have been particularly prolific, providing numerous valuable studies:

- Stockhammer, who provides significant empirical contributions particularly in terms of growth, investment and inequality; (Karwowski et al. 2020; Karwowski and Stockhammer 2017; Stockhammer 2004, 2009, 2010, 2012)
- Epstein, who offers an influential characterisation of financialisation and analyses it in relation to rentiership; (Crotty and Epstein 2009b; Epstein 2001, 2005, 2015, 2018; Epstein and Power 2002, 2003; Jayadev and Epstein 2007; Sturn and Epstein 2013)
- Lazonick, who has been highly influential on the study of buybacks and shareholder primacy; (Hopkins and Lazonick 2016; Lazonick 2009a, 2009b, 2010a, 2010b, 2011, 2013, 2014, 2015, 2016b; Lazonick et al. 2016, 2017; Lazonick, Mazzucato, and Tulum 2013; Lazonick and Mazzucato 2013; Lazonick and O'Sullivan 2000; Lazonick and Tulum 2011; Tulum and Lazonick 2018)
- Froud, who developed the idea of 'coupon pool capitalism' and conducted early empirical studies of various sectors including automobiles, pharmaceuticals and water; (Engelen et al. 2010; Erturk et al. 2005, 2008; Froud et al. 2000, 2001, 2003, 2004, 2006, 2010, 2014; Froud, Haslam, et al. 1998, 2002; Froud, Williams, et al. 1998; Froud, Johal, et al. 2002)
- Foster, who integrates modern concerns over financialisation with the older tradition of monopoly-capital theory; (Foster 2006a, 2006b, 2007, 2008, 2010a, 2010b, 2013, 2015; Foster and Magdoff 2009, 2010; Foster and McChesney 2012, 2014; Magdoff and Foster 2014)
- Lapavitsas, whose broad-ranging work is noted below. (Lapavitsas 2009a, 2009b, 2011, 2012, 2014; Lapavitsas and Mendieta-Muñoz 2016, 2018; Lapavitsas and Powell 2013, 2013; Lapavitsas and Soydan 2022)

2.3 Some aspects of financialisation

2.3.1 Investment

Mainstream economics theoretically predicts that a more developed financial sector will increase investment by making more funds available to the rest of the economy. (McKinnon 1973; Shaw 1973) However, the critical literature on financialisation refutes this, associating it both theoretically and empirically with lower 'real' or 'productive' investment—most commonly explained as a result of finance 'crowding out' investment. (Crotty 2003; Davis 2017; Epstein 2018; Krippner 2011; Orhangazi 2008a; Palley 2007; Stockhammer 2009; Vasudevan 2015)

Empirical evidence tends to contradict predictions that financial development leads to greater investment, although this effect is seen to vary somewhat by country. Stockhammer (2004) suggests that financialisation slowed capital accumulation in the US and France, but not in the UK (which already had low levels) or Germany (which has generally been understood to have an institutional environment that has hampered financialisation). Similarly, Crotty & Lee find a complex relationship between financialisation and growth in Korea, with an initial investment boom which proved to be fragile and gave way to lower levels of investment. (Epstein 2005)

The degree of financialisation's impact on investment has been associated with both institutional variation and the specific mode of financialisation realised within a national economy. (Tori and Onaran 2022) Relatedly, scholars have challenged the supposed institutional advantage of LMEs (sometimes identified with higher levels of financialisation) in promoting radical innovation, finding at best mixed evidence: CMEs are actually more radical in some sectors, and financialised LMEs have pursued high payouts to shareholders that crowd out investment in innovation. (Akkermans, Castaldi, and Los 2009; Duménil and Lévy 2004a; Lazonick 2010a; M. Mazzucato 2013; Schmid and Kwon 2020; Taylor 2004) More generally, the commonplace view that market mechanisms are fundamental to major innovation been challenged by scholars who have identified a larger role for economies of scale and coordination, as well as building on basic science that is difficult to monetise (such arguments therefore afford an important role to the state). (Lazonick and Mazzucato 2013; Light and Warburton 2011; Mariana Mazzucato 2013; Mazzucato 2016, 2021; Rikap 2019; Roy and King 2016; Schlander et al. 2021; Testoni et al. 2021)

There are various reasons financialisation might decrease investment: financial activity 'crowding out' productive investment by offering a higher return; (Demir 2007; Hein et al. 2014; Tomaskovic-Devey and Lin 2011) shareholder primacy ideology (discussed below) promoting the disbursement of retained profits; (Davis 2014; Duménil and Lévy 2003; Hein et al. 2014; van Treeck 2009) increased liquidity preference due to changes in the broader economy; (Davis 2014) decreasing available funds as the financial sector has appropriated more value. (Orhangazi 2008a; van Treeck 2009) Investment could also be decreased in monetary terms as a result of offshoring, even if productive capacity remains constant or increases, as the cost of physical capital such as land and machinery may be lower within other national economies. It is also important to consider that particular sectors may be more prone to financialisation and associated factors that reduce investment—e.g. offshoring. (Auvray and Rabinovich 2019)

2.3.2 Short-termism

Inculcation of short-termism via financialisation is a common complaint in the literature. (Demir 2007; Demirag 1995; Haldane 2015; Haldane and Davies 2011; Lee, Kim, and Hwan Joo 2020) Such short-termism crucially affects investment and financing decisions, leading to inadequate attention to long-run risks and rates of return, such as through underinvestment in profitable long-term projects. (Epstein 2018) This propensity towards short-term thinking is seemingly reinforced by various circumstances related to financialisation: the constant churn of large numbers of shares held for very short periods, the judgement of corporate managers on the basis of financial indicators such as share price and earnings per share, the ease with which large-scale institutional investors can pursue shareholder activism, and the alignment of managerial and shareholder interests through stock-based compensation (and the extent to which this may allow for short-term manipulation to benefit managers off-loading stock). (Lazonick 2009b, 2015)

Some scholars have connected this tendency specifically to the financial view of the firm; (Crotty 2003; Fligstein and Markowitz 1993; Orhangazi 2008a) others primarily blame shareholder primacy ideology. (Evans and Habbard 2008; Hirsch-Kreinsen and Hahn 2014; Mélon 2019; Trades Union Congress 2014) Note that these are not two distinct and mutually exclusive explanations, since the financial view of the firm is often connected to shareholder primacy ideology. Not only does thinking in terms of a bundle of assets raise the question of who owns those assets and

prioritise their ability to secure income streams from them, but the two trends have common intellectual backing: e.g. literatures on the separation of ownership from control, the managerial revolution, and agency theory. (Jensen and Meckling 1976; Fama 1980; Fama and Jensen 1983a, 1983b; Jensen and Murphy 1990; Berle and Means 1991; Burnham 1941; Galbraith 1967; Sneirson 2019)

2.3.3 Cognitive financialisation

Another common concern in the literature on financialisation is the increasing infiltration of society—and particularly the management of firms—by financial thinking. In the apparent absence of any consensus term in the literature, this process might be termed 'cognitive financialisation'. This normalisation of financial logics has often been expressed in terms of the financialisation of households, culture and everyday life. (Fine 2017; Finlayson 2009; Haiven 2014, 2017; Langley 2008, 2020; Toporowski 2008) Examples of these would include government-sponsored 'financial literacy' initiatives. (Arthur 2012; Bay, Catasús, and Johed 2014; Finlayson 2009; Haiven 2017) Similarly, financial institutions have expanded their role in providing services to households, to the extent that leading banks offer computer literacy and security resources to their customers—e.g. Barclays has its 'Digital Eagles' and 'Code Playground' initiatives, while free third-party security software is provided by HSBC, RBS, Nationwide, Santander, and many other banks.

More importantly for this research project, though, financialisation involves rethinking business, entrepreneurialism, investing, management, and other facets of the economy in terms of financial logics, imaginaries and calculations. In many ways financial logics are—one way or another—at the very core of financialisation, including the firm-level financialisation of non-financial corporations. (Kädtler 2011) In the words of Hansen, (2014:612) "financialization is not given by God or by nature, it is a cultural process where we come to increasingly *see the world in financial terms* [emphasis added]."

Some obvious examples of corporate actors prioritising and extending a financial view of the economy would include various forms of securitisation, (Girón and Chapoy 2012; Guttmann 2008; Hudson 2008; Peicuti 2013) as well as other financial innovations in business operation, like supply chain financing. (L. Xu et al. 2022; Zajkowski and Żukowska 2021) Some argue that contemporary accounting standards have also reinforced the perspective of finance. (Müller 2014; Perry and Nölke 2006)

There is substantial evidence that these economic transformations have in fact altered the mindset of corporate managers. For instance, Khurana (2007) shows how official Business Roundtable policy statements metamorphosed between 1990 and 1997, initially rejecting shareholder primacy but later coming to embrace it. In 1990, a statement held that directors should "carefully weigh the interests of all stakeholders." (Khurana 2007:320) Less than a decade later, the new opinion was that expecting directors to "somehow balance the interests of other stakeholders fundamentally misconstrues the role of directors." (Khurana 2007:321) Financialisation thus "implies the predominance of financial *logic* [emphasis added] in the decision-making process of relevant players in the capitalist system." (Braga et al. 2017:835)

One prominent aspect of this cognitive financialisation evident within non-financial business is the reimagining of the firm, with the growing dominance of what has been variously referred to as the 'financial', 'portfolio' or 'bundle of assets' view (or theory, or conception) of the firm. (Blackburn 2006; Crotty 2003; Fine 2008; Fligstein 1990; Fligstein and Markowitz 1993; Froud and Williams 2007; Koslowski 2000; Orhangazi 2008a; Rossman and Greenfield 2006) Such a view presents the firm as an amalgamation of varied income-generating possessions existing only to serve the economic interests of shareholders, in particular through their trading on markets and their exploitation to capture rents. (Birch 2017c; Bourgeron and Geiger 2022b; Durand and Milberg 2020; Froud and Williams 2007; Langley 2021; Rikap 2022a; Roy 2017; Schwartz 2017) This helps to explain shareholder primacy ideology and the downsize-and-distribute strategies with which it has been associated. It is also related to the notion of assetisation (since it reduces firms to 'bundles of assets' that exist to generate income and can be traded accordingly); this will be explored below.

2.4 Financialisation theorised

A range of critical approaches have been adopted in the financialisation literature, offering different conceptualisations, emphases, metrics, critiques and findings. Critical scholars researching financialisation have drawn upon diverse traditions including assorted forms of Marxism (with particular influence from Marx himself, Hilferding, the regulation school and the MR school), post-Keynesianism (with particular influence from Minsky), and institutionalism (with particular influence from Veblen).

In fact, beyond the most general terms, there is not even a consensus on what financialisation means. (Christophers 2012; Karwowski et al. 2020; Lee et al. 2009) Accordingly, the term has been described as "a contested, slippery concept," (Pollard et al. 2018:7) "a buzzword," (Rabinovich 2019:738) a "fuzzy buzzword," (Röper 2018:366) and even "the buzzword of the 2010s." (Christophers 2015b:184) One notorious claim that "it is easily possible to identify at least 17 notions of financialisation" has been repeatedly cited in the literature. (Christophers 2012, 2015b; Klinge et al. 2021; Lee et al. 2009)

2.4.1 Streams of thought

Some scholars have attempted to categorise the literature systematically in a small number of 'streams' or 'branches', but there is no consensus on how this should be done, with different taxonomies being offered. (Christophers 2012, 2015b; Froud et al. 2001; van Treeck 2009; van der Zwan 2014) Christophers (2012, 2015b) sees three streams to the literature. The first (identified with Arrighi, Stockhammer and Krippner) focuses on the growing importance of finance to capital accumulation and profit generation, seeing the structural dynamics of capitalism as increasingly financialised. The second (identified with Froud and co-authors as well as Lazonick and co-authors) focuses on the changing nature and motives of corporate governance, particularly in light of the rise of shareholder-primacy ideology. Finally, there is Martin's focus—taken up also by Langley (2007, 2008)—on the lived realities of financialisation, including the way in which it has affected culture and identities.

Meanwhile, van der Zwan (2014) suggests a broadly comparable threefold division, although with some modifications in which scholars are seen as representative of the different streams—e.g. emphasising the influence of the régulationist school on conceptualising finance as a regime of accumulation. By contrast, van Treeck (2009) recognises four main approaches, some of which are similar to those above and some quite different (e.g. varieties of capitalism is included, whereas the financialisation of everyday life is not). An earlier taxonomy from Froud et al. (2001) helpfully differentiates several related theoretical trends in some more detail. They note the functional overlap between critical 'shareholder value' and 'corporate governance' literatures on the one hand and financialisation literature on the other (which they in turn divide into two different streams: one concerned with varieties of capitalism, another concerned with monetary flows).

Clearly, the literature can be sliced in various ways, to suit different purposes, theoretical frameworks, and methodologies. However, it would be a mistake to reify such divisions: the various research projects do not operate in parallel but cross over and borrow from each other. Moreover, many scholars straddle or have crossed these boundaries. E.g. Lapavitsas' work spans many categories: the reshaping and redirecting of money flows both between firms and households within national economies, (2009b, 2014) as well as between developing and developed nations globally, (2009a, 2014) financialisation at the firm level, (2013) and a broad ideological effect of financialisation, (2011) overlapping with what Martin (2002:vii) has called the "financialization of daily life." It would be difficult to reduce all elements of this work to a single category.

2.4.2 Marxist dissent

Conceptualisations of financialisation often treat it as an effectively exogenous phenomenon, occurring because of exogenous factors. Where such factors are identified at all, they are often taken to be intellectual shifts—the rise of neoliberal thought, innovations in financial theory, the invention of new business practices, etc. Many Marxist scholars question this kind of framing and the assumption (carried with it) that financialisation is best understood as cause rather than effect. Rather, Marxists often frame financialisation as an effect of other changes in the economy, attributing both it and declining investment primarily to a third factor—falling profitability.[12] (Baran and Sweezy 1966; Foster 2007, 2008; Kliman and Williams 2014; Magdoff and Foster 2014; Sweezy 1982, 1994, 1997)

This is in keeping with the tendency among Marxists to reject 'idealist' explanations, and instead to look for causes in deep and apparently immutable features (or especially 'contradictions') of the economic basis of society, such as class conflict. The question of profit rates and their role in influencing structural transformations or secular trends has been an enduring element of Marxist thought, and a major feature in debates around Marxist economics. (Duménil and Lévy 2002; Kliman and Williams 2014; Lapavitsas 2011) Marxist theoretical priorities have often led Marxist scholars of financialisation to emphasise more concrete and measurable aspects of financialisation such as investment, financial flows, securitisation or

[12] Some Marxists have been somewhat ambiguous about the direction of causation. (Fine 2010; Lapavitsas 2014)

monopolisation and less on the more conceptual aspects common to other heterodox theoretical perspectives, such as short-termism, the normalisation of financial logics or shareholder-primacy ideology (a concept outlined below).[13] (Dasgupta 2013; Lapavitsas 2011; Magdoff and Sweezy 1987; Sotiropoulos and Lapatsioras 2014)

This different theorisation of financialisation often comes along with some disagreement over how to interpret the empirical record —especially on investment. Kliman & Williams (2014) find that productive investment has increased as a share of profits and that financial investment has largely been funded through new credit. Similarly, Foster (2008) claims that significant amounts of cash hoarding undermines the 'crowding out' narrative, lending weight to Harvey's notion of insufficient investment projects to 'reabsorb' liquid capital.[14] (Harvey 1982, 2011a) McNally suggests that financialisation did not (at least until the 2007–2008 global financial crisis) reduce investment, but did channel it into opportunities "built on sand." (2009:64)

2.4.3 Neoliberalism

Financialisation has been repeatedly and thoroughly conceptually linked to neoliberalism within certain parts of the literature; according to Harvey, "Neoliberalization has meant, in short, the financialization of everything." (2005:33) There is a strong consensus on this association, especially among theorists with a more Marxian orientation. (Harvey 2005; Fine 2008, 2009b; Sotiropoulos 2011; Dasgupta 2013; Foster 2015; Ward, Van Loon, and Wijburg 2019)

Several authors have noted the (supposed) co-emergence of financialisation and the neoliberal political turn, (Lapavitsas 2011, 2014; Shenk 2015) and the central importance of finance to the neoliberal project. (Saad-Filho and Johnston 2005) It has also been suggested that financialisation has facilitated increased accumulation by dispossession, as one facet of neoliberalism. (Gago 2015; Goldman 2020; Harvey 2005, 2011a; Lawrence 2015; Loftus et al. 2019)

The exact nature of this relationship is debated, however: one group of scholars conceives of neoliberalism as a policy agenda intended to serve certain vested interests, in particular reasserting the power of capitalists (especially rentiers).

[13] Again, there are exceptions, with some scholars attempting to develop Marxist perspectives which take more seriously the apparent fact of shareholder primacy, for instance. (Gong et al. 2014)

[14] The 'cash' being referred to here often includes short-term investments and highly liquid securities, but these are not the kind of high-yield financial investments that would crowd out real investment.

(Duménil and Lévy 2005; Fine 2007) Others see neoliberalism more as an attempt to reconfigure the operations of power within society, in particular through influencing the behaviour of economic entities within the market and citizens within society.

For instance, Finlayson (2009) suggests that New Labour pursued a project of transforming the relationship between the state and the individual, especially with regard to welfare functions of the state, which is seen in part as one facet of the financialisation of everyday life and consumption. Similarly, the City of London has been identified as an important element contributing to constructing a regime of capillary power that forms part of the norms of neoliberalism. (Johal, Moran, and Williams 2014)

Marxists have described financialisation as both the material underpinning of neoliberalism and globalisation, (Fine 2009b, 2010) and the senior partner relative to these other trends. (Foster 2007) Both Fine (2007) and Foster (2007) conceptualise neoliberalism as the ideological complement to the material process of financialisation. While some see financialisation as just one part of the neoliberal arsenal, (Duménil and Lévy 2005) others have suggested that financialisation essentially *is* neoliberalism in practice. (Fine 2008, 2009b)

Still other scholars have posited that financialisation and related concepts (like assetisation, described below) are rival concepts with potentially greater explanatory power than neoliberalism, or at times expressed reservations about the usefulness of neoliberalism as a concept in general. (Birch 2015; Christophers 2015b; Montgomerie and Williams 2009; Venugopal 2015) Developments in the financial system have therefore sometimes been taken to play a larger role than many scholars appreciate, with the influence of neoliberal ideology apparently being overstated. (Green 2016; Green and Lavery 2018)

This association of financialisation and neoliberalism raises an often-overlooked question. If financialisation simply *is* neoliberalism, for instance, then how should scholars categorise and analyse the apparent precursor trends to contemporary financialisation, along with their attendant literatures? Did Braudel, Arrighi and Phillips all err in identifying alleged financial expansion as a correlate of hegemonic decline? Did Hilferding, Lenin and Luxemburg put undue emphasis on the role of banks in the capitalist economy when presenting classical theories of 'finance capital'? Were Baran, Sweezy and Magdoff all premature in recognising a supposed 'financial explosion' in response to secular stagnation? And what should we make of the fact that some scholars (Dutta and Knafo 2020; Fligstein 1990; Fligstein and

Markowitz 1993; Knafo and Dutta 2020) seem capable of retrospectively reading the origins of supposedly 'neoliberal' financialisation as far back as the 1960s?

2.5 Financialisation variegated

Comparative studies often emphasise the geographically-variegated nature of financialisation. This comparison can take a quantitative form—different degrees of financialisation are sometimes observed. Germany in particular is often taken as a paradigm of a less-financialised national economy, in which shareholder primacy is not assumed as the norm; by contrast, economies like the US and UK are often seen as the most financialised. (Christophers 2012; deSouza and Epstein 2014; Philippon and Reshef 2013; Ward et al. 2019) There are also qualitative dimensions, with different modes of financialisation.

2.5.1 Varieties of financialisation?

This conceptualisation of geographic difference is similar to and may overlap with the Varieties of Capitalism (VoC) literature.[15] (Hahn 2019; Hall and Soskice 2001; Karwowski et al. 2020; Lazonick 2010a; van Treeck 2009; Vitols 2002) Within the VoC framework, coordinated market economies (CMEs) reputedly exhibit more patient, bank-based finance and greater collaboration between constellations of firms (somewhat similar to the 'finance-capital' view), whereas liberal market economies (LMEs) have financial systems based more heavily on liquid and open financial markets, demanding more short-term returns as well as greater financial openness and flexibility from firms.

LMEs could therefore be seen as a more financialised form of capitalism: e.g. they promote and institutionalise shareholder primacy and capital-market competition (such as hostile takeovers) to a greater extent than CMEs. (Deakin 2013; Lazonick 2010a) In some ways, empirical data supports this: profitability and

[15] The VoC approach undoubtedly has its detractors. (Akkermans, Castaldi, and Los 2009; Ebenau 2012; Fast 2016; Kang 2006; Schmid and Kwon 2020) These references to the VoC literature should not be confused with a commitment to the VoC framework; rather, they are an attempt to explain some theoretical grounding within a widely-understood framework that draws attention to some relevant factors of national economies and institutions. Ultimately the analysis and conclusions herein are not dependent upon the VoC framework.

dividends are both highest (relative to sales) in Anglo-Saxon firms and lowest in Japanese firms; share repurchases are also higher (relative to sales) in Anglo-Saxon firms, though in this case there is less of a gap between Continental European and Japanese firms (and Japanese firms are more erratic). (Montalban and Sakinç 2013) This is in keeping with the VoC framework's prediction that LME firms will prioritise maintaining profitability in order to retain access to (impatient) capital; conversely, CME firms are assumed to protect their market share since their institutional context makes it more expensive for their workforce to fluctuate. (Hall and Soskice 2001)

It could be assumed that certain countries are simply 'ahead of the curve' in terms of financialisation, while others lag behind. Some scholars have rejected any simplistic hypothesis of 'convergence' towards a singular model, even at differing rates. Attempts have thus been made to articulate the differentiation and specialisation of core and peripheral economies, embedded in institutional contexts and subject to path dependency. (Akçay and Güngen 2022; Becker et al. 2010; Lapavitsas 2009a; Lapavitsas and Powell 2013; Lapavitsas and Soydan 2022; Powell 2013) This may help to explain why the term is so contested: "There is no 'correct' universal definition of financialisation that one could derive by listing its economic and social features because these are inherently shifting and variable." (Lapavitsas and Soydan 2022:424) Rather, it seems that there are 'varieties of financialisation'.

In particular, it has been suggested that national economies may 'financialise' differently depending on their level of wealth/output. (Karwowski 2020; Karwowski et al. 2020; Karwowski and Stockhammer 2017; Lapavitsas and Soydan 2022; Tori and Onaran 2022) This may come along with division and specialisation of labour within the global economy, producing (as some scholars have suggested) an uneven and combined development of financialisation. (Akçay and Güngen 2022; Bond 2008; Fernandez and Aalbers 2020) To give one example, wealthier and more productivist German industry builds up trade surpluses that fund lending to a more financially liberalised (and dependent) European periphery. (Santos and Teles 2020) However, this approach does not preclude the recognition of commonalities, such as increasing entanglement of households with formal financial sectors. (Lapavitsas and Powell 2013)

2.5.2 *Other forms of variegation*

In addition to geographic heterogeneity, financialisation is variegated in other ways. For instance, industries operate idiosyncratically: some are more competitive, regulated, capital-intensive, innovative, or pro-cyclical than others. Financialisation will therefore tend to have varied effects across sectoral divides. Perhaps most notably, the divide between the financial sector itself and the supposed 'real economy' has significant implications in terms of financialisation of the wider economy. To give just one example, the growth in debt of the financial and non-financial sectors have exhibited different trends, with financial firms driving up debt prior to the 2007–2008 global financial crisis and non-financial firms being larger contributors afterwards. (Abraham, Cortina, and Schmukler 2020)

It has also been suggested that the form of financialisation has evolved over time, taking considerably different forms over the past few decades. In particular, a twofold division has been made between an initial period of financial expansion and a subsequent period with a paucity of investment opportunities. (Auvray et al. 2021; Pagano 2014) The second period is particularly associated with intellectual monopoly capitalism, a concept that will be explored more fully below—private control over knowledge is seen as one of the means by which investment opportunities have narrowed, as firms use IP to block each other's' innovation efforts. The second period also largely represents an intensification and 'worsening' of financialisation: lower investment, less competition and higher shareholder disbursement, to give a few examples—more can be seen in the table below.

Table 2-A, Financialisation marks I and II:
(Reproduced from Auvray et al. (2021))

	Financialization I	**Financialization II**
	1980–1999	**2000–2018**
Investment	Low	Lower
Labor power	Weak	Weaker
Globalization	Expanding	High
Shareholders' payments	Expanding	High
Interest payments	High	Low
Competition	Competitive regime	Monopoly

2.6 Shareholder-primacy ideology

Financialisation has frequently been associated with an ideology of 'shareholder primacy' or maximising 'shareholder value'.[16] (Froud et al. 2000; Krippner 2005; Andersson, Gleadle, et al. 2010; Lazonick 2011; Stout 2012a; Su 2012; Davis and Kim 2015; Epstein 2015) While the two concepts of financialisation and shareholder-primacy ideology are distinct, they are closely related. In fact, some have argued that shareholder primacy is of crucial importance or centrality in understanding financialisation at the firm level. (Froud et al. 2006; Greenfield and Williams 2007; Stockhammer 2010)

In the long run, profit-seeking firms always attempt to deliver value to shareholders, either through paying out dividends or delivering capital gains (by increasing the share price of the firm). The ideology of maximising shareholder value is unique in that it represents a prioritisation of this goal by managers, with all other considerations—e.g. increasing revenue, growing market share or increasing productivity—seen as purely subordinate concerns. 'Shareholder primacy' refers more generally to placing the assumed interests of shareholders before/above those of other stakeholders, and is often seen to have negative consequences for society.[17] (Mélon 2019; Palladino 2020b) Overall, almost all of the financialisation literature that directly addresses shareholder-primacy takes a negative view thereof. (Brossard, Lavigne, and Sakinç 2013; Froud et al. 2000, 2001; Greenfield and Williams 2007; Lazonick 2009b; Lazonick and O'Sullivan 2000; Lazonick and Tulum 2011; Stockhammer 2004; Tomaskovic-Devey, Lin, and Meyers 2015; Williams 2000)

[16] I use the term 'ideology' here not out of pejorative intent but because it suggests a broad and deep society-wide transformation in mainstream thinking about how companies should operate, how economic policy should be judged, how competing stakeholder interests should be balanced, and the proper place within the economy of the owners of capital. The effect is not limited merely to investors and corporate executives but also penetrates the mentalities of other such as journalists, politicians, regulators, legal professionals, and educators in the fields of business and economics.

[17] This broader primacy could apply to conflicts over things over than economic value; for instance, increased shareholder *control* over the firm could lead to the adoption of corporate social responsibility policies that do *not* maximise shareholder value. However, major shareholders may actually have little interest in control. (Morin 2000)

2.6.1 Agency theory

Shareholder primacy ideology owes much to the literature on 'agency theory' that was first fully articulated in the 1970s. (Jensen and Meckling 1976; Fama 1980; Fama and Jensen 1983a, 1983b; Jensen and Murphy 1990) This literature has its roots in classical economic theory like Adam Smith and Karl Marx, filtered through the work of institutionalists. (Marx 1991; Berle and Means 1991; Burnham 1941; Galbraith 1967) Shareholder primacy has also seemingly been assumed by—and asserted via—key legal decisions such as Dodge v. Ford Motor Company. (Ostrander 1919) A more detailed history is offered by Sneirson. (2019)

For agency theorists, the corporation should not be understood as an atomic economic unit modelled as a utility-maximising individual 'entrepreneur'—different parties involved in the firm pursue their own individual interests in utility-maximising fashion. (Berle and Means 1991; Fama and Jensen 1983b; Jensen and Meckling 1976) Shareholders fund and ostensibly 'own' the business enterprise but do not control it on a day-to-day basis, while managers dispose of shareholders' money but have their own agendas. As such, managers' incentives must be aligned with those of shareholders (often through the use of stock-based compensation) so that they can appropriately act on their behalf as 'agents'. (Fama and Jensen 1983b; Jensen and Murphy 1990)

2.6.2 Justifications for shareholder primacy

Prioritising shareholders' interests privileges one set of stakeholders at the expense of others. (Aglietta 2000; O'Sullivan 2000; Su 2012) One reason is that shareholders are seen in uniquely laudatory terms: as investors, risk-bearers, value-creators, and job-providers. This one-sidedness is unrealistic, however: shareholders often don't perform these functions particularly effectively, while other stakeholders often do make considerable contributions in these areas. (Lazonick 2013; Mariana Mazzucato 2013; O'Sullivan 2000)

Shareholder primacy is also defended on the grounds of economic efficiency; by regularly returning funds to shareholders, capital is assumed to be constantly—and more competently—re-allocated. In theory, shareholders should be more responsive to market signals that will channel investment into smaller and more efficient firms, whereas corporate managers may have reason to deploy funds sub-optimally within their own firm's boundaries. A quick turnover of cash from and to shareholders is

therefore seen by shareholder-primacy ideology as preferable to (potentially underperforming) firms retaining funds over long periods. (Gleadle et al. 2012; Lazonick 2010a).

An alternative way of understanding this is that diversification has come to be seen as the responsibility of owners rather than controllers of capital. This occurs with the development of financial markets and instruments, alongside greater concerns about shareholder primacy and efficient allocation of capital. As a result, firms disburse funds to shareholders and specialise in particular functions; shareholders may then choose to re-allocate capital among these firms according to their own judgement, based on market signals. The represents a transformation from the previous model in which corporate managers were expected to make these decisions on behalf of shareholders. (Gleadle et al. 2012)

2.6.3 Criticism of shareholder primacy

Despite these theoretical justifications, shareholder-primacy ideology remains controversial. Even aside from wider ethical and political concerns around the balancing of different stakeholders' interests or the social purpose of business, there is the possibility that the ideology is self-defeating. After all, pay-outs signal a lack of faith in managers' ability to optimally deploy funds or effectively pursue diversification strategies on behalf of shareholders. It has therefore been suggested that the turn towards disbursement is an "admission of failure" (Froud et al. 2006:204) by corporate managers. This undermines one of the main claims that often forms a major tenet of shareholder-primacy ideology—that managers are effective agents of shareholders.

Furthermore, in addition to dividend payments and rising share prices (implying capital gains for shareholders), disbursements to shareholders can take the form of stock repurchases—or 'buybacks'. (Lazonick 2015) On the one hand, buybacks have no shortage of proponents: many mainstream economists, finance theorists, corporate managers and investors take buybacks for granted. Often buybacks are understood as merely another means of returning value to shareholders, as valid and unproblematic as dividends—though with different tax and accounting implications. (Almeida, Fos, and Kronlund 2016; Dobbs and Rehm 2005; Gruber and Kamin 2015; Grullon and Ikenberry 2000; Panigrahi and Zainuddin 2015) In fact, there is even evidence that CEOs prefer buybacks to dividends. (Chintrakarn et al. 2018) Conversely, some heterodox scholars have singled out

buybacks for specific criticism as potentially a more problematic aspect disbursement than high dividends. The main accusation is that buybacks constitute a manipulation of the market which leaves most of society worse off. (Lazonick 2008a, 2008b, 2014, 2015, 2016b) It has also been suggested that the use of buybacks could encourage short-termist management strategies and drive up prices for consumers. (Busfield 2020)

A long-term shift has been observed in which buybacks make up an increasing proportion of total shareholder payouts over time. This has been linked to increasingly stock-based incentives and compensation packages for both managers and other employees—for instance, making managerial pay more dependent upon earnings per share. (Farre-Mensa, Michaely, and Schmalz 2014) Buybacks can help managers shift financial metrics in their favour to meet expectations such as earnings predictions. (Almeida et al. 2016) There is even evidence that they are sometimes used intentionally to mislead investors. (Chan et al. 2010) This may help to explain the finding that CEOs prefer them to dividends, which may present less of an opportunity to report numbers that paint them in the best light or otherwise suit their purposes. It also suggests a conflict of interests between managers and shareholders that will be explored more below.

However, this potential conflict is not to suggest that managers do not frequently perform in the interests of shareholders to extract value from firms in the short-term. In some cases, firms have paid out vast sums to shareholders and then required bailing out by investors or governments (foreign or domestic) in the face of unanticipated financial difficulties: e.g. Merrill Lynch, spent $14bn on stock repurchases in 2006 and 2007, only to find itself needing $9bn worth of fresh investment by the start of 2008, due to the then-ongoing global financial crisis. (Lazonick 2008a) This seems to be part of a wider phenomenon of cycling value in and out of the firm rapidly and in ways that seem to be better explained by financial considerations such as capital structure or analyst assessment than by productivist needs or goals: one study found that a quarter of all payouts (via buybacks and dividends) could not have been made without capital being raised to fund them. (Farre-Mensa, Michaely, and Schmalz 2021)

2.6.4 Limitations of the shareholder primacy concept

Such critical discourses on shareholder primacy as an organising norm capture many important elements of financialisation, but not all. Shareholder-primacy ideology provides an explanation for changing norms of corporate governance, increasing disbursement of cash to investors, and pressure from institutional investors in particular to pursue certain business practices (such as downsizing and outsourcing). However, by itself shareholder-primacy ideology gives no obvious explanation for structural economic changes such as the growth of the financial sector within the global economy or financialisation of the public sector.

While it is commonly accepted that shareholder do in fact enjoy primacy in the contemporary financialised economy, this has also been disputed. Primacy in this sense is normally understood as being imposed on firms by investors and their adjuncts (fund managers, financial analysts, etc). This allows for little managerial agency, which has raised doubts among some scholars. They argue that this notion of an influential ideology tying the hands of corporate managers is itself an ideological construct, a 'myth' used by those same managers to disclaim responsibility for the use of strategies actually pioneered by conglomerates in the 1960s.

On this view, "Shareholder value is a malleable social rhetoric used by investors with diverse requirements which does not, therefore, have one invariant set of consequences such as increased management distributions to shareholders." (Froud et al. 2006:4) Institutional investors—even major ones—struggle to impose their will on firms most of the time. If this is true, then the prioritisation of share price may actually reflect managerial priorities such as easy access to capital (by selling equity) or the means to defend against potential takeovers. Additionally, this view suggests that stock-based compensation is not a necessary tool to align incentives but rather a means of increasing executive pay, (Dutta and Knafo 2020) which in turn further incentivises managements' pursuit of high share prices. (Thomson and Dutta 2015)

2.6.5 Concrete evidence on shareholder primacy

On the other hand, European studies have suggested otherwise: e.g. French managers *did* have shareholder value norms imposed on them by institutional investors such as investment funds and pension funds. (Morin 2000) Germany is a more complex case: certain firms voluntarily adopted this orientation early on, while

others resisted and were prevailed upon by institutional investors—though German institutional set-up hampered the efficacy of this capital-market pressure in transforming the economy to some extent.[18] (Jürgens, Naumann, and Rupp 2000; Vitols 2002; Hirsch-Kreinsen and Hahn 2014)

Vitols (2002) uses case studies of the 'Big Three' German chemical–pharmaceutical firms (Hoechst, Bayer, BASF) to argue that management has more agency in responding to capital markets than is commonly assumed. However, this finding may have limited practical significance—in each case traditional big pharma research and production capabilities left Germany one way or another, regardless of the strategy employed by management. Of course, findings from Germany may also have limited applicability to other countries; as mentioned above, Germany is often considered to exhibit a very low level of financialisation.

Moreover, even a 'myth' may have life breathed into it as social reality comes to be constructed in its image; (Birch 2022) shareholder primacy ideology has influenced legal theory and frameworks, particularly over the last few decades. (Birch 2022) (Belloc 2013; Collison et al. 2014; Deakin 2013; Fisch 2005; Mélon 2019; Smith and Rönnegard 2016; Sneirson 2019) Some scholars argue that these rules have often been applied over-liberally in shoring up the position of shareholders vis-à-vis other stakeholders, (Smith and Rönnegard 2016; Stout 2002, 2012a, 2013) and have in some cases been misrepresented in legal teaching and public discourse because they serve convenient purposes. (Stout 2007) Nevertheless, their influence still suggests that the movement towards shareholder primacy in recent decades is more than just a myth.

In reality, blaming management for shareholder primacy and declaring it a 'myth' may over-simplify by over-generalising from the US national experience. Shareholder primacy ideology has not had a homogenous impact across the globe, and no single account would explain its origin or development in different national cases. Even the ideology's apparent origin within the US cannot easily be summarised as the product of a single social group, serving a single agenda. Rather, the status quo is a settlement born out of both contestation and cooperation, from the antagonistic Dodge v. Ford litigation to the mutualistic approach of the agency theorists. The debate over the autonomy of managers despite their claims of 'tied hands' could be seen as an indicator of the extent to which financialisation involves

[18] It has further been suggested that German avoidance of shareholder value ideology has helped it to outcompete other developed capitalist economies in recent decades. (Stockhammer 2004)

the strategic construction and deployment of narratives to further the agendas of certain economic actors—this will be explored more in later chapters.

2.7 Assetisation

An important role in financialisation is played by intangible assets, which have been described as "a new layer for financialization." (Serfati 2008:45) In particular, emphasis is placed on various forms of knowledge and IP including patents, trade secrets and data. There are several strands to this literature, employing varied terminologies and shaped by different intellectual traditions, but they have a common focus on intangible assets and what some have called 'assetisation.' This term was popularised by Birch and taken up by other scholars. (Birch 2015, 2016, 2017c; Birch and Muniesa 2020; Bourgeron and Geiger 2022b; Celerier, Chiapello, and Jeny 2022; Geiger and Gross 2021; Langley 2021; Tellmann 2022)

These various literatures have often focused specifically on the pharmaceutical sector as their object of empirical study. (Arora, Fosfuri, and Gambardella 2001a; Yanagisawa and Guellec 2009; Arora and Gambardella 2010a, 2010b; Baranes 2016; Birch 2017c; Baranes 2017; Bourgeron and Geiger 2022b; Rikap 2019; Sell 2021; Rikap 2021) This choice of sector to study makes sense; intangible assets—and their trading by firms—are vitally important to the industry as a whole and its internal structure in particular, as will be explained in later chapters.

Birch initially defines assetisation as a "gradual shift" towards "[e]conomies dependent on asset creation, asset-income and forms of consumption financed by rising asset values and new debt instruments." (Birch 2015:Ch.4,§3) It refers both to the individual process of transforming a thing into an asset and the "societal consequences" of this transformation becoming widespread and significant within the economy. (Birch and Muniesa 2020:4) The assetisation literature frequently draws upon the work of Veblen, (Baranes 2016, 2017, 2020b; Birch 2016, 2017c; Birch and Muniesa 2020; Langley 2021) as well as the CasP literature informed thereby. (Birch 2016; Baranes 2016, 2020b; Langley 2021) Other scholars have pursued related lines of enquiry using the label of 'the asset economy', often taking inspiration from Minsky. (Adkins, Cooper, and Konings 2021, 2022; Adkins, Konings, and Cooper 2020; Konings and Adkins 2022; Samman 2022; Woodman 2022)

2.7.1 Commodification and marketisation

Moreover, Birch suggests that assetisation is different from commodification—commodities are things to be traded, while assets are things to be held. However, this distinction risks downplaying the extent to which assetisation notably involves commodifying assets. While this similarity could be lost on the reader due to the emphasis on difference, it appears not to be lost on Birch, (2015) who quotes Veblen to convey that assets are indeed "vendible," either indirectly through the sale of common stock or directly as goodwill through the wholesale takeover of a firm. (Veblen 1908b:114) (Veblen goes on to imply the possibility of trading discrete intangible assets such as patents, and no doubt Birch means to include that form of 'vendibility' also).

This observation about the way things—especially intangible things—become socially constructed as assets not only to be harnessed or absorbed through takeovers but also to be traded in their own right is important because of its connection to pre-existing literatures. While these contributions do not use the term 'assetisation', they do address themselves to terms such as 'markets for technology', the patent marketplace, IP commodification, or club goods; the commodification and marketisation of assets frequently plays a significant role in this body of work. (Arora 1997; Arora, Belenzon, and Suh 2022; Arora et al. 2001a; Arora, Fosfuri, and Gambardella 2001b; Arora and Gambardella 2010a, 2010b; Asker, Baccara, and Lee 2021; Baranes 2016, 2017, 2020b; Bianchi et al. 2011; Brandl and Glenna 2017; Buğra and Ağartan 2007; Chien 2010; Gambardella, Giuri, and Luzzi 2007; Gilbert and Sunshine 1995; Haskel and Westlake 2018; Schwartz 2017; Yanagisawa and Guellec 2009)

Assetisation in this broader sense could also be productively situated within ideas around neoliberalism as a project to construct, buttress and (re)assert property rights, subjugating all aspects of society to market logic. On this view, modern IP laws, markets and practices can be understood as an application of propertarian thinking to knowledge, culture and nature. This would connect it to literatures around accumulation by dispossession, primitive accumulation, commons and the 'second enclosure movement'. (Boyle 2007; Harvey 2005, 2011b; Kloppenburg 2010; Krier and Swart 2015; Prudham 2007; Runge and Defrancesco 2006; Zeller 2007) However, since conceptualisations of neoliberalism vary greatly, many scholars would no doubt question this contextualisation of assetisation. In particular, Birch inverts this notion and has suggested that rather than understand assetisation in

terms of neoliberalism, a productive understanding of neoliberalism should be based on the centrality of assetisation—and that in fact assetisation is a more fruitful concept for understanding contemporary capitalism than neoliberalism is. (Birch 2015)

2.7.2 Intellectual monopoly

The literature on monopoly capitalism has also been employed and refined to address these phenomena, giving rise to the concept of 'intellectual monopoly capitalism,' which similarly recognises the centrality of IP assets to capital accumulation. (Auvray et al. 2021; Coveri, Cozza, and Guarascio 2022; Durand and Milberg 2020; Pagano 2014; Rikap 2021, 2022b, 2022a; Rikap and Lundvall 2020; Sawyer 2022) While the term seems to have been coined by Pagano, Rikap has contributed most notably to this literature, developing a theory of a mode of capitalism within which intellectual property assets in particular are central to effective competition at the top levels of key industries. This involves a model of hierarchical differentiation between intellectual monopolist firms that erect corporate innovation structures within which they can exercise power and control well beyond their own firm boundaries and appropriate rents generated by this integrated system of innovation, while externalising certain costs and risks to subordinated firms.

This division and differentiation within the industry that reflects both power and functional role recalls Chandler's (2005:8) description of an industry's well-established "*core companies*" developing a "*supporting nexus* of interconnected and complementary—rather than competitive—enterprises" (including "research specialists") which rarely dislodge the established core. (Baranes 2017) There are also echoes of an earlier notion, popularised by Hilferding: that certain banks build up ownership stakes and board interlocks within networks of industrial firms and cartels, within which they sit at the centre and which they use to organise production and appropriate profit. (Hilferding 1981)

2.7.3 Scholars

Once again, certain scholars have been particularly prolific and influential, each of whom is associated with a particular term/concept and grouping within the literature:

- Arora and Gambardella, frequently working together, exerting an early influence on the literature via their work on technology/patent markets and licensing. (Arora 1997; Arora, Belenzon, and Sheer 2021; Arora et al. 2022, 2001a, 2001b; Arora, Fosfuri, and Gambardella 2008; Arora and Gambardella 2010b, 2010a; Gambardella et al. 2007)
- Birch, leading the 'assetisation' strand. (Birch 2006, 2015, 2016, 2017c, 2017b, 2019, 2020; Birch and Bronson 2022; Birch and Muniesa 2020; Birch and Tyfield 2013)
- Rikap, who has most fully developed the concept of intellectual monopoly capitalism. (Auvray et al. 2021; Rikap 2018, 2019, 2021, 2022b, 2022a; Rikap and Lundvall 2020, 2021; Testoni et al. 2021)

2.7.4 Assetisation and financialisation

There is a general consensus within these literatures that assetisation is linked to financialisation. The two topics are inter-related in such a way that to speak of one often involves invoking the other: assetisation cannot be fully understood without the inciting context of financialisation, but nor can financialisation be comprehended as a phenomenon distinct from transformations in knowledge and IPRs. (Birch and Muniesa 2020) The two trends have reinforced each other and can be understood as "two sides of the same coin." (Pagano 2019:102,119)

Assetisation has sometimes been seen as an element of or counterpart to financialisation processes, but one that has often been underappreciated in the latter literature. According to Langley, (2021:382) assetisation has historically been somewhat neglected in the literature on financialisation but "can be usefully foregrounded to understand the character and movement of financialized capitalism in the contemporary conjuncture, particularly (but not exclusively) in its Anglo-American heartlands." Following a similar line of argument, Leyshon & Thrift (2007:100) claim that there is "a value chain with its own attendant geography made up of the aggregation of assets at one end and the spoils of speculation shared out in

a few cities of the world at the other. Yet nearly all of the attention in academia has tended to be placed on the speculative end of this chain."

As mentioned above, some scholars see an important role for assets in the evolution from one period of financialisation to another. (Auvray et al. 2021; Pagano 2019) Intangible assets have become "a new layer for financialization" and they have "become a key component of modern economies." (Serfati 2008:45–46) Bourgeron & Geiger argue that "in the modern financialized model additional power is gained from controlling patents both as legal entitlements and as material manifestations of a future stream of earnings" and that this must be understood within the broader context of financialisation. (2022b:26) This "focus on the asset directs attention away from speculation, abstraction, fictitious values and trade to the creation of capital revenue at the 'frontiers of financialization'." (Tellmann 2022:33)

Crucially, what occurs in markets for technology also depends on conditions in other markets, such as capital markets: e.g. small firms with IP must choose whether to build a business model around using it or licencing it. (Arora et al. 2001a) Similarly, IP may be used as collateral to access loans, while specialist firms might provide cash flow to innovative firms in return for later royalties, or provide bankrolling and expertise for 'patent trolling'. (Baranes 2016; Haskel and Westlake 2018; Pagano 2014, 2019; Yanagisawa and Guellec 2009) Intellectual monopoly capitalism may also help to drive financialisation, feeding phenomena like securitisation and shadow-banking, since traditional banking is less able to effectively collateralise loans with intangible assets. (Haskel and Westlake 2018; Pagano 2019)

It has also been shown that the intangible investment share of value added is high in countries like the UK and US compared to countries like Germany. (Haskel and Westlake 2018) Given that the former are generally seen as more financialised and the latter as less so, this could be interpreted as further evidence of a relationship between financialisation and assetisation—in the sense that they seem to co-occur at the national level. This concern about the geography of assetisation and how it might illuminate the link to financialisation has been shared by several other scholars in recent years. (Birch and Ward 2022; Ouma 2023; Wu et al. 2020)

2.8 Innovation

2.8.1 The role of pharma innovation

Effective innovation is the cornerstone of the branded pharmaceutical sector—it is the basis on which the fortunes of individual firms rest. Big pharma firms in particular depend on product innovation to maintain their lead in the sector.[19] Major firms must maintain a 'pipeline', constantly innovating in order to ensure a steady supply of patent-protected products; if they stopped developing new drugs, they would be reduced to the less esteemed position of generic drug manufacturers. And yet—puzzlingly—it seems that the vast majority of firms ostensibly engaging in drug innovation never receive an NME approval. (Munos 2009) This implies that a massive proportion of firms currently active in the sector are either start-ups who have yet to 'strike gold' or else hold 'second-hand' IP acquired from other firms.

Innovation also performs a legitimising 'public-relations' function for big pharma. Consumers, politicians, regulators, and the wider public tend to afford more leeway to firms seen as potentially discovering a cure for cancer in the future than those merely manufacturing an existing commodity. Firms therefore attempt to discursively position themselves as developing future medical breakthroughs that justify high prices in the present.[20] This is doubtless made easier by the evidently high levels of investment required and high risks borne on average when developing medical breakthroughs—if it were easier then Munos' survey of the sector would no doubt have found a better track record.

2.8.2 Innovation as investment

Given the broad consensus in the literature that financialisation is generally associated with lower investment, it might be assumed that the same would be true for R&D in pharma.[21] Some of the same arguments may apply in slightly modified

[19] Process innovation (e.g. using new technologies to select candidate molecules) also benefits such firms but is less central to their mission and its benefits to healthcare are harder to trace and measure.

[20] See the discussion of Retrophin and Turing in Chapter 5.

[21] R&D was historically not considered 'investment' in national accounting but this began to change with the United Nations' 2008 System of National Accounts, setting an example that was later followed by others, e.g. the US Bureau of Economic Analysis in 2013.(United Nations et al. 2009; U.S. Bureau of Economic Analysis 2013)

form, such as the idea that high financial returns could 'crowd out' other uses of funds (whether those uses are more fixed capital or developing new technologies).

Moreover, the literature presents findings specific to innovation. In general, financialisation is believed to inhibit more radical and long-term innovation strategies in favour of safer iterations with shorter turnarounds. (Lee, Kim, and Hwan Joo 2020) Even the simple fact of greater coverage by financial analysts apparently reinforces short-termist norms such as frequent disbursement of funds to shareholders, and therefore reduces innovation (though it is unclear how this applies to big pharma specifically). (He and Tian 2013)

On the other hand, the dynamics of R&D and other 'investment' are likely to be different, across all industries but particularly in pharmaceuticals. There are of course functional differences between these two uses of capital—such as unique risks involved in trying to develop new IP as compared to buying more machinery or land. Even if these are not sufficient to generate distinct patterns of investment, the institutional context is likely to create such differences: the treatment of different expenditures in accounting and tax regulations might influence firms' spending on physical vs intangible assets. E.g. in the UK, firms can currently claim capital allowances up to £1m, but R&D allowances are unlimited.

In fact, a good deal of empirical evidence has been assembled to demonstrate that investment in intangibles has in fact steadily increased relative to tangible investment. (Haskel and Westlake 2018) Given the above, it makes sense to see innovation as a form of investment—one both theoretically and empirically differentiated from investment in tangible capital—in order to better understand how financialisation impacts R&D-intensive big pharma in particular.

2.8.3 Short-termism

Financialisation leading to short-termism would be of particular concern in terms of its impact on pharmaceutical innovation. For instance, share buybacks seems to be particularly frequently used in high-tech/research-intensive industries like pharmaceuticals. (Lazonick 2009a, 2013, 2015) In fact, Pfizer's disbursements for 2004–2013 were 37% greater than their entire net income for the same period. (Lazonick 2015) Disbursement at these levels (if not offset by new equity issuance) requires either borrowing or running down of cash reserves in order to pay out to shareholders; whichever method is chosen, the buybacks could be seen as diverting funds that might otherwise fund innovation.

As a result, this focus on returning value to shareholders may be undermining the long-term research commitments on which pharma is ostensibly built. Taken together, dividends and buybacks frequently equate to a significant share of R&D expenditure, or even exceed total R&D spending. (Lazonick 2013) Despite the intention to increase the efficiency of capital allocation, some scholars (Brossard et al. 2013; Lazonick 2015; Lazonick et al. 2013; O'Sullivan 2000) argue that buybacks militate against the social conditions required for successful innovation: "strategic control," "organizational integration," and "financial commitment." (Lazonick 2015:15)

At the same time, this evidence is open to considerable interpretation and debate. Firstly, some scholars have disputed the idea that buybacks are evidence of short-termism. (Fried and Wang 2019) Perhaps more importantly, short-term orientation is difficult to meaningfully measure. While it may be plausible to demonstrate the time horizons of banks, fund managers or certain other economic actors, it would seem difficult or impossible to establish or measure a trend towards short-term decision-making by executives in high-tech sectors which necessarily invest over long time scales—of which big pharma is a paradigm example.

It is unclear how one could objectively show that a firm was prioritizing relatively short-term investment given the variety of potential innovation strategies available, and the various factors that may influence their adoption. This is particularly true given the high level of uncertainty involved in each strategy, the inevitably longer-term commitments involved in drug discovery, and the extent to which future profitability might be determined to a large extent by policy and regulatory decisions (e.g. on pricing). Even seemingly useful proxies may bring with them plenty of pitfalls. E.g. in general acquiring IP at a later stage may imply less long-term planning, but it could also imply a lower appetite for risk, prolonged negotiations over the acquisition or delays in raising capital, inadequate knowledge of early-stage IPs, or other factors hampering earlier acquisition. Similarly, even acquiring a product that has already been on the market for some years could be part of a long-term strategy: e.g. a firm could use its position as the new owner of a drug to promote concern about the drug's safety and have it withdrawn from the market, in order to pave the way for a future product with which it would otherwise compete for market share.

Moreover, financialisation could be recognised as a contradictory process with countervailing tendencies: if intangible assets have become central to accumulation,

then a high-tech sector such as big pharma would likely see an increase in attempted development of such assets, even if this ran counter to the short-term profitability of the firm. In fact, some empirical work has found that institutional investing is associated with *higher* rather than lower R&D spending. (Majumdar and Nagarajan 1997) Not all institutional investors are the same, either; union pension funds in particular have led calls for sustainable investment and promoted shareholder activism aimed at securing long-term firm success. (Evans and Habbard 2008) As such, short-termism remains a challenging area of study, particularly in terms of pharmaceutical innovation.

2.9 Controversy around R&D costs

The Tufts Center for the Study of Drug Development (a source favoured by the industry) put the cost of developing a new drug to the point of FDA marketing approval at $54m in 1979 (in 1976 dollars), $231m in 1991 (in 1987 dollars), $802m in 2001 (in 2000 dollars), and $2,558m in 2014. (DiMasi et al. 1991, 2016; DiMasi, Hansen, and Grabowski 2003; Hansen 1979) A replication of the 2001 study by Adams & Brantner (2006) produced an even higher estimate of $868m, but noted very significant variation between firms and indications. In some cases, even higher estimates have been reached: Herper (2013) suggests the figure could be as high as $5bn once failures are taken into account.

These figures have been challenged vociferously, with critics calling them "extraordinary claims requir[ing] extraordinary evidence." (Light and Warburton 2005:1030) One reason for this is that critics often do not believe they reflect the real costs of bringing new products to market. Love (2003) cites estimates from several different studies that look at specific types of drugs: $16.8m per orphan NME or $5.5m per orphan indication in the 1998–2000 period, net of the orphan drug tax credit the US government provides; $115m–$240m per new Tuberculosis NME in 2001 using similar calculation methods to the Tuft studies (but more conservative—and therefore arguably more realistic—cost estimates); $75.4m per new drug (with evidence that smaller firms exhibit higher R&D productivity) in 1995–1996 according to the Pharmaceutical Education and Research Institute. However, a recent systematic review of the literature concludes that "There is no simple answer" and "estimations are difficult or almost impossible to compare." (Schlander et al. 2021:1266)

2.9.1 What is really a cost?

One reason these figures are so disputed is that they often measure the amount spent on the drugs without relating these to sources of funding. Claimed costs may therefore include spending funded by the public through grants, subsidies, tax credits, bounties, or other forms of public support for research—these have been seen as significant, even crucial to innovation, including drug discovery. (Lazonick and Mazzucato 2013; Light and Warburton 2011; Mariana Mazzucato 2013; Mazzucato 2016, 2021; Schlander et al. 2021) Tax-deductibility of R&D spending alone was once assessed as negating around 44% of out-of-pocket R&D 'costs' claimed by the industry. (U.S. Congress, Office of Technology Assessment 1993)

Critics also charge the industry with inflating R&D costs by including opportunity costs.[22] (Angell 2004; Light and Lexchin 2004; Light and Warburton 2011) This is significant, as the Tuft Center consider opportunity costs to account for about 59%, 51%, 50% and 45% of total estimated costs in their various studies. (DiMasi 1991; DiMasi, Grabowski, and Hansen 2016; DiMasi, Hansen, and Grabowski 2003; Hansen 1979; own calculations)[23] Opportunity costs are generally seen as a legitimate component of cost calculations; (Morgan et al. 2011; Rawlins 2004; U.S. Congress, Office of Technology Assessment 1993; Winegarden 2014) however, there is debate around the appropriate discount rate to use for these calculations. (Angell 2004; Chit et al. 2015; Goozner 2005; Light and Warburton 2011; Prasad and Mailankody 2017)

A more fundamental conflict here revolves around what an estimate of the cost of drug development is *for* and how it should be *understood*. The danger is that these figures will mislead if the opportunity cost is presented as or assumed to be a genuine outlay on which the industry ought to make a profit, rather than an estimate of the profit they would have made had they pursued different investments.[24] (Love 2003)

[22] Opportunity costs here are the profits that would have been made if resources had been deployed to the best alternative use; these foregone profits are considered a cost of capital since investors will only provide funds to the firm if they expect a return greater than they would get elsewhere.

[23] There is also a lesser controversy about the appropriate rate of return to use when calculating opportunity costs. (Vernon, Golec, and Dimasi 2010)

[24] An example may help to illustrate the point: If a firm could invest a million dollars into a project that would double the original investment or one that would triple it, including the opportunity cost

2.9.2 What is really R&D?

R&D costs are also difficult to establish because of substantive functional overlaps or ambiguities in business operations. Clinical trials frequently perform a promotional role as well as a scientific one from the point of view of the sponsor. (Froud et al. 2006; Gagnon 2013; Gagnon and Lexchin 2008; Kessler et al. 1994) In other words, the process of running clinical trials (along with the attention that they may get from the media, particularly if they offer some form of innovation or breakthrough in treatment) can help to make the product's brand name more recognisable, or associate the product with certain experts.

Some trials, often called 'seeding trials', even seem to be designed *primarily* with product promotion in mind. Here, drug companies work with larger numbers of physicians, who are paid to sign up patients (generally a smaller number each). (Barbour et al. 2016) As a result of this study design, the drug company puts their product in front of large numbers of doctors, who may be more likely to prescribe the drug in future as a result.

Even aside from the fact that doctors have been paid to contribute patients to these studies, they will be more aware of the drug and more likely to think of it when the condition occurs in a future patient. (Hill et al. 2008) It has been argued that in some cases these trials have little or no real scientific value, and that the payments are sometimes disproportionate to the work done (i.e. they may effectively—but implicitly—operate as a kind of bribe). (Kessler et al. 1994)

It sometimes appears that firms are not even trying to hide the marketing function of trials. Phase IV (generally post-approval) clinical trials—those most closely associated with promotional purposes—are often run contracted out to CROs via the originator's marketing department (rather than R&D), or even to advertising agencies. (Mirowski and Van Horn 2005) These trials are now carried out for >75% of new drugs (Tufts Center 2008) and represent the fastest-growing area of drug research. (Priya et al. 2011; van Thiel and van Delden 2008) Research as promotion is not a new phenomenon that arose with financialisation, though it has changed in form and degree over time. (Mirowski and Van Horn 2005; Rasmussen 2004)

The category of R&D also encompasses varying types and degrees of technological innovation. Pharmaceutical R&D may involve the creation of new

as an actual cost in calculating their profit margin would suggest that the firm makes a 50% profit from the latter investment rather than a 200% profit.

drugs, but also new processes; it may constitute basic science or very advanced levels of product development and refinement (including those designed to extend a product line's lifecycle through evergreening). Concerns have been raised that R&D is increasingly dedicated to non-scientific purposes and short-term projects, even in high-tech sectors such as big pharma. (Serfati 2008) This could further feed a gap between perceptions of R&D and the reality.

2.9.3 Externalised R&D costs

On the other hand, R&D spending reported by firms may be misleadingly low, from one perspective—it does not account for the internalisation of 'external' R&D costs. Big pharma firms often acquire smaller firms to gain control over drugs or drug candidates. There is also a 'market in technology' separate from M&As, where firms can purchase the rights to individual drugs without a wholesale firm takeover. (See the section on outsourcing R&D)

Either of these practices can be seen as effectively internalising historical R&D costs in a capitalised form; that is, big pharma reimburses the incurred costs of other firms, paying an additional premium.[25] Thus, while the acquisition of new drugs via the capital or technology markets is not R&D expenditure as such—and would not appear under the R&D line item on their accounts—some part of it could be seen as ultimately paying for R&D costs.[26] Compared to internal R&D, this practice effectively reclassifies R&D costs from the perspective of the acquirer, with potential concomitant effects on firm-level variables such as R&D productivity (e.g. R&D spending per NME approved). This reclassification avoids double-counting (at the sectoral level), but downplays the resources deployed (at the firm level) to maintain a product catalogue/pipeline.

[25] One might estimate this premium to be no more than the expected future revenues of the acquired asset(s), minus the anticipated future costs to bring the product to market, all appropriately discounted for time and risk (though it may be less than this if the acquiring firm can 'get away' with it).

[26] This is the same logic by buyers in secondary securities markets are still considered investors or creditors—they have not actually given any money to the firm, but their purchase of securities reimburses the previous owner, creating a chain of repayment back to the issuer.

2.9.4 *Empirical findings*

Nevertheless, scholars have indeed explored the relationship between financialisation and R&D. It has been suggested that financialisation fails to facilitate innovation in pharma, with increasing vertical separation and external sourcing of big pharma R&D assets, but no corresponding pay-off in terms of funding to smaller firms or improvement in innovation output. (Gleadle and Haslam 2010; Gleadle et al. 2012; Gleadle, Parris, et al. 2014) This may be partly because financialisation appears to induce more short-term R&D strategies, as might be expected. (Lee et al. 2020)

Gleadle et al. (2014) find that R&D spending by big pharma declined as a share of revenues after the 2007–2008 global financial crisis, but it was unclear whether this was a new trend or merely the latest short-term downturn in an oscillation that is stable over the long-term. Moreover, research on Chinese firms cautions that the relationship between financialisation and R&D spending is not monotonic and has heterogenous impacts on different firm types, though frequently with negative effects. (Li et al. 2021; Li and Wang 2021; C. Xu et al. 2022; Xu 2021)

2.10 Drug pricing strategies

Drug pricing has been a major topic of both scholarly and public debate in recent years, triggering public activism, governmental investigations, legislative initiatives, and more. What effect, if any, does financialisation have on drug prices? Pricing structures and strategies are often quite different for pharmaceuticals compared to other products. While some drugs are priced more 'monotonically' (such that a 40mg pill will cost several times more than a 10mg pill), others have relatively 'flat' pricing (such that a 40mg pill may cost only a few percent more than a 10mg pill). (Jönsson 2001; Berndt 2002; Lexchin 2009; Morel, McGuire, and Mossialos 2011)

Competition between firms is distinctive in this industry, since patents afford lengthy periods of monopoly power, and counterintuitively more competition can sometimes increase prices. (Hollis 2005; Winegarden 2014) Effective competition can be low even after patents have expired, resulting in enduringly high prices. (Duggan et al. 2008; Duggan and Scott Morton 2010)[27]

[27] See also the discussion of Retrophin and Turing's closed distribution model in Chapter 5.

2.10.1 National price levels

Price levels are different in different national markets, sometimes extremely so (with American consumers charged dozens of times what consumers in the developing world are charged for the same drug).[28] (Berndt 2000; Kesselheim, Avorn, and Sarpatwari 2016; Gupta et al. 2018) One reason for these differences is that government policy can affect pricing strategies. (Duggan and Scott Morton 2006; Duggan et al. 2008; Duggan and Scott Morton 2010; Cabrales and Jiménez-Martín 2013)

Prices are also regulated to varying degrees in different jurisdictions, and this can be effective at reducing prices. (Ekelund and Persson 2003; Dalen, Strøm, and Haabeth 2006; Lexchin 2006; Conrad and Lutter 2019) At the same time, certain attempts at price regulation have been accused of reducing competition and potentially even increasing prices. (Patricia M. Danzon and Chao 2000; Anis, Guh, and Woolcott 2003; Ekelund and Persson 2003; Puig-Junoy 2010; Costa-Font, McGuire, and Varol 2014)

2.10.2 The effect of financialisation

There are a range of theoretically plausible ways in which drug prices could be affected by financialisation. Prices may be driven up by the need for profit margins to compete with higher returns on financial assets, or increasing M&A activity may lead to greater market concentration, with monopolisation resulting in reduced price competition and therefore rising prices. Prices may also rise to cover the costs of buying in R&D or acquiring competitors. Broader financialisation of society (especially households) could lead to greater insurance coverage—this could either drive prices up or down. On the one hand, insurance may remove the need for individual patients to be able to afford drugs, which could allow list prices to creep upwards; conversely, the monopsony power of insurers in such a situation provides them with a powerful weapon in negotiating lower prices. (Roberts, Chernew, and McWilliams 2017)

While the literature has linked financialisation to high drug prices, little effort has been made to establish this link firmly with empirical evidence. (Busfield 2020;

[28] Multiples like this are not as common as some suggest, however—differences in price levels are often overstated. (Patricia M. Danzon and Chao 2000; Morel, McGuire, and Mossialos 2011; Cabrales and Jiménez-Martín 2013)

Fernandez and Klinge 2020) The exception to this is that scholars have traced how the acquisition of sofosbuvir led to higher prices (than those originally projected). (Bourgeron and Geiger 2022b; Roy 2017; Roy and King 2016) This is an important gap in the literature, given the pervasive public interest in drug pricing and the policy debates it has triggered. Chapter 5 contributes to filling this gap in the literature, helping to explain how financialisation and assetisation can affect drug pricing strategies, the role this plays within business models, and the impact this can have on those paying healthcare costs.

2.11 Business models and strategies

Pharmaceutical firms are commonly perceived (even by some critics) as productivist and innovative. In other words, they are assumed to be large, vertically-integrated corporations involved in long-term investment to generate growth by driving forward the techno-scientific frontier. Such firms are generally assumed to produce high-quality goods to stringent standards—even if they perform these functions primarily in pursuit of profit rather than philanthropy.

However, the financialisation of the pharmaceutical sector has seen major changes. Scholars of financialisation frequently argue that firms are disciplined by capital markets to outsource many functions, instead prioritising the task of managing investors and their expectations. This contention has been supported by case studies drawing on corporate accounts as well as qualitative data. (Andersson, Gleadle, et al. 2010; Froud et al. 2006; Gleadle and Haslam 2010)

On the one hand, financialisation of pharmaceuticals has seen the alteration and specialisation in business models and strategies;[29] on the other, a reorganisation of the industry and relationships between firms within it. These changes are in fact inseparable and complementary—two sides of the same coin. They represent in large part the division and specialisation of labour between firms, which have developed new business models and strategies to navigate and harness financialised market conditions.

[29] Scholars sometimes use strict definitions business models and strategies, though without necessarily agreeing on them. (Shafer, Smith, and Linder 2005; Teece 2010) The terms are used more loosely herein—in keeping with much of the financialisation literature—to convey the broad notion of how a firm is structured and run and in pursuit of returns.

2.11.1 Ideal-types

Ideal-typical business models have therefore emerged in the literature, as can be seen in the tables below.

Table 2-B, Approaches to pharma and biotech:
(Reproduced from Gleadle et al. (2014))

Table removed for copyright reasons. Copyright holder is Elsevier Ltd.

Table 2-C, Old-economy and new-economy models:
(Reproduced from Lazonick (2010a))

Table removed for copyright reasons. Copyright holder is the President and Fellows of Harvard College.

2.11.2 The key role of IP assets

Assetisation has led to the emergence of more specialist business strategies and models which focus on the trading and holding of IP assets, along with IP-related services. (Burstein 2015; Golant Media Ventures, Towell, and Keunen 2014; Jarchow and Röhm 2019; McClure 2008; Papst 2013) The blockbuster drug model has been attributed to financial pressures on firms. (Bourgeron and Geiger 2022b; Montalban and Sakinç 2013) However, Montalban and Sakinç (2013) also suggest that the decline of the blockbuster strategy is linked to financialisation, as R&D productivity has declined and R&D externalisation has grown. Blockbuster drugs are therefore becoming more difficult to develop, while generics manufacturers are becoming better at challenging the monopolies of big pharma.

It has been suggested that firms actually under-exploit their IP assets (in the sense that they could make more money from them if they were used differently), which may be taken to undermine this notion. (Chesbrough and Chen 2013) However, this provides further evidence for the increasing normalisation of IP commodification, since Chesbrough and Chen promote licensing out as the main solution to this shortcoming. Other examples of more novel and specialist models within the pharmaceutical space could include businesses built entirely around patent trolling, but also firms that acquire drug rights and try to strategically maximise the income stream they are capable of generating (without any substantive in-house R&D). Notable firms that have inhabited this space include Retrophin and Turing, discussed further as a case study in Chapter 5.

2.11.3 The key role of financing

Financial pressures on firms are seen to be important under conditions of financialisation, and the nature of such pressures will be determined partly on the mixture of types of financing sought by the firm. Different forms of financing carry with them different advantages and disadvantages. For instance, interest on debt must be repaid whereas firms can choose to pay no dividends and CEOs appreciate this flexibility; (Chintrakarn et al. 2018) some firms did this in response to the COVID pandemic. (Eugster et al. 2020) In general, firms rely on a mixture of both equity and debt to finance their operations. However, firms have differential access to specific forms of finance—young and small firms in particular tend to lack access to certain types of financing. There is also some evidence that many firms 'specialise' in particular types of borrowing, such as term loans or corporate bonds. (Colla, Ippolito, and Li 2013) These facts imply that firms will be subjected to different kinds of financial pressures.

One form of financing that has received particular attention in recent years is venture capital.[30] This has particular significance for biotech and pharma firms early in their life-cycle, when it is frequently a major source of funding. (Kolympiris, Kalaitzandonakes, and Miller 2011; Lee and Dibner 2005; Powell et al. 2002; Rossi, Thrassou, and Vrontis 2011; Strömsten and Waluszewski 2012) The growth in availability of venture capital and the increasing importance of venture capitalists to

[30] Tykvová (2018) offers a review of the literature on venture capital and private equity—a closely-related but non-synonymous term.

funding innovative industries has frequently been associated with financialisation. (Busfield 2020; Christopherson, Martin, and Pollard 2013; Evans and Habbard 2008; Froud et al. 2001; Gleadle, Parris, et al. 2014) One specific implication of the availability and dynamics of venture capital is the productless initial public offering (PLIPO). This is the name given to a practice in which firms raise capital through an IPO despite not yet having brought any products to market. (Lazonick and Mazzucato 2013; Lazonick and Tulum 2011; Mariana Mazzucato 2013; Sakinç and Tulum 2012) The mere promise that R&D *might* bear fruit can be enough to sell shares to the public, as investors gamble on the prospects of potential products.

The result is a form of financial speculation on early-stage drug discovery, even among certain publicly-traded firms (which would normally be assumed to be more mature firms with more stable financials, etc). In the case of a PLIPO, returns are largely contingent not upon successful innovation but on successful management of expectations—at least for venture capitalists, who use the IPO as an opportunity to exit early. PLIPOs and venture capital more generally thus illustrate how positive narratives become important to the success of financialised firms, (Andersson, Gleadle, et al. 2010; Haslam, Tsitsianis, and Gleadle 2011) as they boost market expectations and thereby share prices. (Aalbers 2015a; Froud et al. 2003, 2004, 2006)

2.11.4 Priority Review Vouchers

While IP is one of the most crucial types of intangibles in drug companies, and goodwill is also a major factor insofar as it represents accumulated intangible M&A value, they are not all that helps to shape the sector. Other intangibles are also traded and employed to generate income in the pharmaceutical sector, in ways that influence industry structure, innovation strategies, and overall business models. For instance, the US incentivises certain less profitable types of research by awarding FDA Priority Review Vouchers (PRVs), which can be redeemed by holders (at a cost) to expedite the process of regulatory review for a particular drug. A firm which only developed these less profitable products would earn PRVs but have little use for them; however, vouchers can be transferred, so firms that have earned them can sell them to others that have not.

Since the lifespan of a patent is finite and generally begins while a product is still in development, accelerating the review process is likely to increase the amount of time a product spends on the market with patent protection. Potential blockbuster drugs stand to gain a great deal by getting their drug to market faster; like any other

intangible asset, a PRV will be valued based on the capitalised expected future income yielded by its possession and use. As a result, a PRV can be worth very significant sums: AbbVie bought a voucher for $350m in 2015, though in recent years the going price has fallen closer to $100m, perhaps because the market has thickened. (Mezher, Brennan, and Gaffney 2020)

Moreover, PRVs may bias the FDA towards approval for drugs against which they are redeemed; after all, they would not be an effective incentive if they were perceived to lead to accelerated rejection rather than accelerated approval, and it seems likely that firms would not pay such a high price for them if they carried a large amount of risk. (Kesselheim 2008, 2009) While it appears that only one drug has ever failed regulatory review when a PRV has been redeemed, few vouchers have been redeemed (less than 40 had even been awarded as of February 2020); moreover, some regulatory professionals have rejected concerns that priority review biases the process. (Mezher et al. 2020) It is thus difficult to judge—on balance, from the available data—whether PRVs do offer an increased chance of regulatory approval or not.

It seems clear that the PRV system encourages the assetisation, valuation via capitalisation, and effective monetisation of vouchers, although some have been redeemed by the firms to which they were awarded. (Mezher et al. 2020) Conveniently, the types of research for which PRVs are awarded are often among the cheaper forms of pharmaceutical R&D to carry out (e.g. due to small trial sizes). These facts indicate the potential for a business model built around effectively 'mining' for PRVs.[31] Some firms—e.g. Alexion, Novartis—have already earned several PRVs, although it may be difficult to prove whether they are intentionally pursuing this strategy in quite the manner suggested here.

2.11.5 Institutional and policy contexts

While financialisation has widespread effects on pharma firms, including in less-financialised economies like Germany, this effect is heavily mediated by institutional factors. (Vitols 2002) Aside from cross-sectoral variations in national institutions such as co-determination in Germany, both the developing, marketing, production and

[31] I use the term 'mining' not only because it is a clear metaphor but also because it has been popularised in recent years through its usage in relation to cryptocurrencies. If accuracy is desired, a better mining-related analogy might be the famous notion that during a gold rush it is wiser to set up shop selling shovels than to dig for gold.

sale of drugs are all subject to particularly heavy regulation (which varies nationally) compared to the products of most sectors. (Bourgeron and Geiger 2022a)

Moreover, firm innovation strategies are heavily influenced by state policy in areas such as government funding of basic research, R&D tax credits, bounties and other rewards for successful breakthroughs. (Hogarth 2022) To give one example, the strategy of PRV-mining is dependent upon the regulatory infrastructure within which PRVs exist and are endowed with value. Finally, the economic structure of national healthcare systems and health policy decisions such as health priorities can affect the price levels that markets will bear for particular indications and thus the potential market for different R&D projects.

These factors suggest that observed impacts of financialisation are likely to vary by country/region and may change over time as government policy shifts within a particular jurisdiction. Together with national differences in the availability of capital, they may ultimately form the basis of an explanation for various different business models and strategies within pharmaceuticals and related sectors, such as the dominance of amalgamated chemical–pharmaceutical firms (which do not engage in activities like share buybacks) in Germany, or diverging strategies in the diagnostics sector in the US vs EU. (Hogarth 2022; Sakinç and Gleadle 2021)

2.12 Outsourcing R&D

IP assets, such as patents and trademarked drug names, are the basis of the division between R&D-intensive brand-name monopolists and the producers of fungible generic drugs. Without these, big pharma would be brought low by a competitive market driving down prices, with blockbuster drugs becoming a thing of the past. The uneven distribution and alienability of IP also helps to maintain the sector's organisation into a stratum of dominant firms and the smaller firms from which they partially source new products. (Baranes 2016)

Whatever label is used—assetisation, intellectual monopolies, markets for technology—there is a broad consensus within the literature that outsourced innovation strategies have become normalised over time. (Andersson, Gleadle, et al. 2010; Froud et al. 2006; Gleadle et al. 2012; Haslam et al. 2013; Higgins and Rodriguez 2006; Pollard et al. 2018; Schuhmacher, Gassmann, and Hinder 2016) Gleadle et al. (2014) suggest this was driven partly by the weakening of the blockbuster model, though other rationales and pressures could be given—an obvious one would be declining R&D efficiency. (Schuhmacher et al. 2016) Once again, there is also the

possibility that broader social transformations have contributed to this outcome: e.g. firms may have greater access to previously untapped resources in the form of public-sector expertise and IP, resulting from neoliberal policies that have driven universities towards market-discipline, entrepreneurialism, and public–private partnerships.

Whatever the reason, over 20% of firms that own ≥1 NMEs never received an NME approval (having acquired their NMEs post-approval from other firms) (Kinch, Haynesworth, et al. 2014) Among firms surveyed by DiMasi et al. (2003), only 62.4% of their approved NMEs were claimed as entirely self-originated (that is, all stages of R&D carried out in-house), a number which may be inflated by the desire of big pharma to play down the degree of outsourcing. (Light and Warburton 2005) This trend is not restricted to those national economies seen as the most financialised. (Hirsch-Kreinsen and Hahn 2014)

2.12.1 Methods of outsourcing R&D

One popular method of R&D outsourcing is acquiring IP through purchase or sharing it through agreements such as licencing. (Buccafasco and Sprigman 2011; Burstein 2015; Chesbrough and Chen 2013; Golant Media Ventures et al. 2014; May 1998a, 1998b; McClure 2008; Papst 2013) This may involve cooperation or transactions with other firms or with entities such as universities. (Gerbin and Drnovsek 2012; Stuart et al. 2007) This is patent monetisation from the perspective of the other entity—arguably the most 'obvious' way of commodifying and marketizing research, arising ostensibly 'naturally' from recognition of IP as a form of private property. (May 1998b)

Outsourcing also occurs through the employment of Contract Research Organisations (CROs). (Masri et al. 2012; Mirowski and Van Horn 2005; Rajan 2012) Over time, CROs have offered an increasingly wide range of services, taking on a greater variety of functions previously either performed in-house or else not required at all, with many CRO countries 'offshore' from the point of view of US firms (that is, located in Europe, India or China). (Masri et al. 2012) Their main function, however, is to perform clinical trials on behalf of sponsor firms, who generally believe that CROs offer more flexibility and decreased time to market, while the biggest drawbacks are that firms can become dependent on CROs, who do not necessarily share the same vision and objectives, and can be difficult to monitor. (Piachaud 2002)

M&As also play an important role in effectively outsourcing R&D by allowing firms to acquire externally-generated IP. Of all firms have received at least one NME approval since 1950, 90% are now defunct, either through collapse or being acquired or merged into another firm. (Munos 2009) Relatedly, 'experienced' biotech firms (those that have contributed to an FDA approval) are being acquired by larger firms faster than they are being replaced by new entrants to the industry—the average acquisition occurs before the acquired firm has ever had a product approved. (Kinch 2014) Moreover, these small companies have won a steadily increasing share of FDA approvals since the 1970s. (Munos 2009)

M&As produce an intangible asset known as goodwill, a vexed concept that can be roughly defined as the value of residual unidentified intangibles gained when acquiring another firm. (Baranes 2016, 2020b) The increasing significance of M&As in the sector should be reflected in rising levels of goodwill. Birch—a leading voice in the assetisation literature—occasionally affords goodwill some importance, but does not discuss it in detail. (Birch 2015, 2016)

Short of, or prior to, acquiring them, big pharma also forms alliances with "innovation specialists" (Gleadle, Parris, et al. 2014:76) and helps channel funding to them: a tacit bargain between big pharma (offering financial resources to firms with more constrained funding), and smaller firms (offering reduced risk in developing marketable innovations). (Gleadle, Parris, et al. 2014; Montalban and Sakinç 2013) However, while funding is made more available, it is not necessarily made cheaper. (Gleadle et al. 2012)

2.12.2 Making sense of outsourcing

Such a situation obviously accords with financial channels of accumulation and shareholder primacy becoming more important. However, it also fits the intellectual monopoly capitalism analysis, which claims that the largest firms construct organised innovation systems extending beyond the boundaries of the firm, subordinating a network of other entities such as universities and smaller firms; these allow big pharma to direct innovation efforts elsewhere in the network and appropriate much of the rents derived from them. (Chandler 2005; Rikap 2019, 2021; Testoni et al. 2021)

This approach of buying in R&D and forming innovative alliances exposes firms to less R&D risk, increasing their ability to plug holes in product pipelines/portfolios and externalising the cost of many early-stage failures, facilitating their continued

supremacy. Research has found it to be effective both financially and in terms of maintaining IPR portfolios. (Higgins and Rodriguez 2006) One estimate suggests that by buying or licensing the rights to an NME rather than originating it in-house, major drug companies may save more than two-thirds of the funds they would have spent on R&D. (DiMasi et al. 1991; Light and Warburton 2005) R&D outsourcing in this manner has thus contributed enormously to the sustained dominance of big pharma: e.g. ~75% of Pfizer's products were originated by other firms. (Kinch, Haynesworth, et al. 2014)

From one perspective, this kind of outsourcing is a good microcosm of financialisation more broadly: a shift from internal allocation of resources by managers to external allocation of resources by (financial/asset) markets. In fact, in the 2000s GSK attempted to develop 'internal markets' and autonomous research centres (pseudo-firms within the corporate structure) to more efficiently allocate capital to research; when this strategy was deemed insufficient, GSK transitioned to more literal outsourcing via biotech firms. (Gleadle, Parris, et al. 2014)

Outsourcing in this way also facilitates the appropriation of successful publicly-funded research by large corporations in the private sector: e.g. big pharma acquires small firms 'spun off' from university research centres, or funded partly through public grants. (Andersson, Gleadle, et al. 2010; Gleadle and Haslam 2010; Haslam 2010; Lazonick and Tulum 2011; Mariana Mazzucato 2013)

2.12.3 Financialisation of management

To some extent, financialised management may be linked (at least in the pharmaceutical sector) to the normalisation of CEOs with backgrounds in non-scientific disciplines and divisions (especially finance, law, marketing and sales). There are some indications in the literature that the 1990s represent a watershed moment in this regard. (Vitols 2002) The pharmaceutical sector now has a particularly high number of such CEOs compared to other highly innovative sectors (as well as the overlapping category of 'CEOs without experience of new product development'), despite the fact that they negatively correlate with success within the sector. (Barber 2015; Barber and Bistrova 2015; Barber, Whitehead, and Bistrova 2019)

This bundle of assets that constitute the firm is often itself understood as an asset from this financial perspective, securitised in the form of shares, and commodified by equity markets; in particular, biotech start-up founders often conceive of their creations as assets created to be sold to larger firms. (Danzon, Epstein, and Nicholson

2007; Gleadle, Parris, et al. 2014; Lazonick and Tulum 2011; Pollard et al. 2018) This helps to explain the rise within the pharmaceuticals sector of major M&As as well as R&D outsourcing (especially in the form of large firms acquiring small start-ups for their IP).

It might appear contradictory to assert that financialisation leads to both mega-mergers and downsizing/outsourcing among pharma firms, but both strategies have been framed as a means of returning value to shareholders. Downsizing and outsourcing allow firms to manage various costs and risks (especially in R&D), as well as focusing on their core competencies and lines of business that generate the highest returns, maximising efficiency and therefore the proportion of cash flow that is free to distribute to investors. In the less obvious case of mergers and buyouts, shareholder gains might be anticipated due to reduced competition, economies of scale, or the acquisition of promising pipeline products. In both cases, the goal is a reconfiguration of the 'bundle of assets' for the benefit of shareholders, assumed to be the ultimate owners of these assets.

2.13 Narrative and numbers

It has often been asserted (Froud et al. 2006; Gleadle and Haslam 2010; Haslam et al. 2013, 2011; Montalban and Sakinç 2013; Roy 2017) that financialisation—particularly the financialisation of pharmaceutical firms—can best be understood by studying both 'narrative and numbers,' a phrase popularised by Froud et al. (2006) This is normally assumed to mean both that that the 'stories' corporations spin about themselves can be as important as the accounts they draw up, and that (therefore) research into financialisation benefits from the use of mixed methods to capture both the narrative and numerical aspects.

2.13.1 Financial pressures

Positive narratives have become important to the success of firms in the pharmaceutical sector primarily due to financing considerations. Drug companies need to appease investors in order to retain a good valuation in capital markets, and their ability to do so can substitute for actual scientific and/or financial success for some time. (Gleadle et al. 2012; Gleadle and Haslam 2010; Pollard et al. 2018) Market faith in firms tends to reduce capital costs, so the capital-hungry character of pharmaceutical innovation and the long time-frames for over which R&D occurs and

profits are recouped means that this imperative may be felt more heavily here than it would be in many other industries. Additionally, as a high-tech sector, narratives can be easily 'fudged,' as the benefits of R&D processes can be hard to identify, measure or communicate objectively. (Birch 2022)

Investors must be constantly appraised of R&D developments, with funding structured so that taking any project to completion generally requires the support of multiple tranches of investors at different stages, each with their own exit points. For instance, a paper that examines three SME bio-pharma case studies found that they exhibited a tendency to absorb large amounts of (equity) capital, burn through large amounts of cash, and offer frequent opportunities for investors to drop in or out. (Andersson, Gleadle, et al. 2010) Andersson et al. (2014:78) see this capital-market-friendly ongoing recapitalisation alongside high shareholder pay-outs as part of a broader trend across industries, linked with the increasing significance and value of financial assets as well as greater potential for "financial disturbance."

In the context of shareholder primacy norms and modern capital-market conditions—particularly the liquidity of capital markets and the rise of actively-managing institutional investors—this may create pressure on managers to pursue financialised patterns of behaviour that run contrary to a productionist orientation, even in small firms not directly exposed to public capital markets. (Pollard et al. 2018)

2.13.2 Tactical use of narratives

Whether managers accede to these pressures or not, they craft narratives to legitimise their decisions and present information sensitively to the goals of investors—meanwhile, analysts and other actors are also busy propagating narratives, which also influence market behaviour. (Birch 2022; He and Tian 2013)

Similarly, Birch (2022) emphasises the reflexivity of these narratives and their construction, with stories shaped by assumptions about what is important or appealing to other actors. Birch also notes how even narratives recognised as 'unreal' may influence behaviour, repurposing Palo's notion of translocutionary speech acts (by which myths are transformed into social realities by social actors 'playing along').

2.14 Summary

Taken together, the data in Chapter 1 and the literature discussed in the present chapter clearly demonstrate a broad and deep effect of financialisation on the global economy. Whether or not the circumstances generally termed 'financialisation' herald a fundamentally new phase of capitalism, they certainly indicate significant—though variegated—transformations in the functioning of contemporary capitalism. At the same time, these are not transformations of a fundamentally unprecedented type, nor have they occurred solely since the dawn of what is normally considered the neoliberal period in the 1980s; various aspects of financialisation were pioneered going back to the 1960s or even the late 1800s.

Of particular interest to this research project, the pharmaceutical sector has been changed in major ways. What were once large, integrated, productivist firms appear to have retained and intensified their overall size and monopoly power while outsourcing innovation and other important functions. Smaller start-ups and niche firms have specialised in providing the functions that the big pharma giants have shed, such as early-stage research or clinical trials. The literature seems to indicate that financialisation has overhauled management thinking within the pharmaceutical sector; this has partly occurred through the recruitment of new kinds of managers with different backgrounds, and has resulted in the emergence and normalisation of new business models and strategies. Intangible assets have become more important than ever—especially IP—and are increasingly being traded and exploited in relatively novel ways.

2.14.1 Measuring financialisation

Financialisation can be understood and measured in different ways, with different emphases, depending on the sector studied, level of analysis, and so on. As such, various means and pathways have been identified through which financialisation may have an impact upon a sector or firm. In fact, it seems reasonable to believe that no single indicator would provide a clear view of the political-economic transformations termed 'financialisation,' especially given their geographic and sectoral variegation. Rather, a holistic approach integrating various perspectives seems more fruitful and accords with the 'narrative and numbers'

approach commonly adopted within the literature. Various measures or proxies of financialisation at the firm-level are non-exhaustively listed in the table below.[32]

Table 2-D, Means of identifying firm-level financialisation:

Measure or indicator of financialisation	**Used or suggested by**
Extent to which executives' incentives (e.g. stock-based compensation, bonuses) are based on financial performance	(Gleadle and Haslam 2010)
Extent of employees' preoccupation with financial concerns and influence of financial demands on business decisions	(Gleadle and Haslam 2010)
Correspondence of firm to a 'financialised' ideal type or descriptive model developed by scholars[33]	(Andersson, Gleadle, et al. 2010; Gleadle, Parris, et al. 2014)
Ratio of portfolio income (financial receipts, including interest, dividends and capital gains) to corporate cash flow (business receipts, including revenue from selling goods and services)[34]	(Krippner 2005; Tomaskovic-Devey and Lin 2013)
Percentage ownership by institutional investors	(Montalban and Sakinç 2013)
Percentage of total compensation composed of or derived from stock options	(Lazonick 2013)
Stock repurchases (plush cash dividends) as a share of net income	(Lazonick 2013, 2015)
Number/value of M&A events	(Shimura, Masuda, and Kimura 2014)
Background of executives (financial vs non-financial)	(Vitols 2002)
Interlocks with financial firms	(Lapavitsas 2011)

[32] For a more detailed review of the literature covering different aspects of financialisation and types of analysis—such as national-level or firm-level—see Klinge (2021).

[33] This measure is intentionally vague since it involves a subjective assessment against ideal types or models that different scholars will construct differently

[34] This is not the same as financial profits as a share of overall profits because it compares gross income (i.e. total revenue) rather than net income (i.e. profit).

2.14.2 Concluding remarks on the literature

The above review of the literature also clearly demonstrates that researchers conceptualise and approach financialisation in different way, and that some questions remain ultimately unclear. To give one important example, the literature offers no clear consensus on the direction of any net effect on total innovation. Are firms spending less due to short-termism, out-sourcing and the prioritisation of financial line items? Conversely, are they actually spending more due to reduced risk and the increasing importance/value of intangible assets? Should only internal R&D spending be considered financial commitment to innovation, or are capital-market and IP-market operations often actually centred around IP acquisition? If so, should this therefore be considered alongside R&D in terms of what proportion of big pharma's funds are ultimately paying for the cost of discovering new products and guiding them through regulatory approval processes?

There remain gaps in the literature, which could be fruitfully explored by future research. These include the effects of financialisation on drug prices, and the implications this—along with other ways financialisation has reshaped the pharmaceutical sector—has had for public health. However, the existing literature gives sufficient grounds for conjecture and the formation of hypotheses. For instance, financialisation is likely to have an effect on big pharma's (in-house) R&D spending, as well as M&As and operations in the IP market. Some impact on big pharma's financial stocks and flows is also probable. Hypotheses tested in this research project will be discussed in more detail in the next chapter.

3. RESEARCH DESIGN & METHODS

3.1 Overview

This chapter lays out the empirical methods employed, data sources used, and analysis employed in an attempt to answer specific research questions and test particular hypotheses. These elements for the research project are assessed, evaluated and justified. In particular, the case is made for the use of mixed quantitative and qualitative methods in furtherance of the 'narrative and numbers' approach commonly adopted in the financialisation literature. The choice of a sample based on the Fortune Global 500 and the case of Martin Shkreli are also explained and defended, as is the geographic focus of the sample and the ensuing decision not to make use of an intuitively appealing comparative method—matching otherwise-similar firms by geographic location.

3.2 Mixed methods: narrative and numbers

In keeping with the financialisation literature's frequent recommendations, this research project adopts a 'narrative and numbers' approach inspired by Froud et al. (2006), although the specific implementation used herein is somewhat distinctive. Both this research project and that of Froud et al. focus on the relationship between performative narratives and financial numbers that are, in the words of Froud et al., "socio-technically constructed." (Froud et al. 2006:133) However, in each case Froud et al. emphasise the relationship between corporate accounts and the surrounding narratives for a given firm (with firm-specific narratives being the most crucial, but not to the exclusion of industry narratives and grand economic narratives). By contrast, this research project broadens the approach, also examining financial numbers averaged across big pharma as a sector both globally and within national economies, and relating these to industry narratives and grand economic narratives.

The overall design of this research project involves the use of mixed methods,[35] combining both quantitative and qualitative components within a single research agenda and design. To be more precise, quantitative analysis of the corporate accounts published by the world's largest well-established pharmaceutical firms is presented first; this is followed by qualitative analysis of the way in which Martin Shkreli's career illustrates the influence of financial actors and logics on smaller pharmaceutical firms, particularly in the US. The former gives an overview of what has (and has not) occurred on average across the dominant fraction of capital in the pharmaceutical sector under conditions of financialisation; the latter presents a detailed account of concrete events representing the extreme end of these occurrences (in the context of smaller firms, confirming that financialisation has affected them in similar and/or corresponding fashion). This combination allows analysis of practices in the sector as viewed from both 'top-down' and 'bottom-up' perspectives.

The quantitative and qualitative data are independent in terms of the data collection and analysis, but the research questions are not necessarily independent—the very nature of the financialisation posited by the literature review suggests that the lower and upper levels of the pharmaceutical market will interact in ways that make such a separation difficult if not impossible. As such there is a degree of interaction between the quantitative and qualitative aspects in terms of the questions that the research attempts to answer and the conclusions drawn in relation to these questions and wider theorisation of financialisation. The mixing of the quantitative and qualitative elements occurs at the level of overall research design within the substantive theory of financialisation, as well as during interpretation, with the synthesis of findings from both quantitative and qualitative sets of data to inform overall conclusions. The two methods are afforded equal priority or 'weight' in terms of their importance within the research project and their potential fruitfulness for theorising financialisation.

The collection of both types of data overlapped in time, although qualitative data collection occurred over a much longer period than quantitative data collection. The analysis of quantitative data primarily preceded the analysis of qualitative data, but neither was dependent on the other. As such, the research project has much in

[35] This will be justified in more detail below, but also follows quite intuitively from the choice to examine narrative and numbers, and how these relate to each other. For more on mixed methods, see Dawadi et al. (2021), Ivankova (2006), Creswell & Plano Clark (2011), and Greene et al. (1989)

common with the convergent design approach to mixed methods research. However, the two strands of the research project are presented here in a manner closer to an explanatory sequential model—also known as a qualitative follow-up approach. In other words, quantitative data is presented and discussed, then qualitative data is presented and discussed, after which both are interpreted so as to draw conclusions. It should be noted that unlike a standard sequential explanatory study, neither of the two strands was dependent on the other or originally conceived following completion of the other. This is different from an explanatory design in which the researcher first produces quantitative findings and then designs a qualitative phase of the research project informed by these, collecting data with the explanation of specific results in mind—e.g. by accounting for outliers.

There are several reasons for pursuing mixed methods apply here. The research design allows for triangulation—where one strand of the research project helps to confirm the results of the other, and vice versa. The two methods are mutually complementary in that they each "enhance, elaborate or illustrate" the findings of the other. (Greene, Caracelli, and Graham 1989:266) Finally, the quantitative and qualitative facets of the research project focus on different parts of the pharmaceutical sector, and thus the overall breadth and generalisability of the research is increased. While in principle this expansion could be done with a single method, in practice this would be difficult since the analysis of corporate accounts does not apply so easily to smaller, less established firms—especially private ones—whereas the sheer extent of business activity conducted by big pharma firms would tend to make a detailed case study unmanageably large.

The intention justifying the use of mixed methods in this way is that the qualitative strand of the research should help illustrate and explain aspects of the quantitative strand, showing in concrete narrative terms some of the ways in which the pharmaceutical sector is influenced by financialisation and assetisation. Meanwhile, the quantitative data gives context to the qualitative data and can provide a backdrop against which the specific findings of the qualitative aspect make sense. Together, these allow for a more holistic understanding of the phenomena under consideration and the context within which they are instantiated. Both the quantitative and qualitative components of this research project are primarily descriptive. However, the quantitative section is also designed to allow for comparative analysis, insofar as the trends in different geographic regions are compared and contrasted.

3.2.1 Research questions

The main overarching research question for this project could be phrased as 'How has the process of financialisation affected the pharmaceutical sector, from both quantitative and qualitative perspectives?' In service to this principal question, I will attempt to answer various related (but more focused) research questions which contribute toward answering the overarching question.

- How has the significance and role of financial assets, income streams and expenditures within big pharma been redefined?
- How has the significance and role of intellectual property and other intangible assets within big pharma been redefined?
- How has the changing influence and role of finance within the economy exerted pressures on the pharmaceutical sector?
- How has the importation of financial actors and logics affected business models and strategies within the pharmaceutical sector?

I will also seek to answer supplemental research questions which help to situate my research within—and contribute more generally to—wider bodies of literature on financialisation and pharmaceuticals.

- How have the trends observed in financials and intangibles of non-financial corporations varied by region?
- To what extent (and how) are financialisation and assetisation linked in the pharmaceutical sector?
- To what extent (and how) has financialisation taken different forms in different economic sectors?

3.2.2 Definitions

As previously demonstrated, financialisation has been diversely defined and theorised. In answering these questions, some thought must be put into the particular definition or conceptualisation being used of both financialisation and assetisation as key touchstones for discussion. This research project does not reduce financialisation to a single metric or operationalise it through a single quantifiable proxy, but rather as a more plastic process that encompasses assorted concrete phenomena and proceeds through various channels.

Epstein (2005:3) offers a widely-used definition of financialisation in this vein, as "the increasing role of financial motives, financial markets, financial actors and financial institutions in the operation of the domestic and international economies." However, this definition arguably neglects dimensions that are important in understanding financialisation: it is not clear, for instance, that it adequately conveys the increasing importance of financial assets and income for (at least some) non-financial firms; nor does it seem able to properly accommodate the role of financial rationalities and imaginaries (generalised in Chapter 2 as cognitive financialisation) when these thought processes are separated from the actors and institutions who more traditionally enact them.[36]

A preferable (albeit vague) working definition might therefore be the growing significance of 'the financial' in society, where this is understood to include the elements that contribute to Epstein's definition but also additional elements such as financial logics. The most important consideration in delineating financialisation, however, is the way this sits alongside the concept of assetisation. After all, "Although an asset's income streams can be financially sliced up, aggregated, and speculated upon across highly diverse geographies, there still has to be something underpinning these financial operations." (Birch and Ward 2022:1)

At their most distinct, the notions of financialisation and assetisation are two competing theories of the present. At their most intimately connected, they may be understood as two moments in the same circuit, or the same package of social transformations viewed from two different directions. Accordingly, financialisation and assetisation are herein understood to be conceptually separable but practically and theoretically related phenomena. They are also each understood as somewhat intentionally vague and flexible constructs, mooted by diverse literatures.

The quantitative element of this research project tests particular hypotheses about how the financialisation of non-financials affects their balance sheets and income statements. Namely, it attempts to construct a conceptual model composed of various trends posited in the financialisation literature that seem to be compatible and share common perspectives based around financial rentierisation and a highly extractive, short-termist shareholder primacy; it similarly presents an alternative

[36] Additionally, the focus on "domestic and international economies" does no justice to the justifiable interest that other academic disciplines may take in the way that finance may invade other spheres of life, such as mass culture and the high arts. However, this is of little significance for the present research project.

characterisation of how big pharma might be expected to behave if intangible assets are more important and financial accumulation is of limited significance within the sector. (The details of these models are explored further below)

On the other hand, the qualitative element attempts to exploit the advantages of qualitative research and take account of the fullness of financialisation as a concept. At the same time, some focus is necessary, and much of the analysis reveals two main themes: firstly, the interventions within the pharma sector by financial actors and institutions, and the pressures that they create on firms; secondly, the cognitive financialisation of pharma firm management. In so doing, the account also emphasises the way that financial and intangible assets become targets on which financial minds set their sights, which in turn enable the satisfaction of financial demands, particularly when combined with shrewd weaponisation of regulation.

3.2.3 Quantitative hypotheses

A range of hypotheses for the quantitative analysis of corporate accounts can be derived from the literature, reflecting two main (partially compatible) paradigms: financialisation and assetisation. These conceptualisations of contemporary capitalism suggest different sets of hypotheses. In reality, the two conceptions are rarely juxtaposed so sharply, and most scholars recognise at least elements of each. However, for the purposes of analytical comparison and assessment, these will be treated as separate theses, effectively constructed as relatively pure ideal-types.

The first set of hypotheses correspond to what might be called the 'financial rentiership hypothesis'. This might be considered the 'conventional' version of financialisation—based in large part on early literature investigating automobile manufacturing and similar industries. In the context of non-financial corporations, financial rentiership represents their partial 'bankification' as they come to revolve more around holding and trading financial assets, while lending more than they borrow and manage financial risks. The following table outlines what might be expected—and why—if this thesis were correct in the context of big pharma.

Table 3-A, Financial rentiership paradigm:

Anticipated findings	Rationale and basis in literature
High and/or rising financial assets	Financial assets assume greater significance among the total assets held by firms, largely due to better returns but also for other reasons such as liquidity preference in the face of volatile financial markets. (Davis 2016, 2018b; Fine 2013; Froud et al. 2006; Klinge et al. 2020; Krippner 2011; Lapavitsas and Powell 2013; Mazzucato and Wray 2015)
High and/or rising income from interest and investments	Interest and investments contribute more to the total income raised by firms. (Baud and Durand 2012; Chester and Newman 2014; Davis 2018a; Fine 2013; Froud, Haslam, et al. 1998, 2002; Krippner 2005; Stockhammer 2004)
High and/or rising active trading of securities	Financial trading offers appealing returns, growing financial expertise increases viability of trading, and more volatile and speculative financial markets encourage hedging. (Krippner 2005; Newman 2009; Phillips 1994)
Low and/or declining physical asset accumulation	Physical assets are crowded out by financial assets that offer better returns. (Crotty 2003; Grogan 2011; Haskel and Westlake 2018; Klinge et al. 2020; Krippner 2005; Lazonick 2008a; Stockhammer 2004)
Low and/or declining R&D	Firms seek to reduce their exposure to risk and uncertainty, and financial assets crowd out R&D due to better returns. (Andersson, Gleadle, et al. 2010; Gleadle and Haslam 2010; Lazonick 2008b) Serfati (2008) suggests that financial pressures have specifically led to more scientific R&D being displaced by other intangibles, including R&D on things like custom machines.
Low and/or declining (and/or negative) net debt	Firms increasing financial assets, services and competence within a context of increasing financial efficiency leads firms to become net lenders. (deSouza and Epstein 2014; Passarella 2014; Seccareccia 2012; Villani 2019, 2020)
High and/or rising value disbursement to shareholders through dividends and/or buybacks	Shareholder primacy pressures firms to downsize and distribute rather than retaining and reinvesting, while corporate managers' interests are aligned with those of shareholders through stock-based compensation packages. (Aglietta 2000; Froud et al. 2012; Klinge et al. 2020; Lazonick 2009b, 2014, 2015; Lazonick et al. 2017, 2013; Lazonick and O'Sullivan 2000; Lazonick and Tulum 2011)

The second set of hypotheses correspond to what might be called the 'intellectual rentiership' hypothesis. This might be considered a generic version of assetisation as applied particularly to IP and related intangibles—based not only the literature using the term but also the related literatures on intellectual monopoly capitalism, markets for technology and patent markets, and other similar conceptualisations. In the context of non-financial corporations, intellectual

rentiership involves the holding and trading of intangible assets becoming increasingly central to the business, while seeking to originate technological breakthroughs and manage innovation risks. The following table outlines what might be expected—and why—if this thesis were correct in the context of big pharma.

Table 3-B, Intellectual rentiership paradigm:

Anticipated findings	**Rationale and basis in literature**
High and/or rising goodwill	The market becomes more concentrated through M&As intended to secure control of valuable intangibles and reduce competition. (Arora and Gambardella 2010a; Baranes 2020b; Birch and Cochrane 2022; Birch and Muniesa 2020; Chester and Newman 2014; Klinge et al. 2020; Montalban and Sakinç 2013; Rikap 2018, 2019, 2022b; Roy 2017:201; Roy and King 2016; Schwartz 2017; Serfati 2008)
High and/or rising levels of other intangibles	Intangibles become more valuable and holding them becomes more central to business models and strategies. (Arora and Gambardella 2010a, 2010b; Baranes 2020b; Birch and Cochrane 2022; Birch and Muniesa 2020; Birch and Ward 2022; Chester and Newman 2014; Durand and Milberg 2020; Klinge et al. 2020; Montalban and Sakinç 2013; Schwartz 2017; Serfati 2008)
High and/or rising spending on R&D	Development of new IP and other intangibles promises increasingly greater returns; maintenance of internal R&D capacity reduces dependence on other firms and increases bargaining power. (Andersson, Gleadle, et al. 2010; Arora and Gambardella 2010a, 2010b; Durand and Milberg 2020; Gleadle, Parris, et al. 2014; Gleadle and Haslam 2010; Haslam et al. 2013; Klinge et al. 2020; Montalban and Sakinç 2013; Rikap 2018, 2019, 2022b; Schwartz 2017)
High and/or rising net purchase of intangibles	Firms with access to sufficient capital increasingly benefit from outsourced R&D as a means of managing innovation risks, and smaller firms increasingly marketise their intangibles as a means of maximising the economic benefits they offer. (Arora et al. 2001a, 2001b; Gleadle, Parris, et al. 2014; Montalban and Sakinç 2013; Pollard et al. 2018; Rikap 2019, 2021)
High and/or rising net debt and/or debt servicing costs	Firms compete to build up their portfolio of intangible assets, taking on more debt to fund purchasing and licensing, M&A events, and increased in-house R&D spending. (Grogan 2011; Klinge et al. 2020; Mazzucato and Wray 2015; Roy and King 2016; Sakinç and Gleadle 2021)

Another hypothesis is posited based on literature suggesting that financialisation is geographically variegated, with US and UK firms exhibiting the most financialisation, while continental European firms exhibit the least. Financialisation has generally been observed to be more advanced in the UK and US

than in much of Europe, though with exceptions and sometimes only in certain respects such as financial asset holdings or financialisation of non-financial firms. (Aalbers 2015a; Blakeley 2019; deSouza and Epstein 2014; Klinge et al. 2020; Philippon and Reshef 2013; Sakinç and Gleadle 2021; van der Zwan 2014) If assetisation is as strongly linked with financialisation as the literature suggests, the same may also be true of assetisation.

3.3 Assessing the research project

3.3.1 FINER criteria

One popular framework for formulating and assessing research questions—and potentially research design more generally—is the 'FINER' criteria, (Fandino 2019; Farrugia et al. 2010; Hulley et al. 2007) which dictates that research should be directed towards answering questions that are Feasible, Interesting, Novel, Ethical, and Relevant. Each of these criteria incorporates several concerns, all of which are satisfied by the research questions above. For instance, the research methods are both affordable and ethical; the research project also has the potential to meaningfully support, refute or extend findings from the literature. Additionally, the topic of study is certainly of broad interest given public and scholarly interest in big pharma, and has significant relevance to both further research and social-scientific knowledge in a way that could inform future policy.

3.3.2 Accuracy

An accurate measurement is one which represents the real facts faithfully (and is sometimes called 'trueness'). Measurements will tend to be accurate when they are taken using correct information and correctly-calibrated equipment. In the case of this research project, accuracy should be achieved so long as the data gathered are faithful to the realities that they purport to represent. While the accuracy of data from my various sources is beyond my control, checking facts against alternative independent sources provides a means of verifying this accuracy for my case study, since it is highly unlikely that two distinct sources would both misreport the data in the same way.

It should be noted that accuracy is distinct from validity. Data may be accurate but not valid, in the sense that the corporate accounts may be free from fraud or

errors but may nevertheless fail to properly capture the underlying business practices as the researchers intend. This is particularly true if the accounts are used to draw inappropriate conclusions that do not reflect the accounting standards and practices used to draw them up. This is discussed further below.

The major concern in terms of accuracy is that some of the original financial data reported by the big pharma firms in my sample could be intentionally or unintentionally false, and that this could therefore be reproduced by secondary sources of data. Such falsifications have been known to occur in major corporations, and firms sometimes have incentives to misreport information. (Awolowo et al. 2018; Cavico and Mujtaba 2017; Hake 2005; Mohapatra 2021; Petra and Spieler 2020) However, these are also disincentives for such fraud, in the form of stiff penalties, and good auditing practices can help to detect errors or misrepresentations. (Awolowo et al. 2018; Cavico and Mujtaba 2017) Moreover, common book-keeping practices are commonly believed to protect against unintentional errors. (Rodrigues, Carqueja, and Ferreira 2016) Given these considerations, it is unlikely that the data will contain either intentional or unintentional inaccuracies of significant magnitude and regularity.

3.3.3 Validity

A valid measurement is one which actually measures the intended target of measurement. Measurements will tend to be valid when they are taken using the correct technique and target (or a proxy which closely resembles the target in relevant ways). In the case of this research project, validity should be achieved so long as the firms in the sample do indeed constitute 'big pharma' as ordinarily conceived and their reported financial data does in reality capture the types of business activity that the accounting categories are understood to represent.

The major concern in terms of validity is therefore that the financial data reported by firms might be convoluted or misleading in terms of its relationship to intuitive business models, strategies and activities. For instance, if the calculation of 'financial assets' does not really represent what people would ordinarily think of as financial assets in the literature on corporate financialisation, then conclusions drawn on the basis of interpreting this data may be incorrect. This concern is not easily allayed, as corporate accounts can indeed be labyrinthine documents with unclear relationships to intentional business strategy.

This raises the question of how to understand nature of accounting per se and more concretely the corporate accounts from which the dataset presented herein is constructed. The proper contextualisation of this quantitative data implies a degree of critical reflection on the origin and purpose of corporate accounts, along with the legal, institutional and incentive-structure frameworks within which they exist. Even without fraud or error, different accounting practices and standards may represent the same conducted business in different ways. (Sherman and Young 2001, 2016) The construction of accounts involves decisions that reasonable people might not make the same way. It also involves conformity to norms that may vary between national economies, sectors and firms, and may change over time within each of these.

This kind of data may also be consistent with many plausible and competing interpretations. For instance, a rise in financial assets may represent a decision to invest in debt and equity on financial markets, but could also represent the selling off of large quantities of inventory to buyers who are not liquid enough to pay upfront (resulting in a reduction in physical inventory and an increase in receivables). This is exacerbated when the data is coarsely-categorised in a fashion that inhibits detailed analysis. An example of this would be the reporting of 'other intangibles' that are not broken down more into specific types of intangible assets.

More fundamentally, corporate accounts ought to be understood not naively as accurate representations of some underlying reality but rather as the product of boundedly performative acts partially constituting the social reality they nominally represent. (Callon 2007; Cushen 2013; Froud et al. 2006; MacKenzie, Muniesa, and Siu 2007) In other words, accounting practices can not only identify the truth but contribute to making things true, though only within a certain field of possibility. However, these considerations about what accounts represent, are more ontological than methodological, and could not be resolved through the use of different data or different methods of analysis. The vast majority of quantitative economic research necessarily relies upon metrics that may be problematic but to which there are currently no better alternatives.

3.3.4 Reliability

A reliable measurement is one which can be repeated with consistency. Measurements will tend to be reliable when they are not the result of an improbably chance occurrence. In the case of this research project, reliability should be achieved so long as the sources continue to be accessible to other researchers, and the methods are communicated clearly enough that they could be reproduced.

The major concern in terms of reliability is therefore in the interpretive aspect of the case study. This irreducibly contains an element of subjectivity and individual judgement that may vary with the researcher carrying out the study and their engagement with the case. In other words, it is possible and even likely that a researcher approaching the case from quite a different theoretical perspective and with different prior knowledge and experience may not interpret the case in the same way. Such unreliability can be mitigated somewhat through good research design and selection of an appropriate case; however, the potential for a differing interpretation is unavoidably intrinsic to the nature of this kind of research, particularly since theoretical perspectives often contain elements of flexibility that will allow for individual cases to deviate from their generalisations.

3.3.5 Precision

A precise measurement (as the term is used here) is one which measures to a very fine resolution. Measurements will tend to be precise when they are taken using methods and instruments which allow researchers to discern small differences. This should not be confused with the quite different scientific concept involving the degree of closeness between different measurements—also often called precision. In the case of this research project, precision should be achieved so long as both the financial data and the sources for the case study present information in a sufficiently fine-grained manner; e.g. accounts are more precise when they present values in thousands rather than millions (assuming no decimal places).

The major concern in terms of precision is that the sources used for the case study should contain enough detail about the events to permit the most penetrating analysis of the case possible. In some instances public documentary evidence may not contain sufficiently detailed information to form a complete picture of the case being studied; however, a wealth of information is regarding the most important events of this case. In particular, the use of sources such as extensive legal

documentation from court cases, containing things like email correspondence used as evidence, allows for the facts of the case to be ascertained in detail. Precision should be of little concern in the quantitative analysis, since it is unlikely that the interpretation of the corporate financial data will be non-negligibly affected by, for instance, the difference between reporting revenues to the nearest dollar or the nearest million dollars.

3.3.6 Generalisability

A generalisable measurement is one which is consistent with the measurements that would be made in other situations. Measurements will tend to be generalisable when they are taken using a target which closely resembles other potential targets in relevant ways). In the case of this research project, generalisability should be achieved so long as the big pharma sample follows the same trends observed in other large R&D-based drug companies (and possibly other types of IP-based firms in general, even in other sectors) and the case study represents wider patterns of behaviour by financial actors and logics being imported into the pharmaceutical sector (particularly at the smaller end of the market, but potentially in other parts of the sector also).

The major concern in terms of generalisability is that the case may be a truly unique and outlying one, and may not actually correspond to widespread behavioural patterns. It appears that Martin Shkreli—the individual upon whom the case study focuses—is an atypical figure within corporate America, having attracted voluminous media coverage and been subjected to unusual legal sanctions. Nevertheless, it seems clear from reported facts that at least some of the behaviours associated with Shkreli have indeed been repeated elsewhere in the sector.

The generalisability of the findings from big pharma's financial data is of less concern. While very often in social sciences a sample will represent only a tiny fraction of the entire population studied, in this case the firms considered herein may constitute a good deal of the total number of big pharma—or at least the total 'volume', when firms are weighted by measures of size, success, or power. At least for the time period covered by the data, it could reasonably be argued that the sample actually represents most—if not all—of 'big pharma' in its more narrow colloquial sense. Indeed a small number of firms control a large portion of the total pharmaceutical market, as noted in Chapter 1. Nonetheless, other individuals might

reasonably disagree with this constrained view, and include a good deal more large firms active in the pharmaceutical space.

No attempt at generalisation to other economic sectors is made in either the qualitative or quantitative analysis except to raise questions precisely about such generalisations. In other words, the position taken is that since the nature and effects of financialisation and related trends are highly variegated by economic sector, they must be studied in different contexts without an attempt being made to extrapolate a universal account. Some degree of generalisation is made to pharmaceutical firms based in other national economies, but acknowledgement of geographic variation that limits such generalisability is built into the presentation and analysis of the data. Furthermore, the quantitative data presented covers regions expected to exhibit different characteristics and trends, rather than generalisation being based on a single

3.4 Quantitative analysis

The quantitative section of this research project focuses on secondary analysis of corporate accounts panel data. It employs a historical and comparative approach to build a picture of how big pharma functions under conditions of broad economic financialisation, and how this varies geographically. The analysis employed herein does not employ techniques such as mathematical modelling or inferential statistics based on correlation coefficients. The chosen approach takes empirical data seriously, engaging with it as a grounded body of real-world evidence which can inform holistic reasoning, rather than raw material to which mathematical models can be fit or upon which a raft of statistical tests can be performed.

The quantitative analysis therefore proceeds as follows. First, data is presented in legible form through the use of averaging and visualisation in graph form. The data is then discussed, situating it within the wider context of the sector as well as any key events, trends or regional differences that could contribute to shaping the observed data. This analysis includes the observation and analysis of both trends over time and similarities or disparities between regions.

3.4.1 Sources

3.4.1.1 The Global 500

Since 1995, *Fortune* magazine has published an annual 'league table' of the 500 largest firms in the world—the Global 500 (hereafter 'G500'). (Fortune n.d.-b) This widely-consulted list is the global equivalent of the better-known F500, which only includes US-based firms. Both lists rank firms by reported revenue, with the G500 converting other currencies to dollars based on the average exchange rate during the company's fiscal year. In order to be eligible for inclusion, firms must publish financial data and report it to a relevant government body (e.g. Companies House in the UK); this excludes many—but not all—privately-held firms. As such, the list primarily lists the largest *publicly listed* firms, but some privately-held firms may be included. In any case, this turns out not to be a relevant consideration when dealing with drug companies, since even the largest privately-held firms do not make the cut for inclusion on the basis of their size, regardless of reporting status.

The G500 also categorises these firms by industrial sector (based on the largest source of revenue). Following these categorisations therefore allows a broad distinction between the major firms with a pharma-based 'mission' and those simply carrying out some pharma-related activity as part of a diversification strategy.[37] Notably, several well-known German conglomerates such as BASF or Bayer are categorised by the G500 as chemical firms rather than pharmaceutical ones. This is likely because pharmaceuticals are not their primary revenue source, and they are best understood as diversified chemicals manufacturers who use their chemical expertise in part to produce health products. These firms were therefore likewise deemed ineligible for my sample.

There are a small number of flaws in this data, such as missing entries; fortunately, the G500 also lists the previous ranking held by a firm, which allows many of these errors to be corrected manually. E.g. the *Fortune* website 2007 and 2008 listings are identical, but the 2008 data displays different previous ranks—which it can be inferred are actually the ranks for 2007. These errors and omissions were

[37] E.g. General Electric is a huge conglomerate, but its healthcare wing only makes up ~16% of total revenue, and the bulk of that is derived from imaging, diagnostics, information technology, and patient monitoring systems.

corrected before the lists were used—hereafter all references to G500 data are references to this amended version.[38]

After collection and clean-up, this dataset spanned the years from 1994 to 2017, inclusive. Prior to 1994, the G500 was not published in its current form; its predecessor (the *Fortune* 'International 500') is not hosted on the Fortune website, and there are likely methodological differences. Similarly, 2017 was the last year for which data was available at the time of data collection. Data covering this period was used to construct a sample of firms that have been consistently world-leading in terms of their revenues (using a procedure described below).

3.4.1.2 S&P Capital IQ

Financial data on the sample firms was collected from the S&P Capital IQ database (hereafter 'Capital IQ'), with access provided via Wharton Research Data Services (WRDS). Capital IQ was founded in 1999 and later acquired by S&P Global (the parent company of the credit rating agency S&P Global Ratings, formerly known as Standard & Poor's). The service offers pre-packaged (financial and other) data—primarily to financial actors such as banks and investment funds, but also to universities in the form of academic subscriptions.[39] Using the database interface and functions greatly streamlines the data collection process compared to hand-collecting data directly from regulatory filings or annual reports, especially as company annual reports (or alternative documents containing appropriate accounting records) are not reliably available in all countries, and firms often host only the last few years of annual reports online.

Capital IQ also has other advantages compared to collating data from annual reports. Firstly, financial data can be collected in historical dollar conversion or percentage terms to simplify comparisons between firms that denominate their accounts in different currencies (without the need for further calculations). The database also tracks the same legal corporate entity despite any name changes, M&As, or similarly-named parents and subsidiaries. This might otherwise be difficult for researchers to follow—particularly in big pharma, where there have been

[38] This amended version also 'corrected' the years of the data: the list takes some time to compile from publicly-reported financial data, so the year of publication is actually a year later than the year to which the data refers. E.g. the first list was published in 1995 but compiled from 1994 data, so this list was recorded as 1994 data in the amended version.

[39] Further information about Capital IQ, and guidance on using it, is available from the New York Public Libraries at https://libguides.nypl.org/CapitalIQ.

confusing name disputes, multiple major M&As, etc. Capital IQ also contains qualitative data such as timelines of M&A events for each firm, which can further aid in the interpretation and checking of financial data by providing greater context. Finally, the method of accessing data from a reputable financial database is easily and efficiently replicable.

The other great advantage of using data drawn from the Capital IQ database is that it has various options for organising data, one of which provides a relatively consistent accounting format across firms and years. By gathering the above data in this format, the ease and reliability of comparisons between firms is increased, since Capital IQ is effectively standardising accounting practices and categories between firms that might present their accounts differently (and between years—firms are sometimes inconsistent over time in how they categorise similar flows or stocks of value), to a greater extent than annual reports or regulatory filings do. Thus, for all of the above reasons, using Capital IQ increases confidence in the reliability and accuracy of the data.

While Capital IQ greatly facilitated the process of data collection, it was still necessary to check some of the data and reorganise it into a form that would be most easily analysed and visualised for this research project. The data of greatest potential interest and relevance across all firms was therefore copied to a single spreadsheet file, from which it could be summarised in pivot tables and visualised in graphs.

As much data as possible was collected, but in some cases particular years of data for particular firms are not held in Capital IQ, even though the firms were operating at that time. In such cases, the firms were merely omitted from analysis for the missing year(s), as if they did not exist in that year (which, in many cases was in fact the reason for the absence of data, given the number of firms that were absorbed by other firms, and the fact that AbbVie had not yet been created for most of the period). 1991 was chosen as the first year of the period to be analysed, since it emerged as the first year for which data was meaningfully available; there were occasional entries prior to this, but so few as to render inclusion and analysis pointless. 2017 was the last year for which data was available at the time of data collection, so this was the final year of the period studied by the quantitative component of this research project.

3.4.1.3 The S&P500

The S&P500 is one of the most widely-known, frequently-used and well-respected stock indices. It is compiled by a committee of experts who assess firms against various criteria and dimensions, and is generally considered a good indicator of overall stock market trends. It contains only large and strong-performing firms, making it similar to the big pharma firms in the sample. Nevertheless the index covers a fairly large number of firms across a wide variety of sectors, unlike some other major stock indices—e.g. the Dow Jones Industrial Average features only 30 firms.

As a result of these various features, the S&P500 is often used as a rough approximation of 'the stock market', 'public firms', or 'corporate America' as a whole. (Brenner 2009; Kwak and Mitton 2013; Nitzan and Bichler 2009) For instance, Nitzan & Bichler (2009:309) note that "owners of large US corporations try to beat the S&P 500" and compare a biotech index to the S&P500 to demonstrate the growing wealth tied up in the life sciences. Often the index—or some subset thereof—is used as a broad point of comparison for specific firms or industries, including in other studies focused on the pharmaceutical sector. (Andersson, Haslam, et al. 2010; Lazonick et al. 2017; Ledley et al. 2020; Montalban and Sakinç 2013)

Where available, data was collected from Capital IQ on the S&P500 composite stock index, to allow for comparison between the big pharma firms in the sample and a wider universe of large firms. Unfortunately, S&P500 data is not available on Capital IQ for many variables, and is only available from 2002 for those which are present. Additionally, the S&P500 contains only US-based firms, limiting its geographic representativeness. However, this is less of a concern than it might ordinarily be, since the big pharma is itself so heavily skewed towards the US that 55% of the firms in the sample are/were headquartered there. In many ways this is not surprising, considering that the US is the world's largest market and has the world's hegemonic medical regulator (in the form of the FDA, which often sets the pace for similar bodies in other countries). Similarly, the S&P500 contains only publicly-listed firms, which could be problematic for some research projects but is less of a shortcoming in this case, considering that the firms contained in the sample will also be public firms.

Moreover, it should be noted that many of the firms in the sample will also appear in the S&P500, so any idiosyncrasy of the sample as compared to the broader economy is further downplayed. Limitations in the data being used prevent the

exclusion of sample firms from the comparator: Capital IQ provides the S&P500 overall figures, rather than individual data for all 500 firms. Individual firms cannot be manually subtracted from this total without knowing both the composition and weighting for each year in the sample—even if such data were accessible, the task would be excessively arduous for the purposes of this research project. Moreover, there is some precedent in similar research: e.g. Montalban and Sakinç (2013:994) refer to the S&P500 as a "benchmark" and compare it to a pharmaceutical index and a biotech index.

In any case, the use of the S&P500 as a comparator should allow the detection of any divergence or convergence of global big pharma as a specific industry within the wider global capitalist system. In fact, the inclusion of sample firms within the comparator index should build in a conservative bias *against* finding any noticeable trends specific to big pharma (at least in the US, which makes up most of the sample), increasing confidence that any apparent deviation from or convergence to the comparator is genuine, and not merely a product of overall corporate trends.

3.4.2 Time periods

Availability of data for relevant firms in the Capital IQ database is a key consideration informing the period studied, and availability of G500 data is also a significant factor, though a lesser one. The quantitative analysis therefore covers the years 1991–2017, based on sample selection criteria applied over the period 1994–2017 (as described below). While it is unfortunate that the period over which the sample is determined does not fully align with the period over which it is analysed, the overlap is nearly 90% of the longer period, so the discrepancy is small. The extra few years would be unlikely to make a difference to the firms included, due to the regularities with which the same firms appear in the G500 (as will be seen below).

Thus we have a 27-year period, allowing observations over a good timespan—this is important when attempting to establish long-term trends and transformations. In particular, beginning in the early 1990s and continuing well into the 2010s ensures that various key events associated with financialisation (e.g. the 2007–2008 global financial crisis) are encompassed. Similarly, this means that the effect of financialisation is unlikely to be missed, assuming (as the literature often does) that key transformations such as the mainstreaming and hardening of shareholder primacy ideology largely took place beginning from the 1980s and continuing at least through much of the 1990s.

3.4.3 Sample[40]

3.4.3.1 Defining global big pharma

Since the quantitative strand of this research project addresses itself to 'global big pharma', rather than merely the pharmaceutical sector as a whole, the qualifications *global* and *big* must also be considered. 'Big pharma' refers to the leading established firms within this sector, those with the most economic power and resources and with the greatest degree of market monopolisation. The concept is subjective and ill-defined, which is to say that it has no clear boundaries upon which all observers could agree: there is no clear dividing line between what people do or do not mean when they talk of 'big pharma'. As will be explained below, though, there are good reasons to think that the sample chosen is a good approximation of 'big pharma'. Most of the firms occur on lists of the top firms by market capitalisation globally, the top firms by revenue globally, and major mainstream global stock indexes. Inversely, few other pharmaceutical firms appear on any of these lists, and even fewer appear on more than one such list; there are clear reasons to exclude those that do.

'Global' is a problematic concept in relation to both production and consumption of pharmaceuticals. While there is worldwide demand for pharmaceutical products, the US constitutes the main pharmaceutical market, making up ~40% of sales. (European Federation of Pharmaceutical Industries and Associations 2014) Moreover, key business functions such as research and manufacturing tend to cluster geographically in a few regions that have disproportionately high numbers of firms. This is also true of different types of businesses within the sector: India and China produce much of the world's generics, active ingredients, and other inputs such as capsules; conversely, many of the world's largest biotech companies are based in the US, where venture capital funding and prestigious public-sector research partners are more easily accessed.

This specialisation implies that even a 'global' study of big pharma will tend to produce a regionally restricted sample. Specifically, big pharma is primarily concentrated in the US, where the majority of leading firms are based. The sample

[40] The firms examined in this research project are referred to as a 'sample' for convenience and because this is a somewhat conservative approach, but this terminology could be challenged—as discussed above, it could be argued that this list of firms actually constitutes the entire population of global big pharma, depending on where one chooses to draw the line delineating that concept.

presented here is therefore globally representative not in the sense that it incorporates firms from a wide variety of geographic origins, but rather in the alternative sense that it accurately corresponds to the empirical distribution of the leading pharmaceutical firms. Thus, given the nature of global big pharma and the available data thereon, the US is the primary focus of both the quantitative and qualitative components. While a comparative approach is adopted in terms of US, UK and other European firms, the ultimate goal is to understand the global pharmaceutical sector as such, rather than different national pharmaceutical sectors.

However, the global here is conceived not merely as an accumulation of separate national contexts. It should be remembered that the pharmaceutical sector operates across borders, shifts profits between jurisdictions, and has developed a worldwide division of labour. At the same time, big pharma must develop localised pricing models, conform to numerous distinct regulatory regimes, and navigate different healthcare institutional contexts (like the insurance-based US market and the single-payer model of the UK's NHS); the sector can thus be understood as subject to the combined influence of local factors within a global context that has sometimes been called 'glocalisation'. (Robertson 1995; Wakefield 2009) The approach taken herein thus attempts to recognise the regional and local particularities that global perspectives are sometimes charged with overlooking. (Yamada 2012)

Ideally data could be decomposed geographically, since big pharma firms operate as transnational corporations that often have research centres and other subsidiary units located across national borders. Unfortunately, it would be prohibitively difficult (both theoretically and empirically) to determine and analyse the relevant locations for all income, outgoings, assets and liabilities or equity associated with particular firms. While firms do often report geographically disaggregated data for some headline figures such as revenue, there is often insufficient detail to separate e.g. financial and non-financial income or tangible and intangible assets. Similarly, since firms are often somewhat diversified—producing e.g. drugs, devices, diagnostics and nutrition products within the same firm—it would be desirable if these lines of business could be separated out, but unfortunately this is not plausible for similar reasons.

Furthermore, the geography of corporate accounts must be considered sceptically and critically: accounting techniques are available which allow firms to intentionally shift income and assets across borders on paper, receiving benefits like reduced tax liability without substantively altering the conduct of their business.

These are often particularly easy to achieve for firms that hold significant amounts of valuable IP, including big pharma; licencing fees for using IP owned by a different subsidiary are one of the more convenient ways for parent companies to redistribute profits between the various legally distinct entities that contribute to their overall earnings, for instance. Such practices have been particularly associated with firms based in the US (Tørsløv, Wier, and Zucman 2023)—which many big pharma firms are—and observed to occur within big pharma specifically (Brajcich, Friesner, and Schibik 2016)

As a result, firms will simply be categorised by the region in which they are headquartered (for most of the year, in cases where firms moved headquarters). While crude, this should capture at least some important factors. The primary jurisdiction to which firms are subject implies associated governmental factors such as accounting standards, innovation policy and funding, and legal frameworks around IP, employees' and investors' rights. It may also affect the dominant informal 'national culture' within the firm, including assumptions normalised among most workers and managers, or varying amounts of venture capital present to finance smaller firms that big pharma may seek to acquire. State fiscal policies will differ between countries too, of course; in particular, firms will be taxed differently, which will affect business decisions and potentially accounting practices.

The size of a firm could also be understood in various ways, with the two most common being market capitalisation and annual revenue, and a third (less popular) measure being total assets controlled. Strictly speaking, it could be argued that market capitalisation is the most important measure of firm size: in some sense it indicates a valuation of the firm, although that sense may be unclear or contested. Market capitalisation could be understood as an estimation of discounted future income streams, crowd-sourced from market trading activity (the dominant view, as expressed in asset-pricing models); alternatively, it could be seen as a quantification of 'fictitious capital' (following Marxist theory), or even as part of a computation of social power (following 'capital as power' theory). (Leyshon and Thrift 2007; Muniesa et al. 2017; Nitzan and Bichler 2009; Suaste Cherizola 2021)

While market capitalisation is a useful metric, it may be a poor indicator of a firm's 'size' if this is taken to mean their power, influence, and command of resources. Market capitalisation only accounts for common equity value, and thus excludes preferred equity and, much more crucially, debt. Thus, firms that control the same amount of assets and make the same income from them may have

significantly different market capitalisation. While debt is ultimately owed to somebody and thus does not represent permanent value stored within the firm, it does represent resources that can fund operations.

Revenue, on the other hand, represents all of the income a firm receives, regardless of its kind or source. It is at least a very important component of what is ordinarily meant by 'big' pharma. Firms that make a lot of sales stand a better chance of being the recognisable 'household names' of the pharma industry who warrant the most attention, and can generally use their higher revenues to fund more spending (including on advertising, lobbying, M&As, and other expenditures that allow firms to influence market competition and government policy).

Firm size could also have been ranked by total assets, and this would avoid the problem of distortion via capital structure. However, it could be objected that this does not produce an objective and accurate approach to determining size, since it may be influenced in various ways by accounting decisions taken by firms: asset valuation for corporate accounting is not necessarily a strict science producing numbers on which all observers would agree, and firms often have some degree of discretion in certain accounting practices. There are also practical problems with this approach—data on assets is not so readily-accessible as data on market capitalisation or revenue.

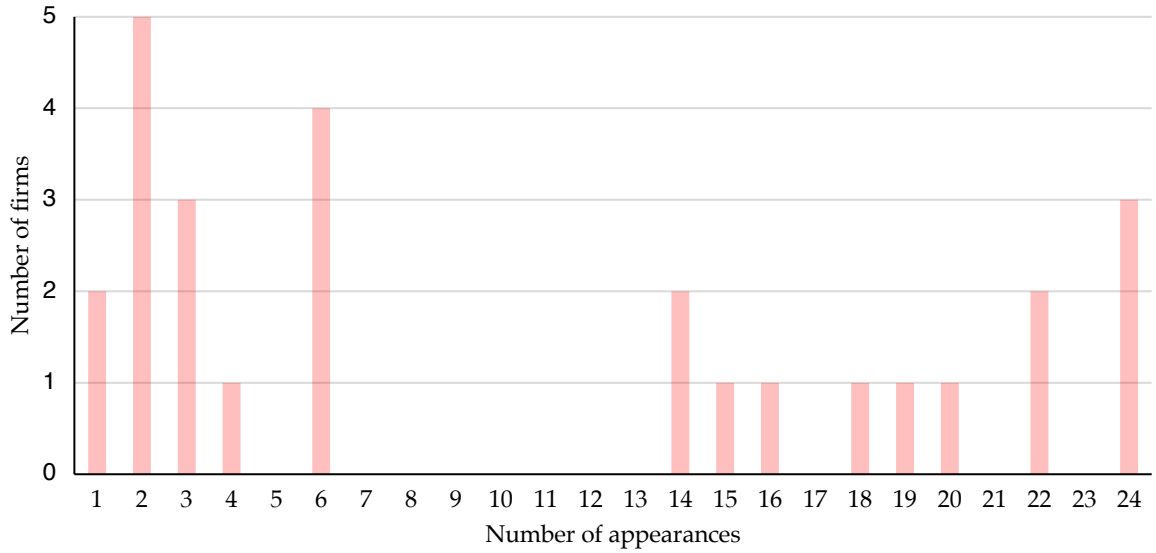
As a result of these various considerations, revenue was chosen as the measure of firm size, although confirmatory checks show that the sample would have been largely identical if market capitalisation had been used instead. As explained below, criteria were used to identify those firms that were *consistently* large, and smaller firms were added to the list if they interacted with one of these consistently large firms via M&A. The sample thus remains the same over time except for the effects of M&A events—these mostly remove firms from the sample as they are absorbed into larger firms within the sample, though in one case a new firm enters after one firm was split into two. Fortunately, there is a convenient means of comparing pharma firms' revenue at a global level: the G500, which ranks the largest firms based on revenue, as well as categorising them into different industries/sectors.

3.4.3.2 Sample construction method/criteria

The G500 lists covering data from the years 1994–2017 (published 1995–2018) were consulted to compile a list of the biggest pharmaceutical firms at a global level (though, as noted above, most of these are US-based firms). Across this period, there are a total of 283 appearances by 27 distinct firms (under 29 names due to two name changes), of which 19 were extant as independent firms in 2017 and a further 10 defunct or subsidiarised due to M&As.

Broadly speaking, two categories of G500 firms (distinguished by their consistency of appearance) are apparent: those that appear just a handful of times, and others that appear more often than not. The distinction between these categories is fairly clear, in the sense that there is essentially no 'middle ground,' as can be seen in the graph below.[41]

Graph 3-A, Distribution of G500 appearances by firms:



The initial core of a sample was compiled from those firms appearing in the majority of years. Added to this in order to construct a full sample were any firms that had merged with, been acquired by, or been spun off independently from, a firm on the initial list which had also themselves appeared in the G500. This meant, for instance, that the precursors to GlaxoSmithKline were both included as they had both appeared in the G500 prior to their merger; conversely, both of the precursors of

[41] Note that for mere rebranding without M&A (e.g. American Home Products changing its name to Wyeth) was ignored, with both names counted towards a single total).

AstraZeneca were excluded since neither had appeared on the G500 in their own right. Sanofi was formed by a merger between Aventis and Sanofi-Synthélabo, the former of which appeared in the G500 and the latter of which did not, so Sanofi and Aventis are included in my sample while Sanofi-Synthélabo is not.

The criteria for including a firm in my sample are therefore:

(A) Appeared in G500 1994–2017

and

(B) Was categorised as pharmaceuticals in G500

and either:

(1) Appeared in the G500 in at least half of the years 1994–2017

or

(2) Merged with a firm that satisfied (1)

or

(3) Was spun off from a firm that satisfied (1)

It may be objected that including firms pre- and post-M&A in a single dataset will result in distortion of the data, with artificially extreme jumps or falls in various metrics as a result of M&A events.[42] However, these are in fact not so artificial after all: when firm financial data or sectoral averages change (merely as a result of pooling two firms' accounting), these changes reflect a substantive restructuring of the market. A merger or takeover often meaningfully shifts relative power within the sector in ways that have implications for pricing, lobbying, business strategies, and so on. Similarly, the change in reported data reflects a real social understanding held by regulators, investors, corporate executives and other key decision-makers within the economy.

[42] E.g. If at a given point in time there are three European firms and two of them with similar levels of R&D spending merge, then the mean for Europe will change significantly if the third firm has a significantly different level of R&D spending (since the mean would go from (X+X+Y)÷3 to (X+Y)÷2).

[Table overleaf]

3.4.3.3 Sample firms

The sample resulting from this method comprises 20 firms: 12 extant (one of which was spun off by another firm on the list) and 8 defunct (due to M&A). These firms—along with some relevant characteristics—are shown in the tables below.

Table 3-C, Sample firms meeting criteria A, B and 1:

Firm name (most recent)	HQ country	G500 appearances (1994–2017)	Status (as of 2018)
Abbott Laboratories	US	19	Extant
AstraZeneca	UK	20	Extant
Bristol-Myers Squibb	US	16	Extant
Eli Lilly	US	14	Extant
GlaxoSmithKline	UK	18	Extant
Johnson & Johnson	US	24	Extant
Merck & Co. (MSD)*	US	24	Extant
Novartis	Switzerland (EUR)	22	Extant
Pfizer	US	24	Extant
Roche	Switzerland (EUR)	24	Extant
Sanofi	France (EUR)	14	Extant

* Merck & Co. is based in the US and trades outside the US & Canada as MSD (Merck, Sharp & Dohme). This is not to be confused with the Merck Group, which is based in Europe and trades in the US & Canada as EMD (Emanuel Merck, Damstadt). Both firms maintain and have attempted to defend their use of the name 'Merck', and both are best known under this name. As a result the name 'Merck' is used throughout, rather than 'MSD' and/or 'EMD'. Any reference herein to 'Merck' is a reference to the US-based firm.

Table 3-D, Sample firms meeting criteria A and B, and either 2 or 3:

Firm name (most recent)	HQ country	G500 appearances (1994–2017)	Status (as of 2018)
Firms meeting criteria A, B and either 2 or 3:			
—AbbVie	US	3	Extant (spun off from Abbott Laboratories)
—Aventis	France (EUR)	6	Defunct (merged to create Sanofi-Aventis, now named Sanofi)
—Glaxo Wellcome	UK	6	Defunct (merged to create GlaxoSmithKline)
—Pharmacia	*	3	Defunct (acquired by Pfizer)
—Sandoz	Switzerland (EUR)	2	Defunct (merged to create Novartis)
—Schering-Plough	US	1	Defunct (acquired by Merck)
—SmithKline Beecham	UK	6	Defunct (merged to create GlaxoSmithKline)
—Warner Lambert	US	2	Defunct (acquired by Pfizer)
—Wyeth	US	15	Defunct (acquired by Pfizer)

* Pharmacia was headquartered in Sweden (EUR) until 1995, then in the UK until 1998, and in the US thereafter until its acquisition by Pfizer.

Given the ubiquity of major M&As in the pharmaceutical sector, the sample presented in the table above is not a consistent survivor group that are present in every year. Throughout the period, a series of events reconstructed the sample over time—adding, removing, renaming or relocating firms. These include numerous M&As as well as several name changes, two HQ relocations by a single firm, and a spin-off. The timeline below illustrates these events and their effects on the sample. Sample firms are coloured according to their HQ location, while firms not present in the sample have an uncoloured background to make it clear that they are included only for context. Firms are generally divided by HQ region, though Pharmacia is included in the US section despite its moving HQ, for reasons of legibility.

Table 3-E, Timeline of sample firms by region, showing major M&As:

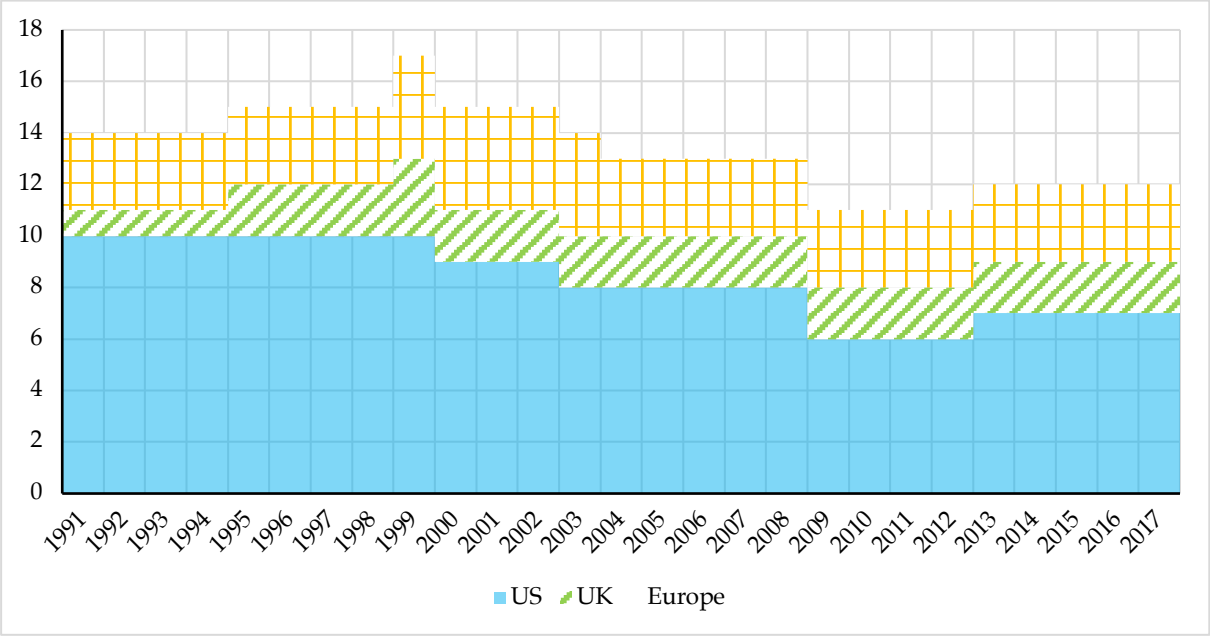
US firms: **UK firms:** **European firms:**

91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17
Abbott Laboratories																						Abbott Laboratories				
																						AbbVie				
Bristol-Myers Squibb Company																										
Eli Lilly and Company																										
Johnson & Johnson																										
Merck & Co.																						Merck & Co.				
Schering Plough																										
Pfizer										Pfizer			Pfizer									Pfizer				
Warner Lambert																										
Pharmacia				Pharmacia & Upjohn						Pharmacia																
American Home Products												Wyeth														
Astra									AstraZeneca																	
Zeneca																										
Glaxo				Glaxo Wellcome					GlaxoSmithKline																	
Burroughs Wellcome																										
SmithKline Beecham																										
Hoechst Marion Roussel									Aventis				Sanofi-Aventis									Sanofi				
Rhône-Poulenc																										
Sanofi									Sanofi-Synthélabo																	
Sandoz									Novartis																	
Ciba-Geigy																										
Roche																										

As can be seen from the table above and graph below, the actual number of firms in the sample varies from year to year, and this is particularly true of the

smaller regional sub-samples based in Europe and the UK.[43] The sample initially increases in size until a peak in 1999, after which point it diminishes until 2009; finally, with the spin-off of AbbVie, one more firm is added to the sample again in 2013, leaving the sample overall small than it began the period. Over time, the sample generally becomes somewhat less US-centric, though it still remains heavily so: of the 1991 sample, 71% are US-based, whereas by 2017 this figure was 58%. The figure below illustrates (in a more easily-deciphered format) the number of firms in each region in the sample each year during the period.

Graph 3-B, Firms in sample (n):



One of the strengths of the G500 as a basis for sample construction is that it should be globally-representative; this might not be immediately apparent, as the figures above convey a lack of national diversity. Superficially, this appears to indicate some kind of bias in the sample of sampling method. However, this tendency to be headquartered in a few countries (primarily the US) is not an idiosyncrasy of the sample; rather, it is a real and observable tendency among the world's leading drug companies. In recent years, some of the largest firms have been

[43] The number of firms in the sample should not be confused for a measure of industry concentration—it would be a crude proxy at best, since M&As could either reduce the number of firms in the sample by combining them or alternatively increase it by rendering smaller firms large enough to qualify for G500 membership. Moreover, the number of G500 pharma firms is also influenced by developments outside of pharma: e.g. de-mergers in other sectors could push low-ranking firms off the list.

Chinese, but unlike the sample these are not well-established household names; there is also limited data available on them. If anything, even the current US-dominated sample may under-represent American power over the global pharmaceutical sector: the US economy represents big pharma's largest market, and US regulators often set the de facto rules of the game for drug safety and efficacy approval.

It must be said, however, that the sample does not contain a single German firm. This is notable because there are several prominent German pharmaceutical manufacturers, harnessing long-standing national expertise in the chemicals sector. As explained above, some of these firms were not eligible for inclusion since their main business is industrial chemicals or similar and pharmaceuticals are merely one side-line in a diversified conglomerate business model. Others may not be large enough by revenue, or may even not publish and report enough data if they are privately held. For instance, BASF never appears in the G500 as a pharmaceutical firm but does as a chemical firm;[44] it is also a component of stock indexes such as the DJ Chemicals Titan 30, Stoxx 600 Chemicals PR, and DAX Chemicals. Boehringer Ingelheim appears only twice (and in the bottom 10% of the list), while it seems that the German Merck Group (EMD) has never grown large enough to appear in the list.

Bayer is the exception here, and is a complicated case. It appears in the G500 frequently as a chemical firm but only rarely as a pharmaceutical firm; it is also a component of stock indexes such as the DJ Chemicals Titans 30 and the Stoxx 600 Chemicals PR, but is also a component of the DAX Pharma & Healthcare rather than the DAX Chemicals. It thus has an ambiguous status, sometimes being considered part of big pharma but often being categorised instead as a chemicals firm. One notable difference between Bayer and many other firms in the sample is that (at least during the period 2000–2019) it does not practice buybacks and gross shareholder payouts are comparatively low overall, though its dividends and interest paid are increasing over time. (Sakinç and Gleadle 2021) While this is only a cursory analysis, it would seem to support the view—in line with both the literature and the findings in the next chapter— that financialisation is occurring but regional differences remain and are sometimes pronounced. The exclusion therefore does not seem to be problematic.

[44] Again, firms are categorised within the G500 by their major source of revenue, so they may occasionally be recategorised as the sales of different divisions change relative to each other.

3.4.3.4 Confirmatory tests

It might reasonably be asked whether this sample fairly approximates the ill-defined concept of 'big pharma.' In order to test this, several other lists of leading firms were also consulted and compared. The goal here was to confirm that the G500 does indeed broadly pick out the largest firms in the pharmaceutical sector, and particularly those that have been so over several decades or more. The result was that the core of the sample does indeed represent a grouping of firms appearing with very high consistency across various relatively objective lists of large firms.

Firstly, the F500 has been published for an additional four decades compared to the G500.[45] The F500 therefore has the potential to demonstrate significance over a greater period of time (though since it only includes US-based firms, the barrier to entry is lower). Every US-based firm from the sample appeared in the F500 every year (except for Wyeth after its acquisition by Pfizer). E.g. Eli Lilly appeared in the G500 only 14 times, but its uninterrupted appearance in the F500 confirms its consistent significance in the sector over more than 60 years.

The sample was then compared the 2017 edition of the Global Top 100 list published by PricewaterhouseCoopers, (PwC) one of the 'Big Four' auditors. (PricewaterhouseCoopers 2017) While appearance in the G500 and F500 are revenue-based, the PwC list is compiled based on market capitalisation. The PwC list contained 10 of the 12 extant firms, with the exceptions being AstraZeneca and Abbott Laboratories.[46] This is a high degree of overlap. The PwC list also included several other firms absent from my sample: Amgen, Celgene, Gilead, and Novo Nordisk. Most of these are newer entrants to the market without a many-decades-long track record, and are more commonly categorised as 'biotech' rather than 'big pharma' (despite having grown to a significant size). The major exception is Novo Nordisk, which was founded in 1923; however, it has never appeared in the G500.

Major global stock indices, which often include the largest and most frequently-traded firms, offer another significant point of comparison for the sample. A major global index was consulted: the S&P Global 100, as of 20th July 2018. (DividendMax n.d.) Of the 12 extant firms in the sample, all were present in the S&P Global 100

[45] As declared in the preface, the F500 data was collected in collaboration with Nicholas Pye, who did not contribute to the production of graphs or the writing of any of the text concerning the F500.

[46] Note that AbbVie appears on the list, and was only spun off from Abbott in 2013. This could be said to justify including Abbott retrospectively—after all, Abbott's market capitalisation would previously (for most of the period) have incorporated much of the equity that comprised AbbVie in 2017.

except Eli Lilly, Roche, and AbbVie (the latter being the only extant firm in the sample not meeting criterion 1). The sample contains all of the pharmaceutical firms in the S&P Global 100 except Bayer. Bayer is a somewhat diversified conglomerate, variously industrially-categorised by different sources: the G500 considers it a chemical firm, PwC classify it under 'basic materials' and the S&P Global 100 lists it as pharma.

In terms of how much the strongly transatlantic sample reflects the wider sectoral geography, it is worth noting that the geographical spread of the firms appearing in the other global lists and not appearing in my sample follow a somewhat similar trend: 3 are based in the US (Amgen, Celgene, Gilead) while 2 are based in Europe (Bayer, Novo Nordisk) and 1 in Japan (Takeda). This suggests that while the sample cannot perfectly reflect the geographic breakdown of the top pharma firms, the emphasis on US firms (and to a lesser extent European firms) does not seem significantly overstated. It should also be noted that Froud et al. (1998) present data showing that in 1994 the US produced 30% of output and in 1995, sample firms had more than a third of the world market between them.

3.4.4 Why not match firms?

One technique for performing comparative research—and answer questions such as whether the VoC model accurately describes geographic variation with regard to financialisation of big pharma—would be to sort firms into matched pairs. This would allow pairwise comparisons between firms on the basis of similarity on certain other (potentially confounding) observable characteristics alongside *dis*similarity in geography. Based on both the financialisation and VoC literatures, the UK is assumed to be more similar to the US than to continental European countries, so in the context of this research project, comparisons would be between one firm headquartered in the US or UK and one based in Europe (or to be more precise, continental Europe, excluding the UK).

However, there are several problems with such an approach to comparative analysis in this case. The upper echelons of the pharmaceutical industry are highly concentrated; few firms may mean difficulty in finding pairs that match closely enough. This is made worse by the fact that big pharma has undergone major restructuring during the time period, including multiple 'mega-mergers'. For this and other reasons, firms that are similar at one point in time may not be similar at another. Moreover, firms that are similar along one axis may not be similar along

another: firms with comparable revenues may have very different market capitalisations, for instance.

As a result of these factors, the choice of pairings is arguably arbitrary. Matching firms into pairs in an attempt to observe regional variation could thus impart a false sense of scientific rigour that might in fact undermine just that. It would seem preferable to use a large sample that more properly represented big pharma as a whole than a small number of firms based on potentially meaningless pairings. An attempt was nevertheless made to implement this form of matched comparison, and indeed it proved to be impractical for this research project.

Firms were matched by revenue such that the larger firm's revenue was within 10% of the smaller firm's (e.g. a firm with $100m in revenue could be matched with a firm that had between $91m and $110m). Data from 1994 was used, since it was near the beginning of the time period and was the first year of the G500. This yielded only three pairs, including no UK firms (further narrowing the geographic scope of the sample):

- Sanofi and Schering Plough, which existed for 18 years before Schering Plough was merged with Merck (and during this 18 years Sanofi had already undergone two M&A events significant enough to change its name).
- Pharmacia and Pfizer, which existed for only 4 years as a Europe–US pair due to Pharmacia moving HQ and eventually being acquired by Pfizer)
- Roche and Bristol-Myers Squibb, which was the only pair to last the entire period in relatively substantially unaltered corporate form

This result was disappointingly in line with the prediction that such matching does not seem to offer an improvement over including all firms, averaged into regions. The pairwise comparison approach was therefore not adopted for the purposes of analysis. Instead, national comparisons are performed simply by decomposing the overall average for the sample into regionally-specific averages plotted alongside it, and comparing these different averages to each other and to the overall global average.

3.4.5 *Data processing and analysis*

Having been downloaded from Capital IQ as Excel spreadsheet files containing the relevant data in historical dollar conversion format, several steps were necessary. First, the data had to be checked and cleaned and reformatted as appropriate: e.g. it was necessary to distinguish between the use of '—' to indicate a value known to be zero and the use of '—' to indicate a value that is undefined (since Capital IQ uses the same character for both, and this affects the calculation of means).

Certain values were calculated from available data, such as total financial asset holding being the sum of certain other line items. Absolute amounts were converted into proportions: e.g. the dollar amount of R&D spending was divided by the total revenue to yield the former as a percentage of the latter. The relevant data was than collated from individual files, producing a single master sheet of data. Pivot tables were created to summarise the data for each region as well as the total dataset, and these were finally used to create graphs visually summarising aspects of the dataset.

Each graph summarises the data for a single metric—whether a line item appearing in the original data or some derived statistic calculated from these. Rather than merely recording absolute values, variables were calculated as a percentage of a relevant total (or a ratio where appropriate). In most cases this relevant total is total assets (for stocks of assets or liabilities) or total revenue (for income or expenses). This helps to easily convey the relative importance of different types of assets, income and expenses to big pharma firms. In some cases, other totals are used; e.g. dividends and buybacks are commonly understood to represent the distribution of profits to shareholders, so these are expressed as a share of the net income to which they relate. The mean for all firms is calculated across the global big pharma industry as a whole to produce an overall average, which is displayed alongside regional means calculated for firms headquartered in the US, UK and Europe. Thus each graph displays four lines, or five where the S&P500 comparator is present.

Calculating these percentages has several advantages. Firstly, it facilitates comparison of differently-sized firms on a level playing field by essentially standardising the data: each firm's reported numbers are considered *relative to its own size*. Secondly, it inflation-proofs the data: the entire 27-year period can be analysed without needing to account for rising price levels across the period. Thirdly, if Capital IQ did not already offer a convenient means of standardising accounts reported in different currencies, this would remove any problem of currency conversion: since both the numerator and denominator are in the same currency and

the output is a percentage, it no longer matters what the original currency was once the calculation has been performed.

It should be noted that another method of calculation was available. An alternative method would be to aggregate or 'pool' the line-item data before calculating percentages, treating the whole sector as a single firm rather than calculating per-firm averages and then averaging these.[47] Neither method is automatically more correct or informative about the sector. Rather, they best answer different types of questions and may be preferred from certain theoretical perspectives.

One advantage of aggregates is that they frequently produce less confusing and counterintuitive results when dealing with numbers measured as a proportion of other numbers (especially when some of these numbers can be negative). Examples may include 'negative' dividends when a firm makes losses or four- or five-figure dividends (as a percentage of profits) when firms barely break even but still pay a dividend. When aggregated with the rest of the industry, such figures tend to show up less frequently and in less pronounced fashion.[48] Aggregating also effectively 'weights' the data: generally speaking, firms with larger revenues and asset bases will have more of an impact on the aggregate than they do on the average.

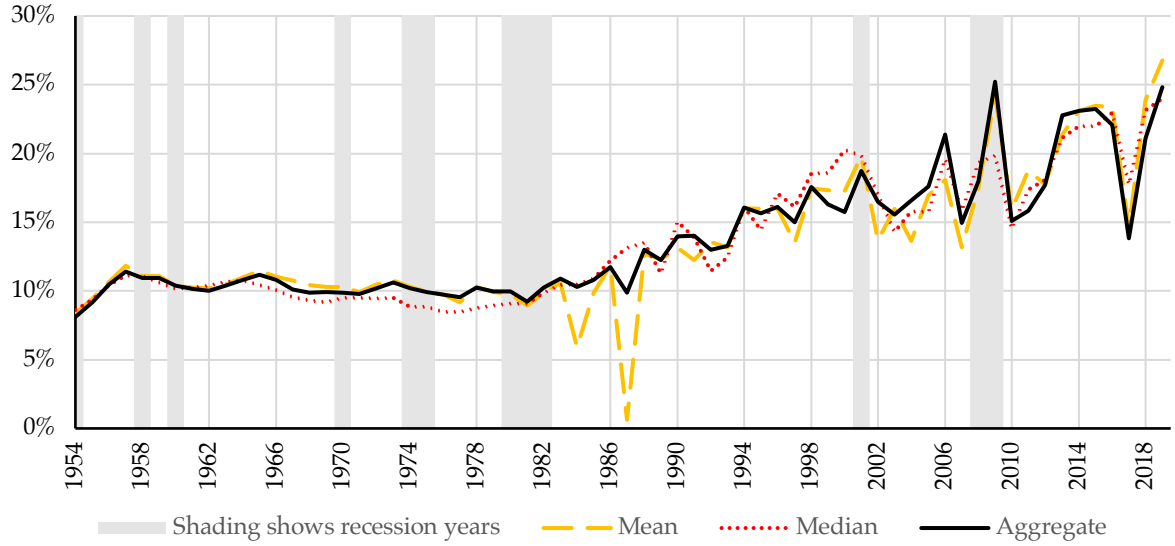
Given these advantages, why not aggregate the data? It should be noted that the mean, median and aggregate measures of net profit margin seem to generally be fairly similar for big pharma; the choice between them does not considerably alter the findings in many respects. In terms of choosing between the mean and median in particular, neither seems to 'track' the aggregate any better than the other overall (with each diverging to varying extents at varying points in time). To the extent that they do differ significantly, it could conversely be argued that there is in fact an advantage in using the mean: precisely because it *allows* outliers to stand out. By drawing attention to outliers, an explanation is demanded in a way that may

[47] A worked example may help to clarify the difference. Suppose that firms A, B and C have 20%, 20% and 50% financial assets respectively, but that firm C has three times the total assets of firms A and B (which have equal total assets). The sector as a whole would have an average of 30% but an aggregate of 38%.

[48] Again, an example may clarify this point. Suppose that firms A, B and C have net incomes of $200, -$100m (a loss), and $1m respectively, yielding respective dividend payout rates of 50%, -100%, and 10,000% if they all pay out $100m. The (rounded) average of these would be 3367%, whereas the (rounded) aggregate would be 297%. Clearly the figure close to 300% better represents a situation in which total dividends ($300m) were just under three times total profits ($101m).

improve understanding of what the data represents. Consider, for instance, the figure below (using F500 rather than G500 data).[49]

Graph 3-C, F500 pharma profit margins:



Two outliers are discernible when the mean is used, indicated by the prominent troughs. However, both relate to a single firm (A.H Robins) and are explained by the Dalkon Shield scandal, which ruined the firm; huge payouts related to legal liability for harm to consumers resulted in losses large enough to noticeably depress the overall mean profit margin for the sector.[50] Such extreme events are unusual—as is evident from the fact that no other such outliers are seen in the data—but there is some investigative advantage in measures that make such outliers apparent.

To re-iterate, the most important implication of aggregating data, is that it calculates results across the whole sector, and therefore indifferently of the individual formal boundaries between firms. This aggregating method can be particularly advantageous when the sector is being framed theoretically as a single agglomeration of investment capital; e.g. aggregating all R&D inputs and outputs may be the preferable method when calculating the overall social efficiency of the sector's innovation as a whole. However, the goals of this research project in large part involve understanding the overall effect of financialisation on firm-level

[49] As declared in the preface, the F500 data was collected in collaboration with Nicholas Pye, who did not contribute to the production of graphs or the writing of any of the text concerning the F500.

[50] Note additionally that A.H. Robins was part of the F500 but not the G500 sample used herein, so this particular event does not affect the findings that follow.

characteristics, with the sector understood not as a monolith but an ecosystem of different firms in (semi-)competition. From this perspective, it seems quite inappropriate to subsume variation within a single pooled calculation.

3.5 Qualitative analysis

The qualitative section of this research project is composed of a longitudinal narrative case study; namely, an account of the career of Martin Shkreli, a now-disgraced financier and entrepreneur. Shkreli serves as a prime example of the interplay between finance and pharmaceuticals, since he:

- Worked for several finance firms
- Founded and served as the fund manager of three hedge funds
- Traded pharmaceutical stocks, primarily taking short positions
- Attempted at least two hostile takeovers of pharmaceutical firms
- Appeared on the '30 under 30' list for finance
- Founded and served as the CEO of two small pharmaceutical firms
- Presided over the acquisition of rights to several drugs and substantial increases in their prices following these changes in ownership
- Became the majority owner and CEO of a third pharmaceutical firm
- Was heavily involved in raising investment capital for all of these funds and firms, sometimes fraudulently in a 'Ponzi-like scheme'

As such, while Shkreli is a single individual, this single case study is a rich one. It offers multiple events and phases: he played multiple roles in relation to the pharmaceutical sector (as a short-seller and a CEO), ran multiple firms (Retrophin and Turing), and during his tenure those firms acquired and monopolised multiple drugs between them (Chenodal, Daraprim, Thiola).

3.5.1 Use of case studies

In combination and in relation to each other, these various above-mentioned strands of the case offer a richer narrative and a greater ability to draw out patterns and conclusions from the data than any single event or series of similar events could. They will also be compared, contrasted and contextualised with the findings from the quantitative study of big pharma in order to draw conclusions about the

relationship between different parts of the wider pharmaceutical sector and different ways in which financialisation manifests within the sector.

Case studies are often considered well-suited to answering more explanatory 'how' questions. In particular, Yin (2003:6) argues that "such questions deal with operational links needing to be traced over time." This is a good description of the types of questions that this research project aims to answer—especially those that are more qualitative in nature, such as "How has the significance and role of intellectual property and other intangible assets within big pharma been redefined?"

Within this research project, the case study is mainly used instrumentally: for the purposes of developing a deeper understanding of something else, rather than merely for its own intrinsic interest. (Stake 2005) The approach adopted here attempts to avoid reductive use of the case, which is no doubt notable (and colourful). A case study of this sort does not constitute a simple attempt to verify any theory or test any hypothesis per se. The value of such a case study within this research project is primarily in illustrating the effects of financialisation on the pharmaceutical sector—particularly, the consequences for the sector of importing financial actors and logics, as well as the connection between financialisation and assetisation.

3.5.2 Type of case study

Case studies often defy easy definition or categorisation, for various reasons, and this study could be categorised in various ways. To begin with, it is longitudinal and nominally retrospective: a single individual is followed over time, with data collected from existing documents not originally intended for the purposes of this research project (e.g. court documents). The case was selected with the benefit of some degree of hindsight, having some idea of the significance. On the other hand, "retrospective" may be somewhat misleading: work began on collecting data beginning partway through the events described, and continued to be updated as an ongoing project as developments continued to occur.

In terms of its role in confirming or disconfirming theory, this case study might be considered a plausibility probe. Such a case can provide evidence that is confirmatory in the weak sense of being consistent with and increasing confidence in the theory, but not in the strong sense of proving the theory or ruling out promising alternatives. Another function fulfilled by this study is the heuristic one: to aid in the construction and refinement of theoretical understandings, such as through helping

to identify concrete mechanisms, linkages and causal pathways. These in turn can aid our understanding of *why* and *how* certain factors are related to each other; (Eckstein 2009) this is one facet in the development of theory towards deeper comprehension rather than mere surface description or even predictive power. Heuristic case studies still require careful selection, much like full-blooded theory-testing case studies. The difference is that case selection should pay heed to different features of the cases when the study is designed to achieve different ends.

To state that a study is not intended to yield firm conclusions proving or disproving a theory, does not necessarily undermine its contribution to social science: studies as seminal as Dahl's in New Haven have been labelled plausibility probes. (Eckstein 2009) The goal of such studies is generally to establish a degree of confidence in the theory that justifies further and more systematic exploration, which often would require dedication of considerable resources that it might not be wise to undertake lightly. Moreover, even the social sciences should reserve an important place for explaining how/why phenomena occur (rather than simply noting and measuring correlations), just as the physical sciences do: a famous example of this would be the debate over how to *interpret* observed quantum phenomena, such as how to explain what superposition entails. (Lewis n.d.)

3.5.3 Case selection

The specific 'case' in question here is the case of Martin Shkreli as an individual financier and corporate executive. Defining this case helps to establish the boundaries of the study and what should or should not be considered as part of the narrative and its analysis. While using something like the price hike of Daraprim (for which he was responsible) as a case might be a more obvious choice—similar to Roy's (2017:49) use of "an *innovation process* behind the *sofosbuvir*-based medicines" [emphasis in original]—it was apparent early on in the process of considering and planning this case study that Shkreli as an individual was much more deeply and complexly involved in the gradual blurring of boundaries between finance and pharmaceuticals than could be captured by focusing on any single event. Moreover, a major advantage is that a great deal of information is available on the case due to a combination of news reportage spanning years, court documents from multiple legal cases and other primary sources such as corporate accounts.

Picking Shkreli as the case allows the study to address his entire career from its beginnings as a hedge-fund intern all the way through to his effective

disqualification from involvement with the pharmaceutical sector by a judge. This permits the advancement of a much more varied and therefore sophisticated analysis than would be possible by focusing on a single event or firm; few other cases would present such a wide variety of entanglements between finance and pharmaceuticals. Another point to consider here is that seeking to make an argument about the importation of financial actors and logics into the pharmaceutical sector implies in itself a concern for wider context: e.g. if a former financier moves into big pharma, it is necessary to understand their actions within the sector in light of their past within finance. For instance, Glabau (2016:¶2) describes Shkreli's price hike of Daraprim as "a prime ethnographic moment in a much larger, more complex story about how the production of biomedical knowledge is now being shaped by the financial services industry"—if this is so, then certainly this larger story can be better comprehended when we recognise Shkreli's past as a short-seller of other pharma and biotech firms.

This case was chosen not because it is considered typical or broadly representative, nor because it is least likely to produce evidence for the theory if it were not true—but precisely because it is neither of these things, but rather the opposite. Shkreli is a particularly idiosyncratic case, a paradigmatic one in the sense that he had spent his entire career in finance and sought to import what he had learned there into the life sciences. On the one hand, Shkreli had interned at a hedge fund while still a teenager, and then received a degree in business administration; he had later worked at several more investment funds before founding first one and then a second of his own. On the other hand, he had no prior training in pharmacology or work experience in the pharmaceutical sector (nor did he have any background in related areas like biology or industrial chemicals).

The case is also potentially extreme because Shkreli was establishing new firms based on a business model of his own creation, rather than taking the helm of a more established firm—it might reasonably be assumed that an individual like Shkreli has more influence over the business model and strategies of a 'tabula rasa' firm than an existing one more constrained by the path-dependence of its own history. For these reasons, Shkreli represents more or less the limit case of financial actors and logics being imported into the pharmaceutical sector.

Such a case might be seen to have little value, at least beyond some highly descriptive or idiographic study that is not expected to significantly inform wider reasoning or permit the drawing of any generalised conclusions. This is because a more extreme case is often an 'easy' case—the kind most likely to produce evidence

that appears to support or at least be compatible with the theory being tested or otherwise considered. However, there is more to a paradigmatic case than this.

Firstly, even a supposedly easy case could fail to find any convincing link if the assumptions or theories being applied to explaining it are in fact incorrect. I.e. the evidence in a given case may underdetermine the theory explaining it, but even a supposedly easy case will not *necessarily* yield evidence consistent with the theory. Secondly, a paradigmatic case is likely to be one in which various factors and mechanisms are in play, providing a wealth of evidence that can help to flesh out our understanding of a phenomenon in practice.

Finally, there is a great deal of information available in this case, allowing for an extensive and detailed reconstruction of the facts of the case. More specialist news media (such as financial or pharmaceutical industry sources) have followed Shkreli's career for over a decade, and even major newspapers have published updates at least since late 2015. Additionally, Shkreli's repeated legal woes have ensured a stream of publicly-available court documents that—as a result of the legal discovery process—contain detailed information otherwise likely to have remained secret (such as internal messages). Few after-the-fact case studies would allow for such extensive data collection and fact verification.

3.5.4 Sources

3.5.4.1 Google News

The main source of data used to construct the case study narrative was a wide variety of reports from news media outlets, primarily in the form of webpages. The search procedure was a form of snowball search in two ways. Firstly, newly-discovered reports would often contain links to other sources. Secondly, as new information was uncovered this would often suggest new search terms (such as firm names or drug names) or other criteria such as time periods around which articles on a certain event were likely to have been published. Searches were initially based on terms such as 'Martin Shkreli', 'Turing Pharma' and 'Daraprim price hike', but many more search terms and strategies were used over time.

While traditionally scholars have relied on specialised tools such as ProQuest or LexisNexis databases for archival news media searches, this is no longer necessary. It appears that Google News has arguably surpassed these traditional databases, particularly in terms of picking up newswire stories and online-only news sources. (Jozaghi and VANDU 2022; Weaver and Bimber 2008) Thus Google News offers the

advantage of covering a wide variety of different news sources, including some that are not well-represented in other databases. As such, other studies have previously used Google News searches as the basis for news coverage analysis, either in conjunction with other databases or on its own. (Jozaghi and VANDU 2022; Mahabir et al. 2018; Perks, Gatchet, and Gatchet 2022; Prohaska 2022; Young Lin and Rosenkrantz 2017)

Moreover, Google in general is a powerful apparatus that offers a host of specialised search tools, including advanced functions. Non-news searches were also conducted in some cases, particularly when seeking further context or detail on specific claims made in articles (as part of the snowball approach). Various search tools were used as appropriate for both news and non-news searches, including basic Boolean operators (Google has some shortcuts for this: e.g. 'Skhreli+Turing' returns only results containing both 'Shkreli' and 'Turing') as well as exact-phrase searches (Google treats anything within double quotation marks as an exact phrase: e.g. '"Most hated man in America"' will return only results containing the entire phrase). Google also allows searching for content by date ranges, which can be a helpful function when gathering data on a specific period in time.

A diverse range of news sources were identified via this search strategy, of which the most well-known were general news media, mostly newspapers (e.g. The New York Times, The Washington Post, The Guardian, The Chicago Tribune, CNBC, Vox and the BBC) and some articles from Newswires (e.g. Reuters). Perhaps unsurprisingly, these sources often gave an overview suitable for the lay person but omitted more detailed contextualisation. By contrast, the sources that proved more useful for piecing together all of the details tended to be the business and financial press along with their online counterparts (e.g. Forbes, The San Francisco Business Times, Financier Worldwide, TheStreet, The Motley Fool) and specialist health industry blogs and similar (e.g. STAT, Kaiser Health News, Fierce Pharma and Fierce Biotech). Surprisingly, some cultural magazines covered interesting angles on the story (e.g. Vanity Fair, Elle).

There is little doubt that the ability to piece together the facts of the case in detail were aided greatly by the high level of public appetite for media coverage of the story. Shkreli achieved a high degree of notoriety, becoming widely known as "the most hated man in America." Many news outlets continue to cover Shkreli's career and legal battles, as late as early 2023. This case study benefited, therefore, from far-reaching news media reportage beyond what might be expected when investigating

the business decisions of any other pharmaceutical CEO with a background in finance, or similar figure.

This granularity of detail and depth of contextualisation allowed for a more vivid illustration and sophisticated analysis than might be possible in some other cases. This advantage was also compounded by the existence of lawsuits and congressional hearings, due to their high standards of factual accuracy—when dealing with a case like this, such documents can generally be used to settle any doubt about the accuracy of a claim made in a news report or similar source, and they often provide detailed information that would not otherwise be accessible (such as internal emails between employees of a firm).

3.5.4.2 Other sources

The news reports gleaned from these searches were supplemented with other sources. Certain primary sources were crucial to developing an understanding of the case—in particular, investor presentations and court documents played a major role. Investor presentations can often be found on company websites and/or re-uploaded by secondary sources such as investment news sites. Court documents are generally available from official repositories but are also often re-uploaded by news media and may be found embedded within reports. Official information from bodies such as the FDA and Federal Trade Commission (FTC) also proved highly valuable in contextualising the case institutionally and legally.

Other primary sources offered further helpful additional context and insight, mostly in terms of understanding Shkreli's thinking. These included mainly recorded public appearances along with Shkreli's Twitter and Instagram accounts, but also regulatory filings. Footage of congressional hearings and media interviews were either viewed live on televised broadcasts or in recorded form online (e.g. as video embedded in news reports). Official filings were retrieved through searching the US Securities and Exchange Commission's database, known as EDGAR (for Electronic Data Gathering, Analysis and Retrieval system). Some academic literature discussing the case was also consulted, since such texts often offer more context and sophisticated discussion aimed at a more specialist audience. For a list of sources consulted, see the appendix.

3.5.5 Fixing dead links and checking data

Some 'dead' links were found during the search for both news media reports and primary documentary evidence; older investor presentations especially may

have been deleted—not only are they spurious non-current information that may have little ongoing value to investors, but they may be potentially incriminating in light of the lawsuits faced by individuals and companies involved in this case. Deleted pages like these are generally recoverable using the Internet Archive's 'Wayback Machine,' which can serve a cached snapshot of what a page displayed at a prior date, provided that someone has used the Wayback Machine to record it. The appendix provides links to cached versions where an original page is known to have been deleted, but excludes pages that were deleted without having been cached.

3.6 Summary

In summary, this research project uses mixed methods, quantitatively analysing corporate accounts from big pharma and qualitatively analysing the business models and strategies adopted throughout the career of a former hedge fund manager turned pharma CEO. This mixture of methods is inspired by the 'numbers and narratives' approach to financialisation research. Firms were chosen for the quantitative sample on the basis of appearances in the G500 and related M&As/spinoffs; the sample thus constitutes a grouping that intuitively corresponds to 'global big pharma'. The case for qualitative analysis was chosen due to a unique combination of features that both make the case easy to research in detail and allow it to encapsulate a variety of relationships between finance and pharma. As such, both the sample and case are appropriate to draw meaningful and valuable conclusions about the nature of financialisation, particularly the form taken in the contemporary pharmaceutical sector.

4. QUANTITATIVE ANALYSIS: THE NUMBERS

4.1 Overview

This chapter presents the findings from a quantitative analysis of big pharma financial data, in the form of graphs with accompanying commentary. This data is contextualised and analysed with the overall goal of providing insight into the business models and strategies of big pharma, and specifically how it has been transformed by financialisation.

Specifically, this chapter tests two characterisations of the modern economy derived from the literatures on financialisation and assetisation. It aims to answer the question of whether big pharma business models are best understood as based on financial rentiership (in the form of what might be called 'bankification') or intellectual rentiership ('assetisation' with an emphasis on intellectual property as a key intangible asset class). These two paradigms are summarised below as an aide-mémoire; they are discussed in greater detail in Chapter 3, particularly in Table 3-A.

Ultimately, the chapter concludes that big pharma has largely steered clear of rent-seeking through financial strategies, though it has exhibited some of the indicators of growing financial pressure, such as rising leverage and net debt, as well as growing disbursement through dividends and buybacks. This supports the notion that financialisation is variegated by sector, since it makes evident the contrasts between producers of e.g. automobiles and pharmaceuticals under conditions of financialisation.

The findings also support geographic variegation, in that there are disparities between firms based in the US, UK and continental Europe. However, these do not necessarily break down in the way that might be predicted by the financialisation literature or established approaches like the VoC framework: European firms sometimes hold higher levels of financial investments, and the also seem to dedicate more resources to short-term securities trading when compared to US firms, for instance. Similarly, Europe seems to have a more active M&A market but do not significantly outspend the US on R&D (and in fact have spent less during the last few years of the period).

Table 4-A, Summary of paradigms:

	Financial rentiership	Intellectual rentiership
Financial assets	High/rising	—
Financial investment time-horizon	Short/reducing	—
Securities trading	High/rising	—
Debt time-horizon	—	—
Net debt	Negative/falling	High/rising
Debt servicing costs	Negative/falling	Ambiguous
Physical asset accumulation	Low/falling	Low/falling
R&D expense	Low/falling	High/rising
In-process R&D and purchase of other intangibles	—	High/rising
Other intangible assets	—	High/rising
Goodwill	—	High/rising
Disbursement	High/rising	—
Regional variation	US and UK exhibit the most financialisation, Europe the least.	Unclear, but most likely US and UK exhibit the most, Europe the least.

4.1.1 Notes on data

Capital IQ is the source of all data presented in the graphs, as described in Chapter 3. Corporate accounts normally present different line items grouped into different kinds of financial statements: e.g. stocks of assets, liabilities and equity are shown on the balance sheet while flows of income and expense appears on the income statement. Data presented here are instead grouped on the basis of what they reveal about the functioning of big pharma and how they relate to the theses tested. E.g. holdings and purchases of intangible assets would appear on separate statements in the source documents, since they are stock and flows respectively; here they are grouped together, since they both demonstrate the role of intangible assets.

Note also that different countries use different accounting standards. This is discussed in more detail where particularly relevant, but it is important to be aware in general of the extent to which accounting does not merely objectively represent reality—different accounting standards represent reality in different ways, and may

allow differing degrees of choice or subjectivity. (Brown 1995; Müller 2014; Perry and Nölke 2006; Procházka 2018; Zhang and Andrew 2021) Accordingly, accounting practices instantiate sets of collective and individual decisions about how to categorise, measure, estimate, and so forth.

The main accounting systems discussed below are the Generally Accepted Accounting Principles (GAAP, used in the US) and the International Financial Reporting Standards (IFRS, forming the basis of the standards generally used in the UK and Europe). (Perry and Nölke 2006) Although not discussed below, it should also be noted that several of the European firms are Swiss, which is significant as Switzerland does *not* require all firms to use IFRS, though it does allow their use.[51] It should also be noted that certain practices within these different systems have been revised over time. (Perry and Nölke 2006)

4.2 Financial assets

4.2.1 Total financial assets

Roughly speaking, financial assets are generally defined as non-physical assets constituting a contractual claim, such as cash, derivatives, shares in other entities, outstanding loans to other entities, etc. Exactly what counts as a financial asset is a complex and sometimes controversial process—e.g. many people are surprised to find that cryptocurrencies are not routinely considered financial assets, and there is some debate over how they should be accounted for. (Corbet et al. 2019; Procházka 2018) Holdings of total financial assets were calculated by summing all relevant balance sheet line items; these were considered to be:

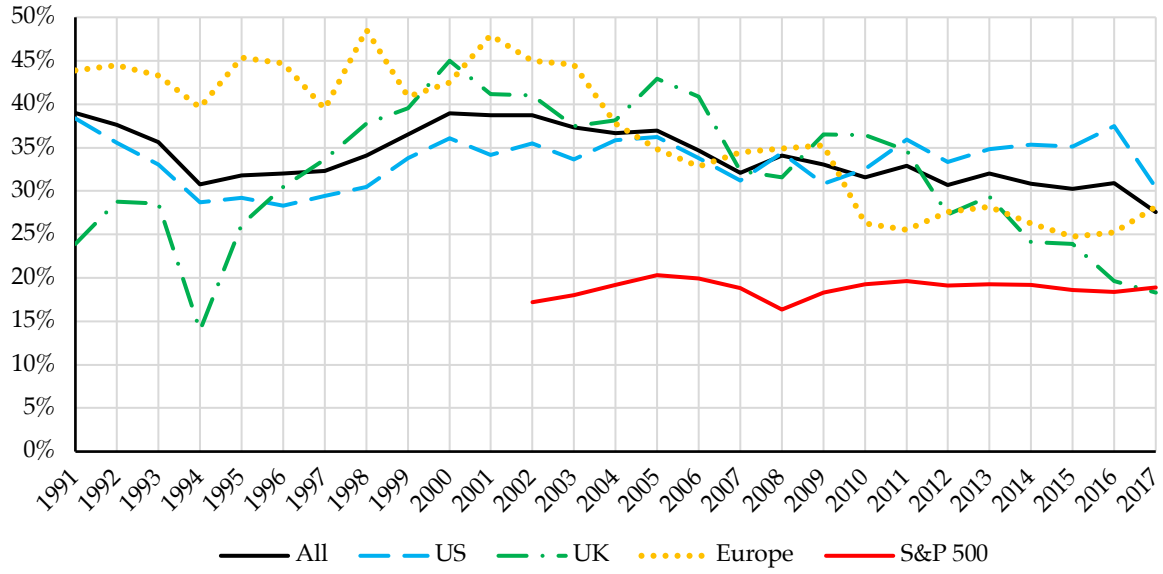
- Those relating to cash and equivalents (and restricted cash)[52]

[51] Swiss law and the SIX Swiss Stock Exchange recognise several accounting standards, as SIX Exchange Regulation notes on its website: https://www.ser-ag.com/en/topics/corporate-reporting.html.

[52] 'Cash equivalents' are investments purchased close to their maturity (normally within three months) and easily converted to a known amount of cash—this primarily means very short-term bonds or highly liquid bonds purchased very near maturity. 'Restricted cash' is often poorly-defined but is generally understood to mean 'earmarked' money held by firms; it is held for a defined purpose that precludes its use for general spending or investment. E.g. banks may lend on the condition that a percentage of the lending is constantly held as a balance in a separate bank account.

- Those relating to receivables (incorporating accounts receivable, accounts receivable long-term, loans receivable long-term, other receivables)[53]
- Those relating to investments (incorporating short-term investments, trading asset securities, long-term investments)[54]

Graph 4-A, Financial assets (% total assets):



The global average financial share of total assets declined by more than a quarter over the period, also representing a decline relative to the S&P500, which stayed relatively level across the period. Nevertheless, the big pharma average has generally been at least one and a half times that of the S&P500 in years for which data on the latter is available. Taken together, these facts indicate that big pharma has historically held significantly more financial assets than other sectors have on average, but also that this gap is closing and big pharma's financial holdings are in decline rather than rising.

[53] As income that is due but has not yet been received, receivables can be considered a form of credit. If including receivables seems dubious, note that this is standard accounting practice, (Ernst & Young 2021) and consider that immediate payment would have resulted in cash holdings instead—certainly a financial asset.

[54] Note that on a balance sheet, 'investments' means financial investments, rather than physical investment. It refers to holdings of financial assets such as stocks, bonds, derivatives, or land rented out or held for capital appreciation. (Ernst & Young 2021) This notably excludes direct investments in the firm's own earning capacity via assets such as property, plant & equipment, or land occupied by the firm itself.

Surprisingly, the S&P500 also did not meaningfully 'financialise' in this respect, on average—at least for the period over which such data is available. While the financial boom and bust do seem to have shifted the relative importance of financial assets in firm portfolios, even this was not drastic: the low point across the whole period (in 2008) is 16% of total assets, and the mid-2000s peak just 20%. Compared to the start of the data, the S&P500 ends less than 12% higher than it was (which equates to less than two percentage points higher).

Regional comparisons are also counterintuitive, given the commonly-held view that the US and UK lead the way in terms of high levels of financialisation. The US holds the highest proportion of total assets in financial form, but has only done so since 2011; in fact, it held the lowest from the mid-90s to the mid-00s. Prior to this latter point, financial share of asset portfolio was highest in Europe, and prior to the latter point it was lowest in the UK. Levels of financial assets have been most stable in the US and the largest decline across the whole period was seen in Europe. However, when looking at shorter sub-periods, it becomes clear that the UK has experienced some particularly sharp increases and decreases (e.g. more than doubling from 1994–2000 and falling by more than half from 2005–2017).

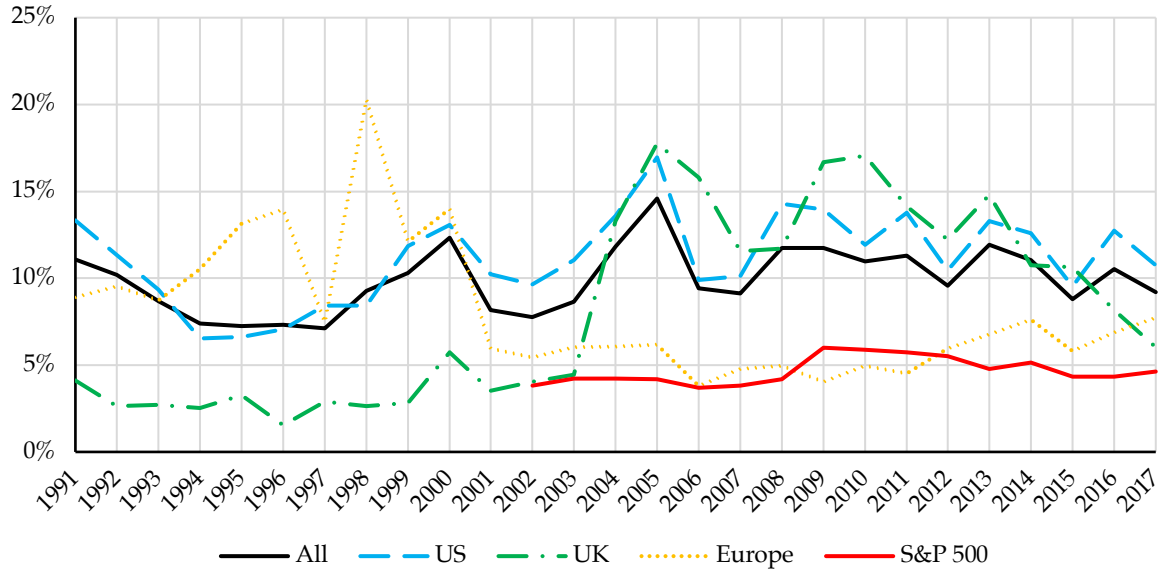
While the data suggests that big pharma is potentially more financialised than many other sectors, it does not conform to the expectations engendered by much of the literature. Notably, financialisation seems to be *declining* rather than rising across much of the period, which contradicts the consensus view that firms have become progressively more financialised over the last few decades. (Epstein 2015; Epstein and Power 2003; Froud et al. 2006; Krippner 2011; Lapavitsas and Powell 2013; Stockhammer 2004) Moreover, the US and UK do not necessarily display the highest levels of financialisation, as would be predicted by much of the literature. (Froud et al. 2006; Karwowski 2020; Karwowski and Stockhammer 2017; Konings 2008; Langley 2004) To better understand what might be occurring and where big pharma's priorities lie in terms of financial assets, the trend in total financial holdings can be decomposed into its key constituent elements, disentangling more liquid holdings from those held over the longer term.

Note that the individual components discussed below do not sum to the total for all financial assets, since not all categories are discussed in detail. In particular, accounts receivable—the amounts due to firms for sales on which payment has not yet been made—for are considered financial assets despite their basis in real-economy transactions. This classification may be unintuitive, but it makes sense since

firms delivering goods prior to payment are effectively offering a form of trade credit to their own customers. It should also be remembered that had the sales already been paid for then the firm would instead hold an equivalent asset in the form of cash (until it spent that cash), which is one of the most fundamental financial assets.

4.2.2 *Liquid assets*

Graph 4-B, Cash & equivalents (% total assets):



Cash & equivalents are the largest component of financial assets (broadly constituting ~10% of total assets over time, as compared to other line items below that more commonly make up ~5–10%, ~4–6%, or 0%). Despite some fluctuation there is not an overall trend either up or down over the period at the level of the global average. This suggests that big pharma's decline in financial asset holding was not driven by the running down of bank accounts or other highly-liquid assets.

Of course, levels of cash holdings vary by region and over time. While levels in the US are once again generally more stable, the UK and European have essentially traded places: first the UK and then Europe held low proportions similar to that which the S&P500 does in the years for which data is available.

In the early 2000s there is a generalised slump in big pharma cash holdings between 1998–2001, when Europe's declines by nearly three-quarters, and 2003–2005, when the UK's more than triples. UK holdings do fall off again, though more slowly, while Europe's increase. The global average, in contrast, effectively 'nets out' these

rises and falls, and therefore generally remained around double that of the S&P500 average.

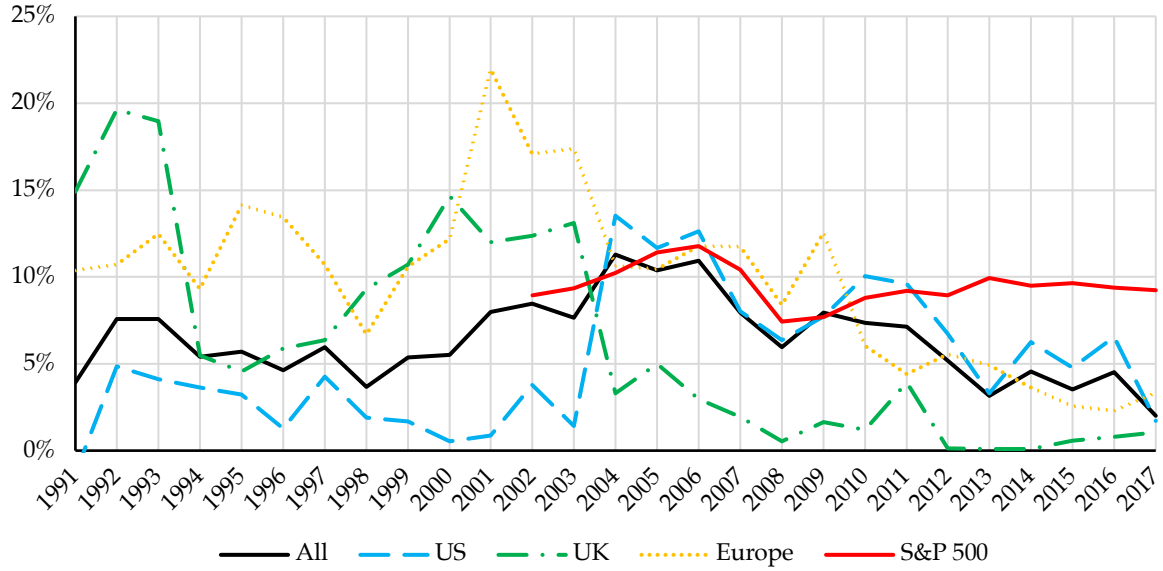
It is interesting that S&P500 firms generally hold about half as much cash as big pharma, considering that the latter often present themselves as sinking almost all available funds into R&D. This is consistent with Pinkowitz and Williamson's (2007) finding that pharma firms tend to be cash-rich compared to those in other sectors. Presumably there is some reason for such high cash holdings, though it may not be immediately apparent. It is possible that without retaining substantial liquid assets, firms find themselves more fiscally constrained in acquiring competitors or their assets. (Harford 1999) Alternatively, since the sector is so prone to M&As, including 'mega-mergers', (Comanor and Scherer 2013; Danzon et al. 2007; LaMattina 2011; Ornaghi 2009) even large firms may hold excess cash to allow defensive measures against potential takeover threats (such as major stock repurchase programs). (Faleye 2004; Harford 1999)

High cash holdings must also be explained in light of shareholder primacy, since it encourages managers to pay out excess funds to shareholders. This could be explained quite simply: perhaps any influence of agency theory, efficient market theory, shareholder primacy and shareholder activism is still not enough to overcome the natural inclinations of managers. It may be that big pharma executives prefer to (and exercise enough autonomy to) maintain funds within the firm—where they can access and control them in order to plan the sector's long-term innovation cycles—rather than relying on outsiders to monitor and approve of their investment plans. (Knafo and Dutta 2016, 2020; Stout 2012b) This would be particularly likely in more R&D-intensive contexts dealing with high levels of risk and uncertainty, so it would fit well with the nature of big pharma.

There is also another possible explanation: it has also been suggested that cash holdings are actually *positively* correlated with shareholder primacy, and that they largely represent interest-bearing short-term financial investments (since the accounting category is cash *and equivalents*, which includes various securities that can be liquidated at short notice). (Davis 2018b) As such, high cash holdings could be evidence of high levels of financialisation; the problem for this theory in the case of big pharma, as will be seen below, is that it does not seem to accord with the trends in other categories of financial assets.

4.2.3 *Financial investments*

Graph 4-C, Short-term investments by region (% total assets):



The global average of short-term investments as a share of total assets broadly increased from 1991–2004 and then declined from 2006–2007, ending the period about a fifth what it had been during its peak years of 2004–2006. In contrast to both overall financial assets as well as cash & equivalents, the S&P500 seems to hold more short-term investments than big pharma does—this is particularly true by the end of the period, due to the S&P500's relatively steady holdings of approximately 9%, more than double the global average for big pharma for the last half-decade.

Regional trends are somewhat differentiated, with US holdings remaining fairly steady at under 5% until 2003, whereas European holdings begin at ~10% in 1991, double by 2001,and then decline back to 10% by 2004. Conversely, the UK shows a broad decline (despite some fluctuations) across this sub-period, reaching less than a third of initial levels by 2004; after this, UK levels of short-term investments remain below 5%, as US levels did previously. (This is another example of an apparent switch of positions, though this time between the US and UK.) Regional differentiation is less pronounced in the latter part of the period, as the US and Europe decline more or less in lockstep from 2004, almost converging with the UK's low levels by the end of the period.

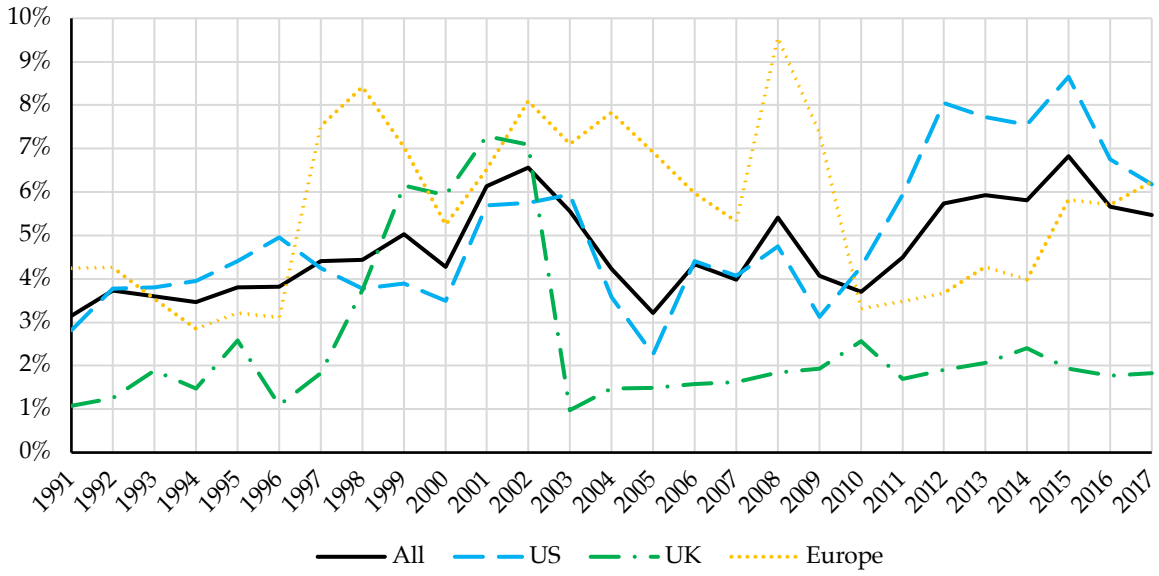
Once again, Europe does not conform to the expectation of lower financial assets, with an average above the global average for most of the period. Combined with other findings—like the fact that holdings were consistently lower over several

years at the end of the period than they were in the first few years, or the initially low proportion of the US—this calls into question some common tropes from the literatures explored in earlier chapters. Firstly, it is not apparent that UK and US firms are more commonly functioning as financial rentiers than are European firms, as would be suggested by the frequent focus on an 'Anglo-Saxon' or 'Anglo-American' element to this mode of financialisation. (Karwowski and Stockhammer 2017; Langley 2007; Siepel and Nightingale 2014)

Secondly, much of the literature has emphasised the supposedly short-term perspectives of financialised firms. This point has primarily been made in terms of value disbursement rather than value generation/capture; (Demirag 1995; Epstein 2018; Lazonick 2015; Lee et al. 2020) nevertheless, some scholars have emphasised short-term investment as part of the financialisation 'package'. (Demir 2007; Epstein 2018; Haldane 2015; Haldane and Davies 2011) The apparent decline in short-term investment strategies therefore casts doubt on the general idea of corporate managers neglecting longer-term investment in favour of 'quick bucks' and paying out free cash flow to shareholders.

One reservation about these findings is that 'short-term' may be understood differently depending on the context. Most accounting practices define short-term investments as those expected to be held for less than a year (including those that have less than a year of maturity remaining). There is often no strict definition of the time horizons involved within the literatures addressing managerial short-termism (such as the shareholder primacy literature); one year may not be the appropriate threshold to determine long-term orientation, particularly in the context of big pharma, with its R&D projects which can last a decade or more. (PhRMA 2015)

Graph 4-D, Long-term investments (% total assets):



While short-term investments have less significance in recent years, the same cannot be said of long-term investments. Rather, these have increased as a percentage of total assets—only by a few percentage points, but this still puts the last half-decade over 50% higher than the first half-decade. The global average has generally remained below 6%, increasing to a peak just over this in 2002, then falling off to its starting level and rising back to ~6% from 2012 onwards.

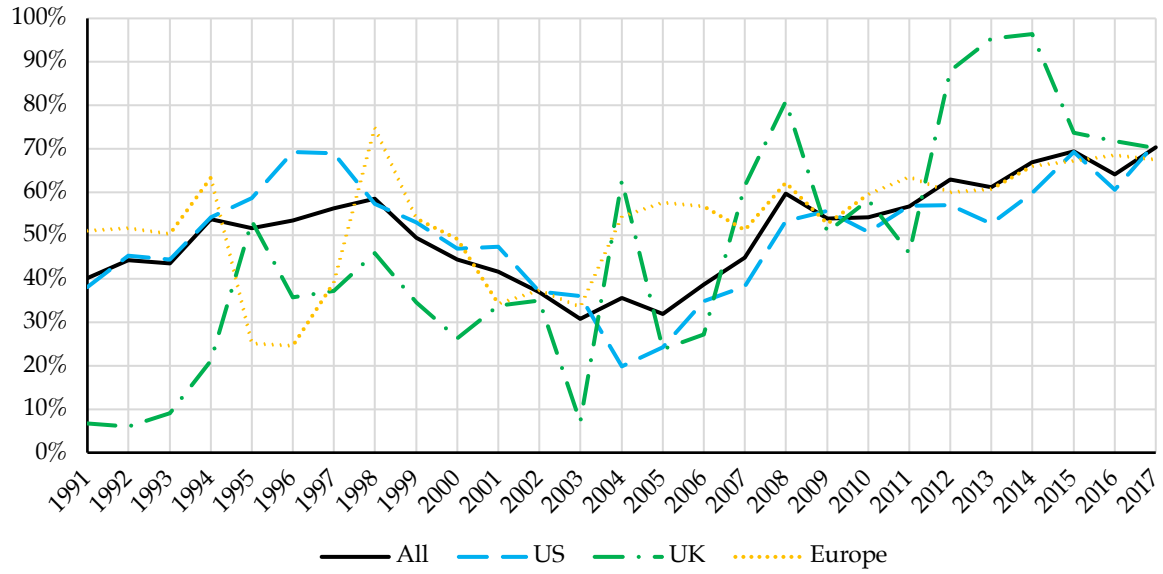
Contrary to expectations of financialisation stimulating short-term orientations among corporate managers, long-term investments have actually overtaken short-term investments in their contribution to big pharma asset portfolios by the end of the period, due to the increase of the former to around 6% combined with the decline of the latter. Unfortunately, long-term investment data was not available for the S&P500, so no comparison can be made in this respect.

That said, regional comparisons can still be made. In the UK, long-term investments have generally been lower as a share of total assets than in other regions, whereas European firms have held the highest proportion for much of the period. UK holdings roughly double across the time period, and this climb would be quite steady if not for a 1996–2002 manifold ramp-up followed by a very sharp decline in which they fell back to prior levels in a single year. US long-term investments also approximately doubled, while European firms' holdings increased only by around 50%.

All in all, the long-term investment data poses a mixed picture in terms of its conformity to the 'Anglo-Saxon' financial rentiership hypothesis (understood to

incorporate claims about the relative financialisation of different regions, as outlined above). In favour of the hypothesis are the observations that holdings of this class of investments have increased, that they have increased proportionately most slowly in Europe, and that they have become highest in the US. Against it are the generally low levels over time in the UK and the previously high levels in Europe; at the same time, it should be noted that long-term investments overtaking short-term investments is curious given the emphasis on shareholder primacy within the financialisation literature. Of course, even when classed as 'long-term', financial investments can in reality be much more short-term compared to drug innovation, so these findings alone do not disprove a shift away from more long-term commitments.

Graph 4-E, Long-term investments (% total investments):



This shift from short-term to long-term investments is easier to track when long-term investments are measured as a percentage of total investments (understood here as short-term investments + long-term investments—which must sum to 100%, so the lines on the graph essentially divide the total investment space into long-term below the line and short-term above the line). This illustrates a generally rising long-term share of investments at the global level both from 1991–1998 and from 2005–2017, whereas there was a downward trend between these two periods.

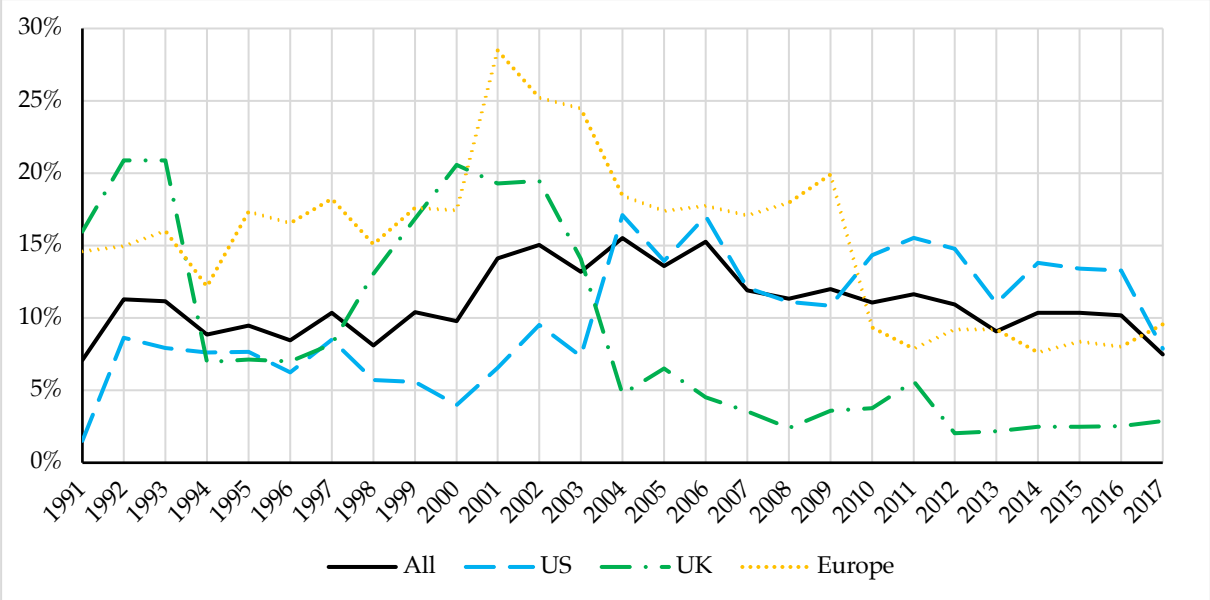
Overall, there is a rebalancing of the financial investment portfolio in favour of more long-term investments over time: if the first and last few years are averaged, the proportion of long-term investments climbs from just over 40% to nearly 70%.

This transition is particularly pronounced in the UK, where firms initially held on average ~10% of investments with long-term intentions, an exceptionally low proportion compared to anything in the US or Europe throughout the whole period. Similarly, the UK's peak average long-term holdings are higher than those in the US or Europe at any point—surpassing 95% in 2013—though the UK average does converge to the global average by 2017.

Clearly, given the above data, the huge proportionate rise in the UK is actually not a consequence of major increases in long-term investment (which ends the period about as high as it started it), but rather a collapse in short-term investments, with the total investment portfolio shrinking substantially from around 15% of total assets to merely 1%. The collapse in short-term investment is particularly extreme in the UK; at the global level, there is a combined decline in short-term investment and rise in long-term investment (as a share of total assets).

To reiterate, these findings cast doubt on the notion of corporate short-termism driven by factors such as shareholder primacy ideology. Contrary to predictions that big pharma would increasingly prioritise short-term financial activity, it appears that in at least one important dimension the opposite has been true. Of course, this is just one possible way in which firms may prioritise the short term—more are considered below. Another note of caution in drawing broad conclusions about financialisation is that S&P500 data is not available to serve as a comparison, which makes it hard to discern how generalisable across other sectors this transition to more short-term financial investing may be.

Graph 4-F, Total investments (% total assets):

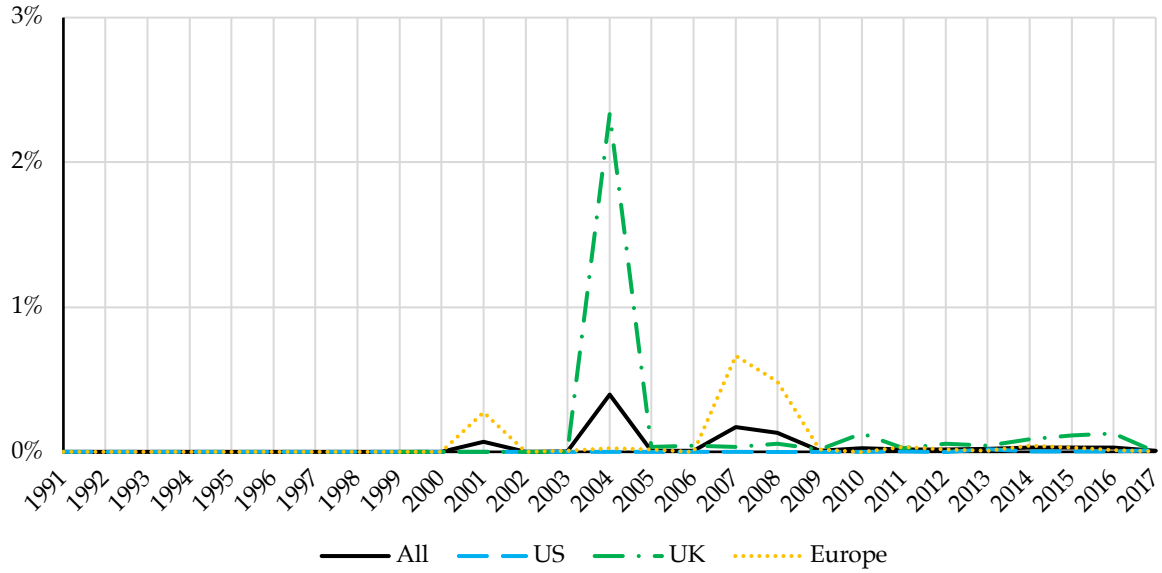


The graph above sums short-term and long-term investments to track the size of total financial investment portfolios (understood, as above, as short-term investments + long-term investments), relative to total assets. Thus it does not contain different source data but merely makes more legible the combined effect of two of the above graphs, as each data point is the sum of the two corresponding datapoints in the short-term investments and long-term investments graphs. Clearly, at a global level, overall financial investing by big pharma saw a bump in the early–mid-00s, but that there is no sustained long-term trend upwards.

All of this makes clear that the fall in short-term investments has more or less offset the rise in long-term investments at the global level, resulting in no overall rise in financial investments as a proportion of assets. However, once again this is differentiated by region: the US average has indeed risen, as the financialisation literature would predict, whereas the UK average has declined to a relatively low level and stayed there for over a decade, contrary to expectations based on the literature. Europe has frequently held a higher proportion of its assets in the form of financial investments, contradicting the idea of Europe as less financialised.

4.2.4 Trading assets

Graph 4-G, Trading asset securities (% total assets):



Trading asset securities—also known as held-for-trading securities (hereafter trading assets) are financial instruments acquired or originated with the primary intention of selling for short-term profit. Specifically, they can include debt and

equity as well as derivatives, and 'short-term' is normally considered to be less than one year. Trading assets tend to be held by financial firms that are actively trading in financial markets (e.g. investment banks or hedge funds), although they are sometimes used by non-financial firms to hedge against market risk. Big pharma rarely holds more than negligible volumes of such securities, which is not surprising given that the sector is not known for maintaining the kind of sophisticated finance divisions that would take responsibility for this kind of trading activity, nor for being particularly exposed to any particular basic commodity price against which they may need to hedge.

Nevertheless, there are a few years in which certain films held significantly more trading assets than usual, with attendant impacts on averages. Most significantly, in 2004 AstraZeneca held trading assets equivalent to 5% of total assets, which is proportionately comparable to Lehman Brothers' holdings in Q3 of 2007. However, this datapoint was the exception to the rule, as no other firm came close, and neither did any other year in AstraZeneca's history. Roche held 0.8%, 2% and 1.4% of total assets in the form of trading assets in 2001, 2007 and 2008 respectively. All other data points (for all firms, in all years) stand at less than 0.5%, and the global average accordingly never amounts to more than 0.4%. As such, any apparent variation between regions clearly amounts to nothing more than occasional deviations from the norm by just two firms.

Given the above, it seems clear that the financial holdings of big pharma do not relate in any significant way to active short-term price speculation, other than in truly exceptional instances. Even if a substantial share of total assets are financial in nature and may generate financial income, trading assets barely appear among them. Rather, big pharma firms seem to prioritise first highly liquid assets, then long-term investments, followed by short-term ones held to maturity. It seems most likely that firms hold financial investments primarily to secure regular streams of income such as dividends and interest payments, or to realise capital gains over a longer period.

While such a pattern of investment is somewhat in line with the financial rentiership thesis by virtue of its use of financial assets to generate profit, it defies expectations of short-termism created by the shareholder primacy and financialisation literatures examined in Chapter 2, as discussed above. The present data also call into question the notion of increasing internalisation of financial capabilities and expertise in non-financials. (M. J. D. Carmo, Neto, and Donadone 2021; Fligstein 1990; Orhangazi 2008a, 2011) This is particularly so if this

internalisation of finance is conceived in terms of active short-term trading of financial instruments, since the trend seems to be merely holding more cash and sitting on investments passively for longer periods—at least within big pharma.

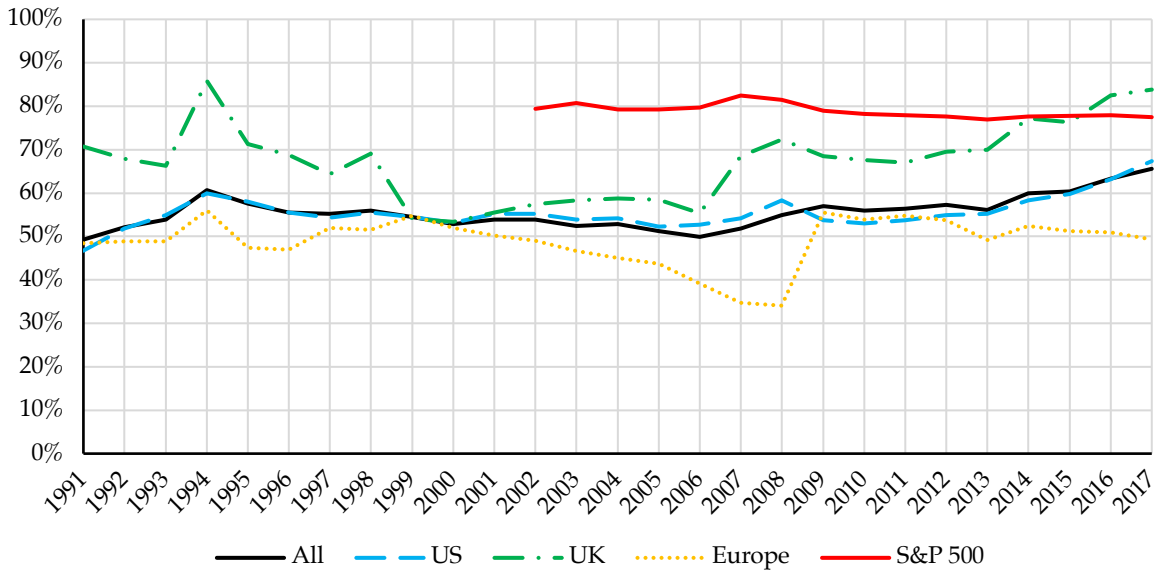
4.3 Credit/debt

Credit and debt occupy a complex position within the financialisation literature, since in many ways they are two sides of the same coin (what is credit from the perspective of the creditor is debt from the perspective of the debtor). Moreover, the net effect that the financialisation of non-financial firms would have on debt-related variables (such as flows and stocks of borrowing and lending) is difficult to anticipate. On the one hand, financialisation has often been linked to growing indebtedness across economies, and the issue of firm leverage has been one aspect of this. (Christophers 2012; Karwowski et al. 2020; Karwowski and Stockhammer 2017; Stockhammer 2010) Thus it might intuitively be assumed that corporate debt levels should rise overall, and this should be reflected in the sample of big pharma firms.

However, when decomposed into different types/sources, the contribution of non-financial business to this growth is relatively minor: the debts of households and the financial sector have tended to increase more quickly—with the latter misleadingly bringing up the average of total business debt. (Stockhammer 2010) Meanwhile, it has frequently been argued that financialisation drives non-financial firms towards financial accumulation and that in fact many became net creditors to the rest of the economy. (deSouza and Epstein 2014; Villani 2020) In fact, global corporate debt trends appear to be driven primarily by China, at least over most of the last two decades. (Abraham et al. 2020) These observations contradict the above suggestion that debt levels among sample firms would rise, at least in net terms.

4.3.1 *Debt stocks*

Graph 4-H, Debt ratio (total liabilities / total assets):



The debt ratio measures leverage, or the extent to which a firm's assets have been financed through debt rather than equity. It appears to be on the rise in the US and UK. When compared to the S&P500, big pharma's debt ratio in the US and Europe remains lower, though UK firms surpassed it by the end of the period as part of a long-term trend. There are several reasons that the debt ratio could increase, both purposeful and incidental. Some of these can be related to financialisation in terms of the increasing significance of financial logics and concerns around placating shareholders and financial analysts.

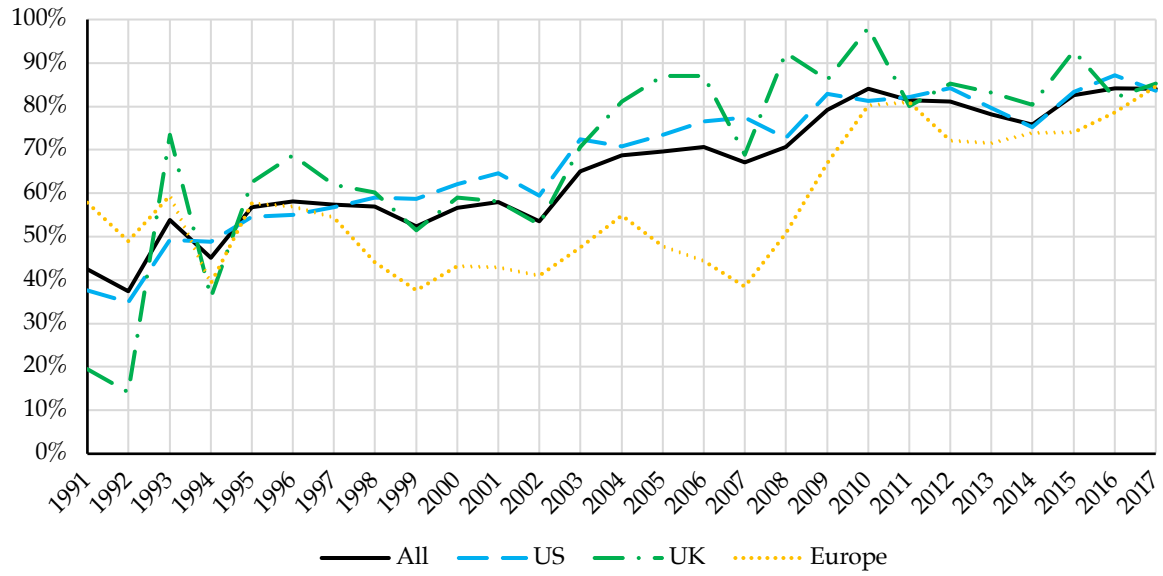
Any change could be the consequence of an intentional decision to rebalance the firm's debt ratio. This can help to alter perceptions of the firm: higher leverage means higher earnings per share and returns on equity—metrics which may be attractive to certain investors or the financial analysts who guide them. This may explain why the debt ratio has seemingly remained lower in big pharma than other sectors in the past; as pharmaceutical innovation is an inherently risky and uncertain business, the major drug companies may have traditionally been less willing to compound this with further financial risk.

Buybacks also necessarily increase leverage, as the firm reduces outstanding equity but not outstanding debt (and if stock repurchases are funded through borrowing then they increase gross debt, intensifying the effect). This should be considered in relation to the data on buybacks presented below. Alternatively, big

pharma may merely have taken on major debts to fund the expansion of various business operations or to finance M&A activity. In the context of a concentrating market with frequent M&A waves—as observed under conditions of financialisation—a high proportion of debt financing can also defend against hostile takeover. These possibilities, along with the previous explanations, should also be considered in light of the different implications of debt and equity in situations such as illiquidity or insolvency, as well as different implications for net income and taxation; moreover, for other tax reasons, shareholders often prefer for shares to rise in price rather than to receive dividends.

The lower debt ratio of European firms somewhat corroborates the idea from the VoC literature that despite closer relationships with banks and greater access to committed debt finance, European firms are more 'conservative' in their financing decisions—this has also been shown by prior studies. (Walker, Zhang, and Ni 2019) These findings could also relate to European firms being more conservative in their disbursement policies, which may increase the value and volume of outstanding shares to help maintain a more balanced debt ratio.

Graph 4-I, Long-term debt (% total debt):

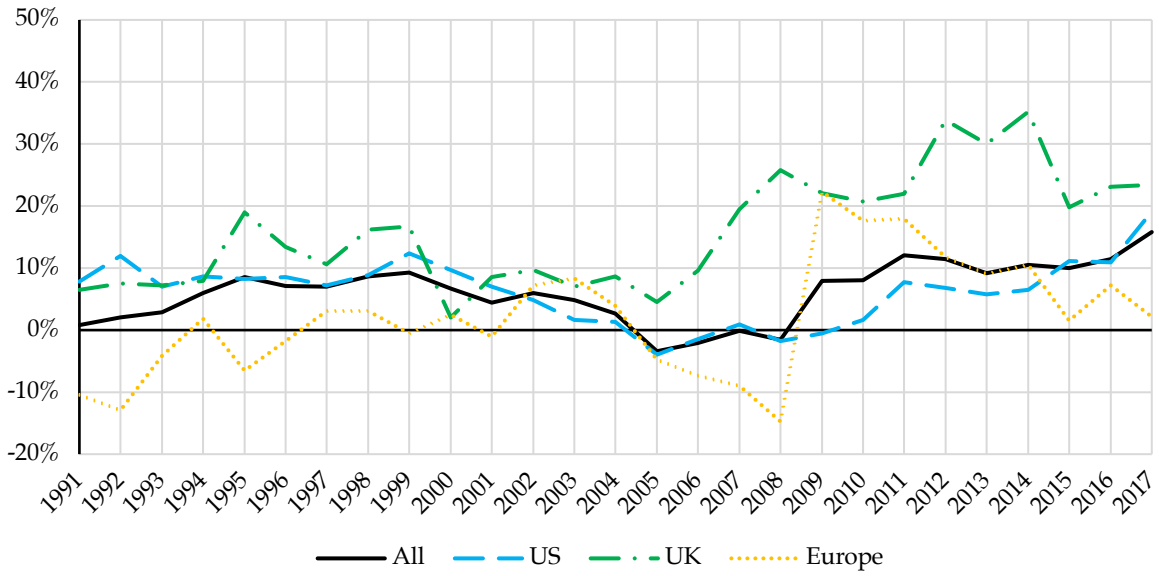


There has been a significant increase in the percentage of big pharma's total debt that is categorised as long-term, to the point that it now makes up more than 80% of total debt in each region. In Europe this increase began only around the time of the financial crisis, whereas it is observed from the very beginning of the period in the US and UK. Europe has also seen the lowest increase from the start to end of the

period, whereas the UK's was the largest. This raises problems for the assumption that European firms benefit from stable access to credit for substantial investment projects (due to long-term partnerships with banks), while the LMEs render firms more dependent upon volatile market sources. This view is commonly advanced within the VoC literature (Hall and Soskice 2001; Lazonick 2010a), though some have suggested that it oversimplifies financing differences between LMEs and CMEs. (Berghoff 2016)

While a relative rise in long-term investments seems to clearly signify an absence of short-termism, a relative rise in long-term debt is more difficult to assess. One way of reading this finding is that firms are planning further ahead and therefore borrowing substantial amounts to fund investment projects that will take many years to pay for themselves. Alternatively, longer maturity on debts could indicate short-termism in the form of 'buy now, pay later' logic—cash on hand increases immediately, while the cost of repayment may be a can that is kicked down the road.

Graph 4-J, Net debt (% total assets):



Big pharma's net debts are substantially lower than the debt ratio may imply: e.g. at the beginning of the period the average debt ratio is around 50% while net debt is less than 1%. Therefore it seems that firms in the sample tend to hold substantial levels of others' debt that offset much of their own debt where possible. Clearly this offsetting of firms' own debts with financial assets has occurred less in the UK, especially over the last decade or so of the period, where net debt is

proportionately higher, sometimes substantially so. This concurs with prior findings that the UK has high levels of non-financial corporate debt. (Karwowski et al. 2020; Karwowski and Stockhammer 2017)

The industry has been a net creditor to other sectors at times (indicated by a negative net debt), in both the US and Europe, but not in the UK. This substantial commitment to lending is initial evidence for a degree of financial rentiership. However, net creditor positions have not been maintained: no region has been a net creditor to the rest of the economy since about 2010, though Europe may be returning to such a position by the end of the period. These findings somewhat contradict the literature on corporate net lending in several ways.

Firstly, the UK non-financial corporate sector as a whole is generally considered to have been a net lender through much of the 2000s; (Chamberlin 2008; deSouza and Epstein 2014; Villani 2019) some studies have contradicted this but still found that UK corporations assumed a net credit position for a few years during the period. (Behringer 2019) Similarly, deSouza and Epstein (2014) find that the UK has higher net lending than the US, France or Switzerland during the 2000s, with the US also significantly higher than France. This is in stark contrast to the data presented here, which show UK big pharma always maintaining a net debtor position—likely because of sectoral idiosyncrasies—and European firms establishing larger net credit positions than US ones.

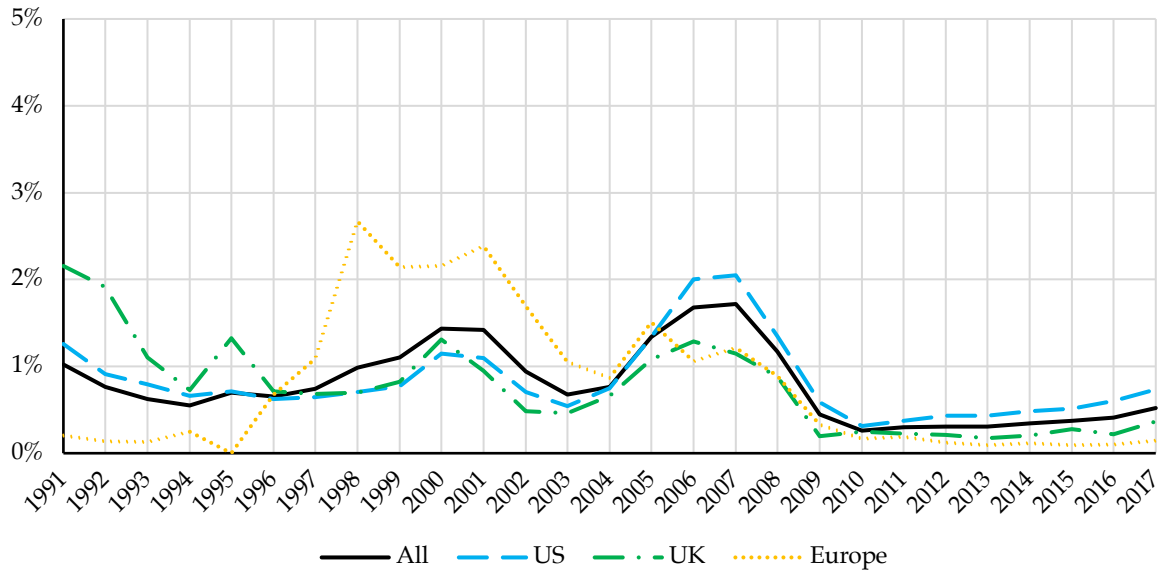
Secondly, some of the net creditor positions occur earlier in Europe than is normally suggested by the financialisation literature, which tends to focus more on 2000s and 2010s. (Behringer 2019; deSouza and Epstein 2014; Villani 2019) They are also both more frequent and greater in degree compared to supposedly more financialised regions. Thirdly, in terms of the overall general cross-country trend, prior research on corporate net lending has generally indicated an opposite direction of travel from around 2005 onwards, compared to what is seen here. (Behringer 2019; Villani 2019)

Finally, by the end of the period, net debt levels seem to be rising in the US but declining in Europe—contrary to the assumption that net lending indicates financialisation unless we assume that Europe is the most financialised of the regions studied here. Taken together, these results are something of a puzzle for those who present financialisation as a phenomenon led by 'Anglo-Saxon' economies that increases financial intermediation and inhibits 'real' investment (leading to greater net lending).

4.3.2 *Interest flows*

In addition to the total stock of various forms of financial assets and liabilities, financial flows should also be considered: i.e. streams of income from financial investments and the cost of servicing debts. In considering interest income and outgoings, it is important to note that general interest rates across the global economy have not remained constant. E.g. the Bank of England base rate began 1991 at over 10% but did not climb above 1% from 2009 to 2017; likewise, the US federal funds rate began 1991 at over 6% and did not climb above 1% from 2009 to 2016; similar declines occurred in European countries in which sample firms were based.

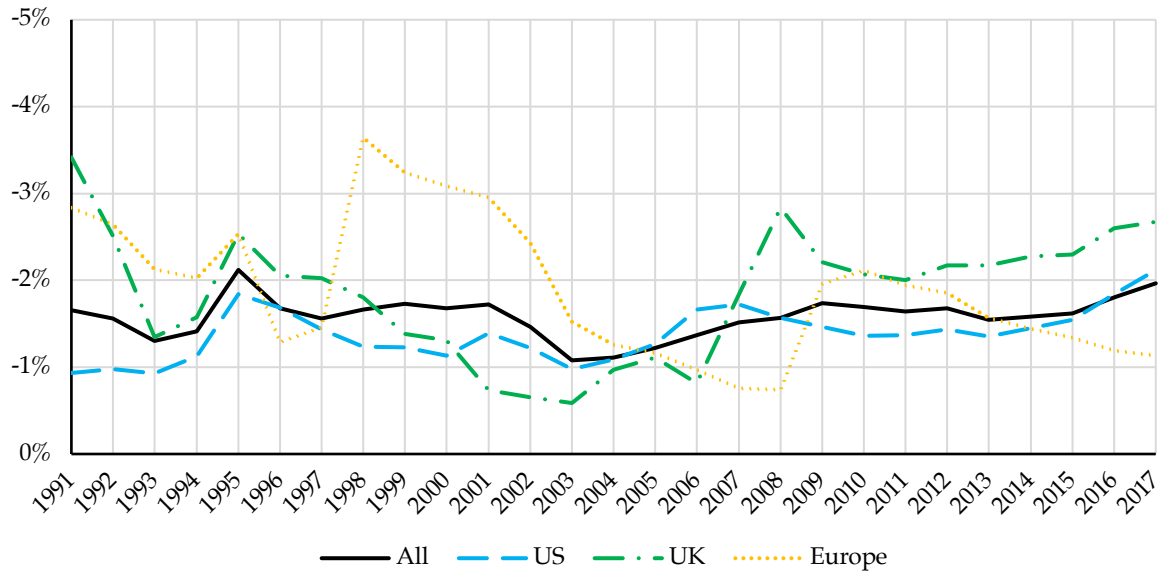
Graph 4-K, Interest & investment income (% total revenue):



As with debt, note that in addition to borrowing funds to finance their operations, firms also act as lenders and thus receive interest income. Interest & investment income follows different patterns in different regions but overall could be said to have declined substantially around the time of the financial crisis and great recession. The UK and US seem to co-vary more closely, while Europe does not track the other regions so well—in particular, there is a major increase from 0% to 2.5% (the highest peak for any region) in the mid- to late-90s, whereas US levels remain steady and the UK sees a slight decrease. It seems odd that European firms once led the pack in terms of financial income, given the expectations around regional variegation of financialisation. The latter part of the period, conversely, does find the US maintaining the highest levels and the lowest in Europe.

Perhaps unsurprisingly, the direction of change—though not necessarily the magnitude—seems to have broadly reflected interest rate movements (at least since around 2000). This may be evidence that big pharma primarily receives investment income in the form of relatively 'safe' interest-bearing assets—most likely government or corporate bonds. This led firms to end the period with historically small (but growing) financial income streams. Again, these results call into question the assumption of financial rentiership, in which financial channels of accumulation are assumed to be of increasing importance to non-financial firms. (Alvarez 2015; Froud et al. 2001; Krippner 2005)

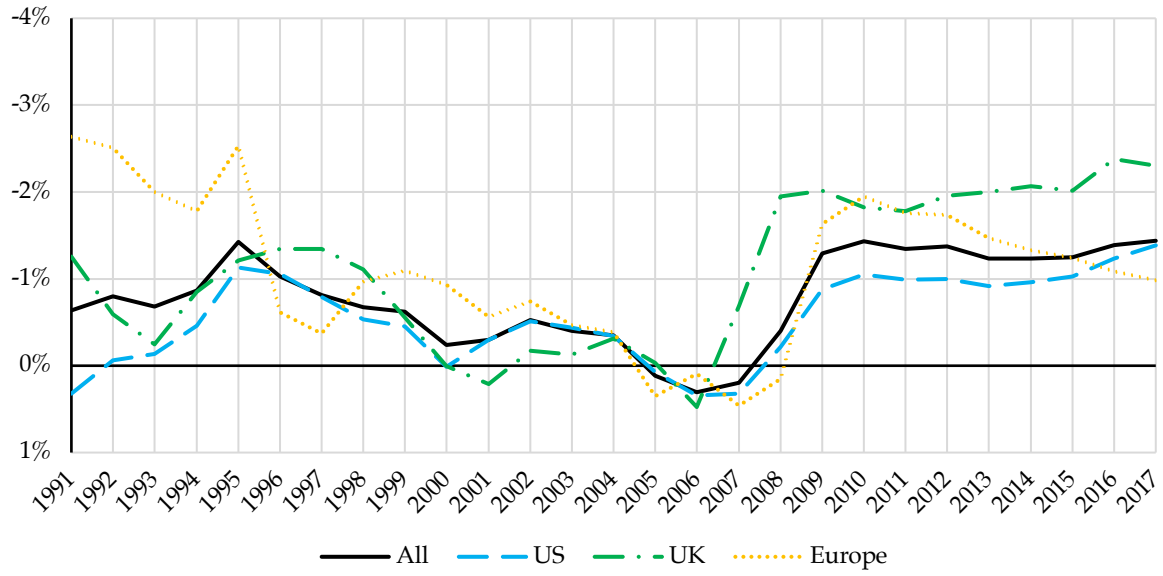
Graph 4-L, Interest expense (% total revenue):



There does not seem to be any clear pattern in interest expense relative to revenue, especially across regions. It has doubled (from a very low level) in the US, but has decreased in Europe, and has fluctuated quite a lot over time, especially in Europe and the UK (making it hard to establish any definite trend across the period).

It is worth noting that this relatively static level of interest expense occurred despite rising debt across the time period. One obvious explanation for this is the very sizeable broad decline in interest rates across the global economy: lower interest rates on higher debts could counteract each other to some extent. Given that interest expense is presented here as a percentage of revenue, another factor potentially contributing to the apparent stability of interest expense would be changes in revenue over the same period that debts and/or interest rates are changing.

Graph 4-M, Net interest expense (% total revenue):



Net interest expense represents gross interest expense minus investment income, and therefore is lower than gross interest expense.[55] While net interest expense declined from the mid-90s, it rose sharply in the late-aughts, and for nearly the last decade remains at a stable level, higher than before.

Taken together with the above data, this net data illustrates how big pharma firms have at times offset their interest costs with financial income, especially around 2005–7, when their investment earnings were large enough to produce a net in-flow of interest payments. However, this has proven unsustainable over the long term, and a fall-off in such income followed by a prolonged plateau has led to somewhat increased net interest payments for the industry.

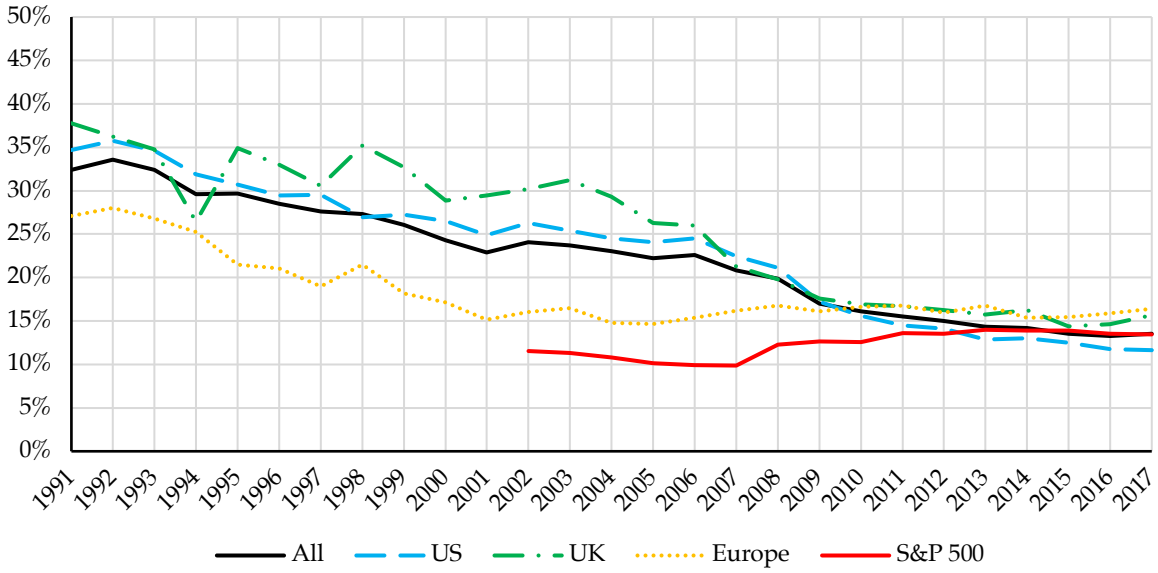
The difference between gross and net is often proportionately less than with debt, indicating that incoming and outgoing interest are not simply proportional to lending and borrowing. Rather, it seems that the relative rates of interest on these activities contribute to determining net flows of interest. One possible explanation for these patterns is that firm investments may be primarily constituted of very 'safe' assets such as government bonds, which attract low rates of interest compared to corporate borrowing costs. This would accord with the more noticeable gap between net and gross lending than that between net and gross interest, as well as the earlier observation that investment income movements for sample firms seem to largely correspond to central-bank interest rate movements across relevant countries.

[55] So long as investment income is non-zero—which it always is, except for one year in Europe.

4.4 Physical assets

4.4.1 Property, plant & equipment

Graph 4-N, Net PP&E (% total assets):



Net property, plant and equipment refers to the original value of fixed physical capital (such as land and machinery), less the value of depreciation.[56] Since depreciation accumulates over time, reducing the current value of the assets, the dollar amount of net PP&E will tend to fall over time unless firms continue to invest in physical assets at a rate that offsets this depreciation. Net PP&E represents a declining share of total assets in all regions, with global levels at the end of the period less than half those at the beginning of the period. However, it appears that after a period of remarkably steady fall, the last several years of the period saw an arrest in this decline. Broadly the same trend has occurred in all regions; Europe started from lower levels, though a convergence has been observed since then.

[56] Depreciation is an accounting practice spreading the cost of a tangible asset (other than land) over its expected usable life and gradually writing down its current value. This has practical advantages, like reducing taxable income. It also has accounting advantages, like matching the cost of an asset more closely with the income it generates over time—in line with e.g. US Generally Accepted Accounting Principles. A similar practice known as amortisation applies to intangible assets. A basic overview of these concepts is available via Investopedia: https://www.investopedia.com/ask/answers/06/amortizationvsdepreciation.asp.

Financialisation scholars have often advanced a thesis of financialisation engendering low and/or declining investment in physical capacity. (Davis 2017; Stockhammer 2004; Tori and Onaran 2018, 2022) The pattern of declining physical assets within big pharma does appear to concord with this. Surprisingly, the S&P500 comparator evinces a small increase. This latter finding is more in line with studies that have challenged the idea of financial investment 'crowding out' physical investment. (Davis 2018a; Kliman and Williams 2014) Of course, PP&E as a share of total assets is a relative measure, and may rise or fall for reasons other than absolute increases or decreases in physical investment.[57] Nevertheless, while limited, even this metric suggests something about the proportionate nature and deployment of corporate resources and thus firms' priorities and strategies.

It should also be borne in mind that PP&E holdings are hardly the best measure of the most relevant and important form of 'investment' in big pharma. Since the sector is made up of R&D-intensive firms tasked by society with delivering medical innovations, it arguably makes sense to afford more weight to R&D spending as the most meaningful form of long-term investment among the sample firms.

4.5 Intangible assets

As mentioned earlier, intangible assets—those that are neither monetary (e.g. cash, stocks) nor physical (e.g. inventory, buildings)—can be broken down into several categories. From an accounting perspective, intangible assets are a surprisingly complicated category; while financial and physical assets are largely accounted for on the basis of what they are and how the firm intends to use them, intangible assets are often accounted for based on how they entered the firm's balance sheet. There are several ways this can occur in relation to IP assets, a key category (especially for big pharma):

- In-house R&D activity (e.g. research staff salaries)
- Contract-based R&D outsourcing (e.g. buying services from Contract Research Organisations)

[57] For instance, a firm that is growing may demonstrate a fall in its net PP&E share of total assets not because it is actually decreasing its investment in nominal or even real terms, but simply because it is accumulating other types of assets more quickly.

- Individual rights transfer (e.g. purchase of a patent or temporary agreement to market a particular drug)
- M&As (e.g. acquiring a competitor, thereby taking control of their portfolio of drugs)

Unfortunately, the distinctions made in corporate accounts are often very coarse: firms normally subdivide intangibles into goodwill and 'other intangibles'.[58] This precludes the measuring of specific types of intangible assets, such as patents or PRVs. It also means that it is difficult to separate intangibles that were generated 'internally' (including through contracted outsourcing), those that were internalised through M&As, and those that were purchased or licensed individually. This separation is possible to an extent, however: figures such as goodwill (which arises only through M&A) offer some indication as to the relative significance of different means by which assets are produced and exchanged. Similarly, R&D data gives partial insight into the innovation activity of firms, though it leaves much to be desired for reasons that will be discussed below.

4.5.1 Research & development

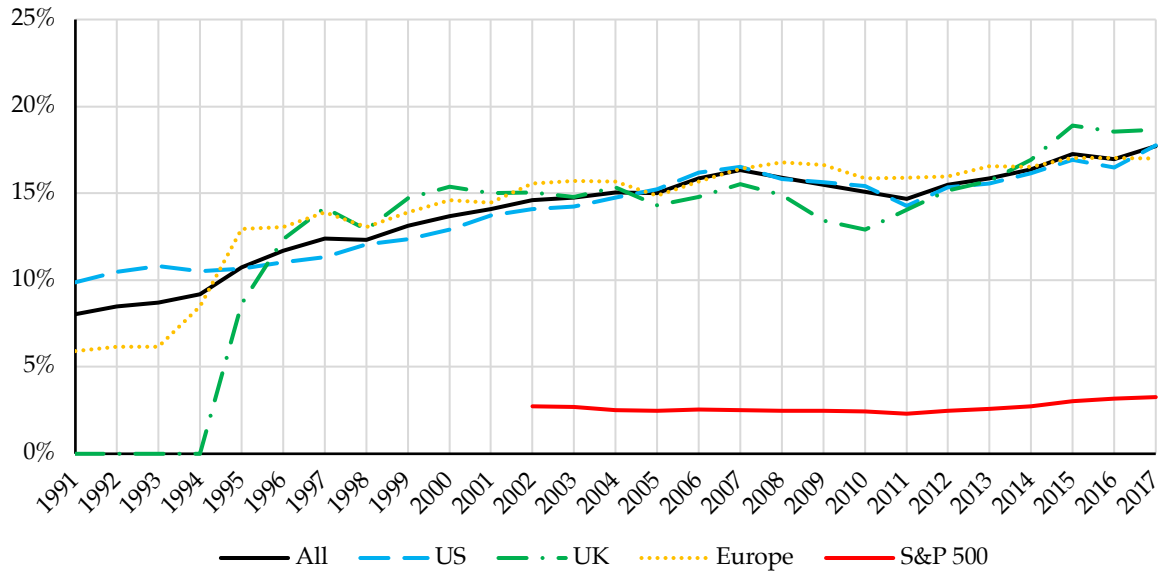
In order to properly comprehend the data that follows—and the limitations of the data—it is particularly important to understand the complexity and variability of R&D accounting. There are two methods of accounting for R&D activity (whether that activity is in-house or outsourced). (Deloitte 2023; Ernst & Young 2021) Perhaps most obviously, a firm can expense R&D, simply recording all of its R&D spending as R&D expense on the income statement in the period in which it occurs. This is essentially the default treatment under GAAP, and was mandatory until 2001.

[58] At least in the main data reported by Capital IQ. More detailed information may be available, at least in some cases, but this would require more laborious data collection and could pose problems in terms of comparability, since more detailed breakdowns of financial figures tend to be more heavily influenced by accounting practices and individual firm-level discrepancies in how business activity is organised and recorded.
For instance, big pharma firms operate with significantly different divisional structures. Some may report all of their pharmaceutical sales under a broad 'health' division that also includes devices and diagnostics; others may separate out vaccines, oncology and other specialisms from their main pharmaceutical division. Yet other firms may report sales divided only by region, such as 'North America' or 'Europe', regardless of product type.

Secondly, a firm can capitalise R&D, adding R&D spending to its balance sheet (as intangible assets). If it does so, some of the spending will be amortised, writing down the value of the asset over time and charging this reduction in value as a cost to the income statement. Accounting rules generally require that R&D spending fulfil specific criteria in order to qualify for capitalisation, if it can at all—otherwise, it must be expensed. (Deloitte 2023; Ernst & Young 2021) IFRS requires capitalising where certain criteria are met and expensing otherwise. In particular, R&D spending that is 'unproductive'—that in excess of the value of any asset yielded—must be expensed.

Thus, R&D expense is not the same as R&D *spending* in the lay sense, since it fails to capture the capitalised portion of R&D. Nor are accounting treatments of R&D activity necessarily consistent across time. Moreover, as mentioned above, there are other ways in which intangible assets constituting the concrete outcome of innovation investments may enter the possession of firms—namely, internalisation from other firms. For this reason, this section will also discuss other modes of intangible asset attainment, such as goodwill from M&As.

Graph 4-O, R&D expense (% total revenue):



The R&D expense share of revenue paints a different picture of 'productive investment' (broadly construed) when compared to the PP&E share of assets. There seems to have been a very steady, sustained increase in R&D expense across the entire period at a global level. This led to the proportion of total revenue dedicated to R&D expense more than doubling between the start and end of the period. By

contrast, the S&P500's significantly lower R&D expense has barely increased since the first year of available data in 2002. Thus while the big pharma global average remains around the same multiple of the S&P500 at the end of the period, the gap is slowly widening in terms of percentage points of total revenue.

As with other line items, there is variation between regions, though with R&D expense it is minor. Prior to circa 1996 there appears to have been a sharp appreciation in R&D expense in both Europe and the UK, but this seems to be an artefact of accounting changes in certain firms rather than a substantive economic development. Certain firms demonstrate striking discontinuities in the data: e.g. both Sanofi and SmithKline Beecham (the latter being the only UK firm reporting R&D data prior to 1995) show a sudden jump from 0% to >9%. These discontinuities do not appear to be a result of straightforwardly switching from one R&D accounting method to the other, but do each coincide with a data source change (DSC) for the relevant firm within the Capital IQ dataset.

Prior to the DSC, both firms showed substantial costs in other line-items—e.g. amortisation, other operating expense—that disappear from the accounts afterwards, whereas R&D expense appears. It therefore seems that much or all of these prior expenses were R&D expenses being categorised under other line items. There does not seem to be a single explanation of these DSCs, but they seem to be the most plausible explanation of the firms' reported numbers, and it is likely that some of the firms changed accounting standards over time, or that different data sources reported data according to different accounting methods. While these apparent accounting changes may overstate the increase in R&D expense, they do not seem to fully explain it: for instance, R&D expense rises for two decades after these changes in the mid-90s, and US firms (which cannot capitalise R&D) adhere closely to the trend of UK and European firms since at least 1996.

This finding of rising R&D expense could be seen to defy gloomy predictions that investment and innovation would be threatened by shareholder primacy, 'crowding out' of productive investment in favour of financial assets, and other aspects of financialisation. (Davis 2017; Lazonick 2016a; Lazonick et al. 2016; Pagano 2014) This is even more so since this R&D data excludes spending on 'buying in' the outcomes of R&D projects completed by other firms (e.g. through M&As or licensing deals), which will be discussed below. It could be argued that a firm's reported R&D expense therefore actually underestimates its total allocation of resources towards 'innovation'—or more specifically, towards securing new intangible assets such as

IP. Of course, practices such as buying smaller firms to obtain their drug portfolios or pipelines do not constitute 'new' inputs to R&D and thus would not be counted towards the sectoral total R&D spending, as this would result in double-counting. However there are two main reasons it could be considered a form of innovation spending, at least from the perspective of the individual firm.

Firstly, acquisition costs can be understood as the ultimate source of funding, paying back the previously-invested funds of the previous asset holder and thus 'transferring' the burden of illiquidity (of having value 'tied up' in the investment rather than in an easily-spendable monetary form). It may help to understand this point by analogy to the ownership of financial assets: current shareholders are commonly called a corporation's 'investors' (or call current bondholders 'lenders') even if they bought their assets on the secondary market, and thus never actually provided any funds directly to the security-issuing entity.[59] The same logic would imply that firms could reasonably argue that some of their goodwill costs effectively represent part of their commitment to innovation (though most people would probably not call them 'innovators' on this basis alone).

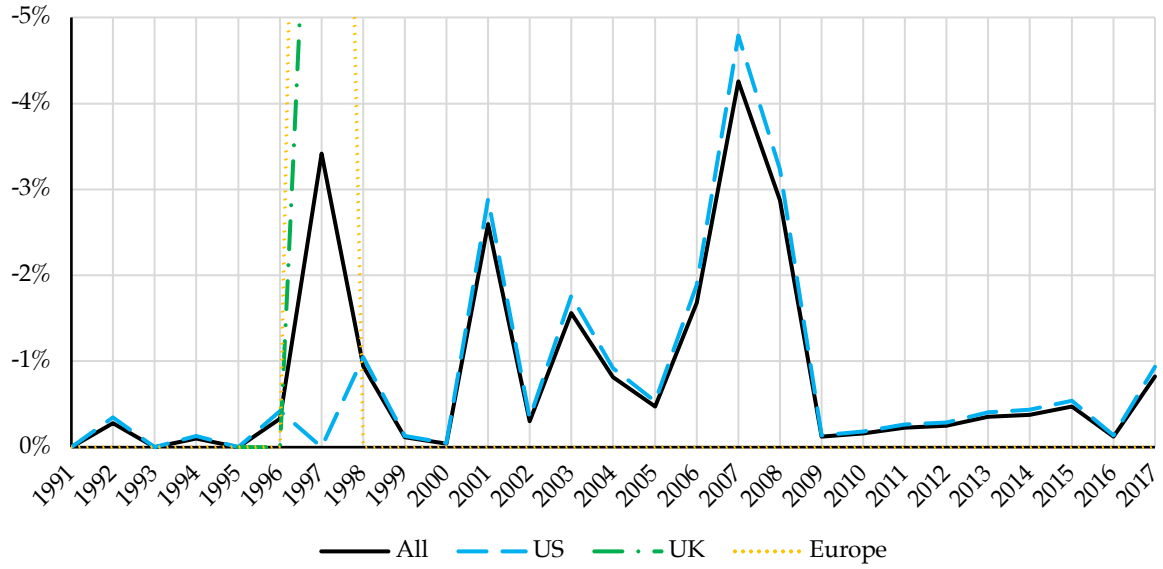
Secondly, and perhaps more straightforwardly, the question addressed is the rising importance of controlling assets (especially intangibles) and how firms deploy resources to this end. From the perspective of this strategic control of assets—or indeed of the commitment of resources to different purposes—it arguably matters little whether a firm obtains a patent at the cost of a certain amount of R&D spending or an equivalent amount of spending on buying a biotech firm that has just been awarded the patent—these are two means of securing the same innovation 'output' (an intangible asset expected to yield a future income stream).

However, it should be noted that from some other perspectives it may indeed matter a great deal which of these two means of gaining an asset is pursued by a firm. After all, not only will reported R&D or intangibles be different but these will indirectly alter other line-items and financial ratios. These different approaches may also have different implications for tax liabilities, cash flow, and so on. Given these

[59] This idea of contributing to innovation via providing exit opportunities to early investors brings to mind the role of Fannie Mae and Freddie Mac in the US mortgage market. They are considered to play an important role despite not originating any mortgages themselves, since they provide liquidity to other institutions. Banks and other mortgage originators replenish their liquid funds by selling mortgages on, allowing more to be issued and thereby improving the accessibility of credit for households.

factors, investors, analysts, and other outside observers may perceive one strategy—or one set of numbers—to be superior to the other, and respond accordingly. Executives will tend not to favour a course of action that they see as likely to impair the firm's access to capital, and much less will they act so as to knowingly degrade their own reputation among board members and investors.

Graph 4-P, In-process R&D expense (% total revenue):



In-process R&D (IPR&D) expense recognises R&D projects that have been acquired through M&A and then expensed rather than capitalised; as such, it reports the R&D that was underway by the target firm in the present accounting period. As with other intangible line-items, there are complex accounting issues and rules that cannot be fully examined here. It should suffice to note that IPR&D expense does not reflect the same kind of internal generation that standard R&D expense reflects, but nevertheless indicates the dedication of firm resources to controlling IP.

There are significant regional variations in reported in-process R&D expense. In fact, most UK and European firms do not even include it as a line-item in the financial statements on Capital IQ. However, in 1997 Pharmacia and Roche report ~10% and nearly 25% respectively; in the graph above, other firms are simply discounted due to their non-reporting of IPR&D expense data, which means that these are also the regional averages for the UK and Europe respectively.[60]

[60] This method was chosen since the true figure could be non-zero but be incorporated within another line-item. If other firms had instead reported zero, the averages would be computed as 3% and 8% respectively.

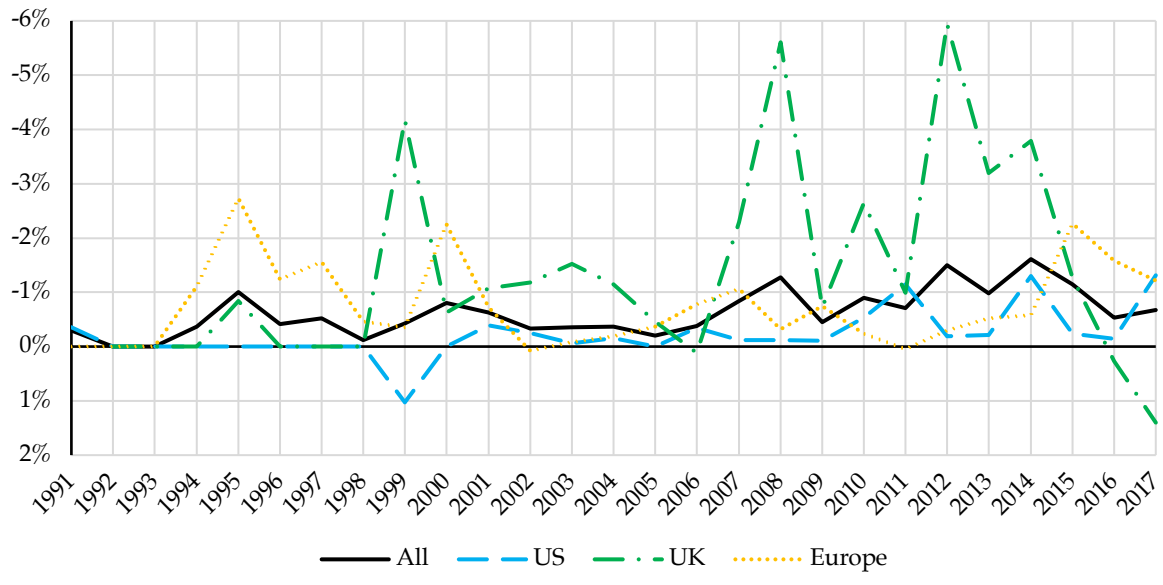
Meanwhile, the average for the US never reaches 5%, and neither does the global average (being heavily influenced by US firms).

The norms of accounting for IPR&D also vary over time, as capitalisation of such acquired projects was increasingly promoted by accounting authorities over time (particularly in the US), similarly to standard R&D expense reporting. Overall, it seems that IPR&D expense ends the period higher than it began, but still at a low level, having previously (erratically) reached levels several times higher during the period from 1997–2008. This is not strong evidence of any particular trend over time, and raises the question of why the middle of the period saw such high levels by comparison with the start and end.

Based on this data, it would be fair to conclude at least that big pharma do regularly acquire ongoing R&D projects, supporting the contention that innovation is being bought in through M&As. (Comanor and Scherer 2013; Danzon et al. 2007; Frantz 2006) However, the evidence is weak and the decline from 2007 in particular requires explanation. It could be that M&As have fallen off after the financial crisis, but this is not suggested by the data below (such as that on goodwill). Another—possibly preferable—explanation is that the decline results from accounting changes. It is possible that more US firms began to capitalise their IPR&D acquisitions rather than expense them, and they therefore appear elsewhere, such as within the balance-sheet data below, rather than as a separate line-item on the income statement.

4.5.2 *Other intangibles*

Graph 4-Q, Purchase of intangible assets (% total revenue):



The literature suggests an emergence and growth of a market for intangibles such as patents, PRVs, etc. The data here confirms that this market intangibles as discrete tradeable assets exists, with fairly constant exchange of assets between firms. This market includes both IP and non-IP intangibles, and involves firms from the sample: in 2012, AstraZeneca sold Pfizer the global rights to over-the-counter Nexium; (AstraZeneca 2012) in 2016, Pfizer licensed its experimental drug PF-00547659 to Shire; (Pfizer 2016) in 2019, Eli Lilly purchased the global rights to experimental drug CNTX-0290 from Centrexion. (Eli Lilly 2019) From 2009 to 2019, at least 6 PRVs were purchased by firms in the sample—Sanofi, AbbVie, Novartis, Eli Lilly, and AstraZeneca twice. (Mezher et al. 2020) These are just a handful of transactions in which specific intangible assets were acquired via a deal between firms rather than the absorption of one by another.

Based on the graph, this market appears relatively small in size overall, with the global average never rising above 2%. However, this share of revenue is many times higher than the share of assets generally dedicated to securities held for trading (undermining simplistic notions of financialisation as a rise in financial assets and dealing). Levels are quite different between regions, with the lowest levels generally occurring in the US; this may contradict expectations that the US would exhibit high levels of IP marketisation. Overall, though, this data further supports the idea of a significant market for technology within the pharmaceutical ecosystem, in which some firms may take different roles or participate to different extents. (Arora et al. 2001b; Arora and Gambardella 2010a; Chien 2010; Yanagisawa and Guellec 2009) Levels also generally seem to rise over time (at least until the last few years of the period), though with significant variation. This broadly supports the rising significance of intangibles, as suggested by much of the literature—especially that focused specifically on assetisation. (Baranes 2017, 2020; Birch 2017, 2020; Birch and Muniesa 2020; Chiapello 2023; Leyshon and Thrift 2007; Rikap 2021; Serfati 2008)

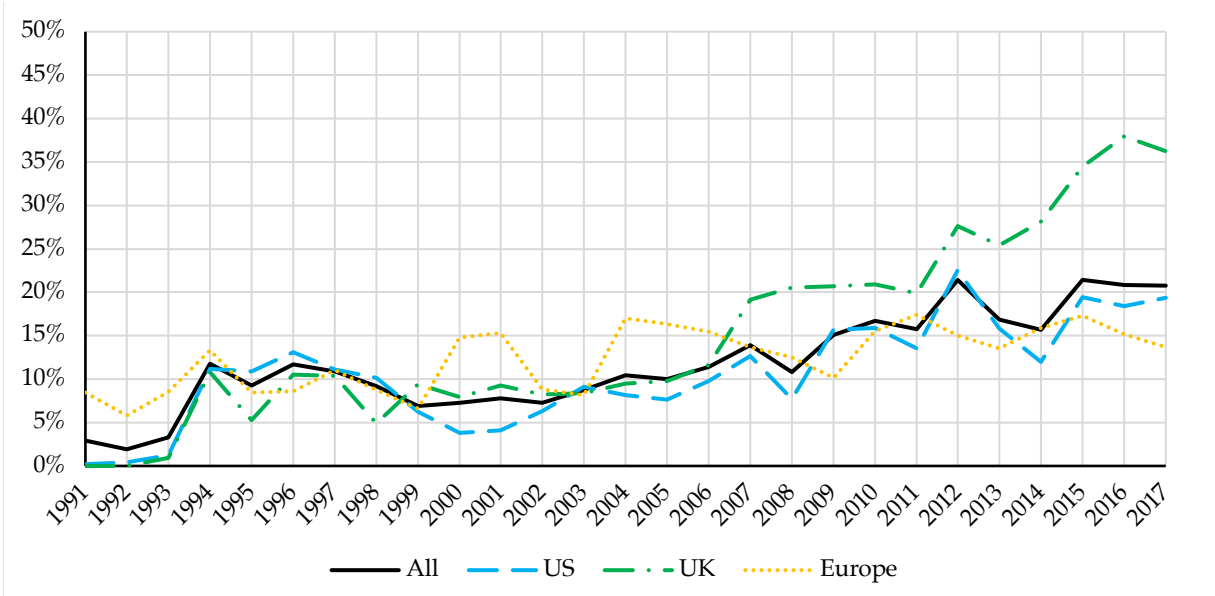
Moreover, it is necessary to observe that the figure for purchase of intangible assets is a net figure;[61] this means that the total volume of trading in big pharma's IP markets cannot be known. However, it will almost certainly be higher than these net figures indicate, since firms may both buy and sell assets in the same year. What can be said is that the cross-regional average consistently indicates net purchases,

[61] A negative percentage here indicates net purchases, while a positive percentage indicates net sales. The graph has been inverted and titled to read more intuitively (with higher net purchases appearing visually 'higher' on the graph despite being a negative number).

suggesting that the sample firms are regularly purchasing more intangible assets from outside the sample group of their own peers than they are selling outside of this sample group.[62] This resembles various accounts in the literature, in which big pharma are said to be sourcing innovation externally from smaller firms through acquisition or licensing of products. (Abraham 2018; Danzon et al. 2007; Gleadle, Parris, et al. 2014; Gopalakrishnan, Scillitoe, and Santoro 2008; Rikap 2019) If these net-inflows come primarily from smaller firms—especially venture-backed biotech start-ups, university spin-offs, etc—then this would further confirm these patterns.

Notably, UK firms are clearly spending more of their funds than US or European firms on purchasing intangible assets as such, especially from around 2006. This may correspond to the higher holdings of goodwill by European firms (and lower holdings by UK ones): one reading of the above data is that European firms are acquiring more intangibles (in the form of goodwill) through M&As, while UK firms are acquiring more intangibles (in the form of patents, licences, etc) through purchasing them from other firms. Other possibilities are discussed below.

Graph 4-R, Other intangibles (% total assets):



[62] This is likely but uncertain, due to the mathematics involved. Measured as a percentage of revenue, purchases and sales within the group will not normally net to zero: for instance, a firm with revenue of $100m selling an asset worth $1m to a firm with revenue of $50m will result in the firms recording 1% and -2% respectively, for an average of -0.5%. As such, the alternative explanation is that smaller firms within the sample are increasingly selling assets to larger firms within the sample.

The ‘other intangibles’ line-item refers to all identifiable intangible assets (i.e. those other than goodwill, which will be explained below). This includes those that are generated internally as a product of the firm’s own innovation projects (if capitalised) and those that are acquired from other firms. The specific composition of these intangibles is unclear from the way the data is reported, but in the context of big pharma they likely consist primarily of IP-related assets such as patents of various sorts and trademarks on drug brand names—as mentioned above, firms in the sample were also known to hold PRVs during the period covered by the data.

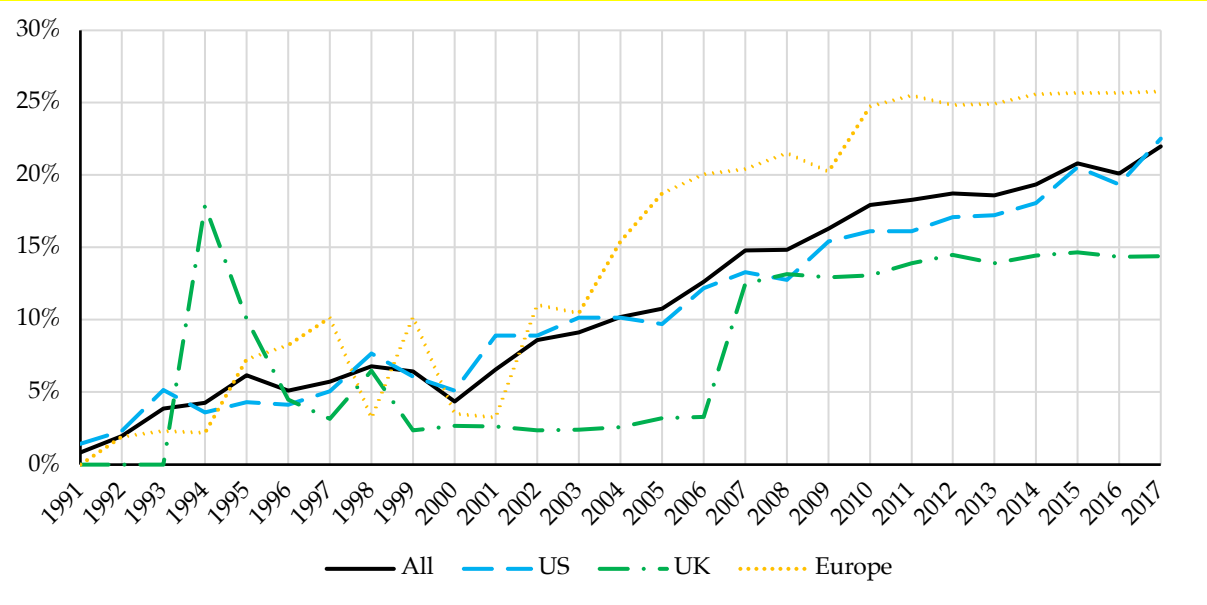
In sum, these identifiable intangibles have risen from negligible global average levels to represent another fifth of assets. Europe initially had the highest levels but by the end of the period has the lowest. Since 2007, other intangibles have been highest in UK firms, and by 2017 were more than double those of their European counterparts. Thus Europe has seen the lowest rate of increase in other intangibles, and the UK has seen the highest. Quite how to interpret this regional difference is unclear: is it a substantial difference in strategy, or just a technicality of presentation? (Of course, both of these explanations could apply in tandem.)

The former could well be the case—perhaps national regulations and institutions or even culture and habit encourage top executives to pursue different means of acquiring IP and other intangibles. Regulations governing M&As and competition law vary by jurisdiction (as do their enforcement in practice); this could result in desired M&As being blocked in certain countries, but the same regulators may not take issue with licensing deals. This could lead to geographic differentiation in levels of goodwill and other intangibles as firms choose M&As where possible and other means of acquisition where necessary. This suggestion is compatible with Europe’s higher goodwill (discussed below), aligning with Europe’s historically greater market concentration and laxer attitude to mergers compared to the US. (Fox 1997)

However, the alternative explanation also seems likely, especially since goodwill and other intangibles may be treated differently by different accounting standards; in particular, rules differ between American and European accounting systems when it comes to the impairment of intangibles. (Deloitte 2023; Ernst & Young 2021) This could contribute to US firms writing down goodwill more rapidly, thus depressing reported levels compared to European firms. Another important consideration is that even within a specific accounting system, measurement of goodwill is often arguably at least as much art as science. (Brown 1995; Ramanna and Watts 2012; Sack Elmaleh n.d.; Wood 2011)

4.5.3 *Goodwill*

Graph 4-S, Goodwill (% total assets):



Goodwill is another complicated concept.[63] In principle, it is an intangible asset, normally taken to represent some advantageous features of the firm that are hard to isolate or measure, often based on such vague notions as customer loyalty or brand reputation. However, firms do not calculate and report the value of their own internally-generated goodwill. Rather, goodwill appears as a measurable accounting phenomenon only as a result of M&As; (Ernst & Young 2021) it is entered on the balance sheet of the acquiring firm with a value to the premium paid over the net fair value of assets and liabilities of the acquired firm (adjusted by amortisation and/or impairment where appropriate).

A firm's balance-sheet holdings of goodwill can therefore be understood as the accumulated and adjusted value acquired through past M&A transactions that does not correspond to identifiable and calculable assets. The measurement of goodwill is often considered difficult and subjective, since it is a residual left over after other assets have been identified and valued. Failure to properly conduct this process of identification and valuation accurately will lead to an inflated or underestimated valuation of goodwill.

[63] The debate over exactly how to understand and measure goodwill goes back more than a century, and is too complex to adequately address herein. (Giuliani and Brännström 2011; Gynther 1969; Miller 1973; Nobes 2021; Wood 2011)

Since the mid-aughts, goodwill has been noticeably higher in Europe, and lowest in the UK. This is a notable deviation from what might be expected—that tactics such as M&As would be more significant in the US and UK. For instance, Bertrand & Zuniga (2006) find that during the 1990s, the UK and US exhibit many more M&As than most of the European countries studied (including France). This should be interpreted with caution, however, since it was merely a count of M&A events; it did not measure their size or compare this to the firm's total resources, as the above data does. Taken together with the data for other intangibles, this might indicate that in fact wholesale firm acquisitions are more common in Europe, while UK firms are more selective about the assets they acquire on technology markets, with the US somewhere in between. However, accounting differences could also explain this, as mentioned above.

Despite this variation, it seems that there has been a huge increase across all regions, and the global average has risen from near-zero levels to over a fifth of total assets. This suggests a sustained and significant concentration of capital within the market through M&As, as the largest drug companies have more or less continuously combined with both each other and smaller firms. It also suggests that these M&As were important to firms, and that they were driven primarily by the search for valuable intangibles. After all, firms either paid significant amounts for the ill-defined 'goodwill' itself, or else were willing to pay this in pursuit of more definable assets held by target firms. For the most part, either tangible nor financial assets could be acquired much more cheaply than through wholesale acquisition (and more easily, given the existence of competition laws), which suggests intangibles as the major motive.

Of course, it is difficult to infer much beyond this from increasing goodwill—if the specific components that made up this goodwill could be known and measured, they would be accounted for as something other than goodwill. While the proportion of big pharma's goodwill that relates to IP and technological know-how or trade secrets cannot be determined, it seems likely to be significant. These assets are generally either entirely absent from the balance sheet, or else valued based on the cost of generation rather than factors such as expected future returns. This means that even IP appearing on the balance sheet is likely to be significantly under-valued unless it has changed hands via the market to establish its competitive market price (since firms are likely to value assets based on their future earning potential rather than historical cost when considering acquisition). The premium that constitutes

goodwill therefore incorporates the difference between the prior value assigned—if any—to IP and the full value as determined by the market.

It is worth noting that since goodwill is a premium paid for an acquisition, it can be arbitrarily large as long as the buyer can afford it, without any additional assets being reflected in this premium. Ordinarily a buyer will attempt to acquire a firm for the minimum price possible, but if there is resistance to a takeover from relevant actors able to sway investors— such as executives, board members or financial analysts—then the acquiring firm may be forced to pay a higher price to convince shareholders to part with their equity. Moreover, firms have been known to enter into bidding wars for desirable acquisitions, driving up the price in the process. (Roy 2017)

One implication of this is that a more concentrated market, or one more averse to M&As, may lead to lower premiums as there is less competition between potential acquirers. As such, it is hard to say how much rising goodwill reflects changes in things like market concentration rather than the extent to which big pharma is dependent upon outside sources to maintain its pipelines. However, market concentration would not seem to explain these results since there is no clear relationship between goodwill's contribution to balance sheets and big pharma's sectoral concentration (there is not a straightforward linear trend towards a smaller sample over time, for instance). It therefore seems that if goodwill values are being inflated by competition over control of firms, then this is related less to mere concentration of the sector and more to changing pharmaceutical-sector strategies leading to progressively greater prioritisation of M&As over time.

Another reservation about the data presented here is that accounting standards have changed significantly over time. E.g. Pfizer's acquisition of Warner Lambert in 2000 used the 'pooling' method, which essentially merges the balance sheets of the two firms based on book value; this was superseded in GAAP in 2001 by the purchase method, which requires the recognition of goodwill based on market value. (Haslam et al. 2013) This would naturally increase reported goodwill, since the pooling method does not result in goodwill being accrued. The purchase method was in turn replaced in 2008 by the acquisition method, which would also tend to increase goodwill at the time of an M&A, but also subjects it to impairment testing (potentially reducing it over time). However, once again it should be noted that there is not a major discontinuity between the data before and after these changes. Similarly, UK and European accounting standards display similar patterns of

goodwill and were not subjected to the first change (having never used the pooling method). This suggests that the trend is substantively reflective of economic reality.

4.5.4 Further comments on accounting

All of the above discussion of intangibles demonstrates how individual line items—like R&D—can mislead without additional context. Executives may even encourage such misunderstandings to manage perceptions of the firm. The 'narrative and numbers' concept emphasises how particular numbers can be selected and presented so as to support a desired narrative, although the numbers also exist independently of this narrative—at least for firms subject to the kind of transparent financial reporting that is standard for public firms in most 'developed' economies. (Andersson et al. 2008; Andersson, Haslam, et al. 2010; Froud et al. 2006; Montalban and Sakinç 2013; Roy 2017)

Such reporting of the numbers provides a means for sceptical scholars (or financial and media actors) to 'test' the narratives and explore their relationship to firm strategy and executive performance. In this case, big pharma's narratives around innovation have a complex relation to the numbers: big pharma firms do indeed spend significant amounts of money on activities that in some form ultimately serve the ends of innovation, and yet much of this does not occur through original scientific contributions (furthermore, the accounts are silent on how much of this is actually conducted in-house).

More generally, and perhaps more importantly, this also demonstrates the way in which naïve readings of economic data can fail to capture complex realities. Even in the absence of managerial myth-making, a lack of context may result in misapprehensions as to the meaning of the data. It would be easy to pull data from a database like Capital IQ or Compustat and draw straightforward conclusions without considering the constructed nature of such data, or its relationship to other metrics. It would have been easy, for instance, for a researcher to overlook the relationship over time between big pharma's interest expense and economy-wide interest rates; of course good research design will reduce these risks, it cannot neutralise them entirely.

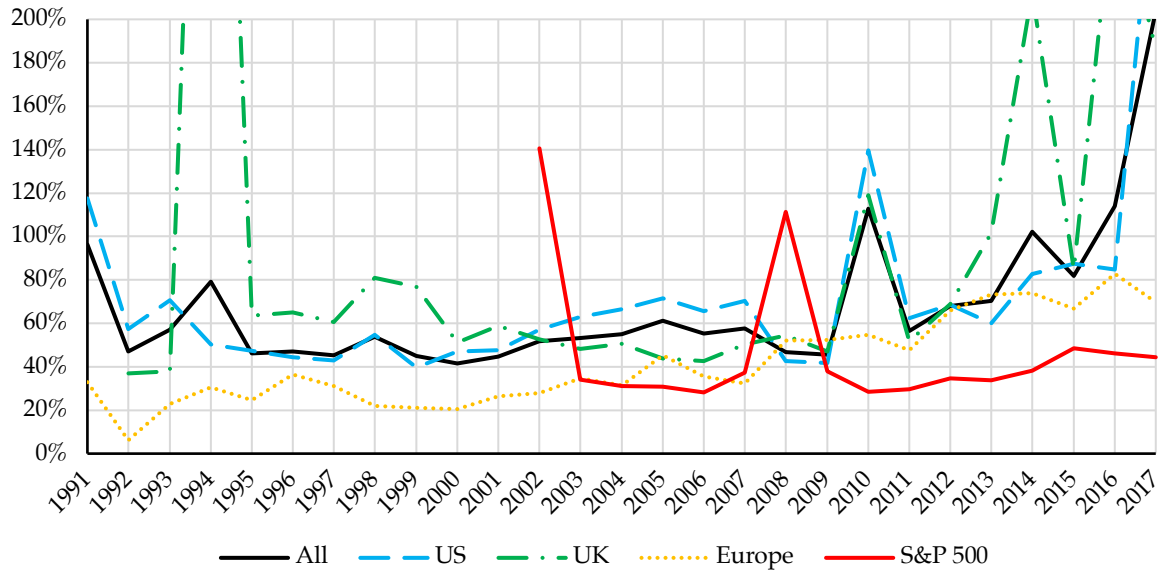
4.6 Disbursement

Firms frequently suffer pressures to disburse value to equity investors via dividends and stock repurchases. In fact, it is often posited that firms, or at least publicly-listed ones, ultimately exist to do just this—produce profits that they hand over to shareholders. This view is particularly common among advocates of shareholder primacy. (Fama and Jensen 1983a, 1983b; Jensen and Meckling 1976) The relative pros and cons of dividends and buybacks are hotly contested: dividends are often taxed at a higher rate than the realisation of share price appreciation, because they are classed as income rather than capital gains; dividends can be used to offer a steady and proportionate return of liquidity to all shareholders over time, whereas buybacks are more 'lumpy' in their redistribution both over time and between individual investors. Large firms tend to use a mixture of both dividends and buybacks, which may imply an attempt by executives to balance the interests of different types of shareholders with different priorities or strategies (e.g. pension funds vs. hedge funds). (Farre-Mensa et al. 2014; Panigrahi and Zainuddin 2015; Voss 2012)

Note that whereas total assets and total revenue must always be positive, disbursement is measured here as a proportion of other metrics that can be negative, primarily net income. As a result, certain data points have been excluded to avoid misleading results, for reasons of arithmetic: a positive dividend or buyback value divided by a negative net income yields a negative percentage. This negative percentage would create the impression of lower disbursement than is the reality, biasing the graphs downwards. In particular, it should be noted that any firm making a loss will automatically pay out more than 100% of its net income that year, even if it issues no dividend and repurchases no stocks, since zero is higher than any negative number. This is important when considering the proportionality or sustainability of disbursement to the earnings from which the disbursement is theoretically made—at least over the long term. Given these excluded data points, the true extent of value distribution is actually underemphasised by the results below—they are distributing more value to shareholders than the graphs would suggest.

4.6.1 *Dividends*

Graph 4-T, Dividends (% net income):



The graph above shows the payout ratio (total dividends ÷ net income). It has been relatively flat for most of the period, except in Europe, where it has steadily grown from the early 1990s. However, over most of the final decade, a growing proportion of net income was clearly distributed to shareholders in dividends. This would seem to be in line with the wider corporate trend towards downsizing and distributing, and the prioritisation of shareholders, so widely observed in the financialisation literature (Farre-Mensa et al. 2021; Lazonick 2014, 2015; Valeeva, Klinge, and Aalbers 2023)—though some of this emphasises buybacks rather than dividends. In particular, these findings corroborate those of Valeeva et al., (2023) who identify big pharma as making large payouts (through both dividends and buybacks) and present this as evidence of financialisation.

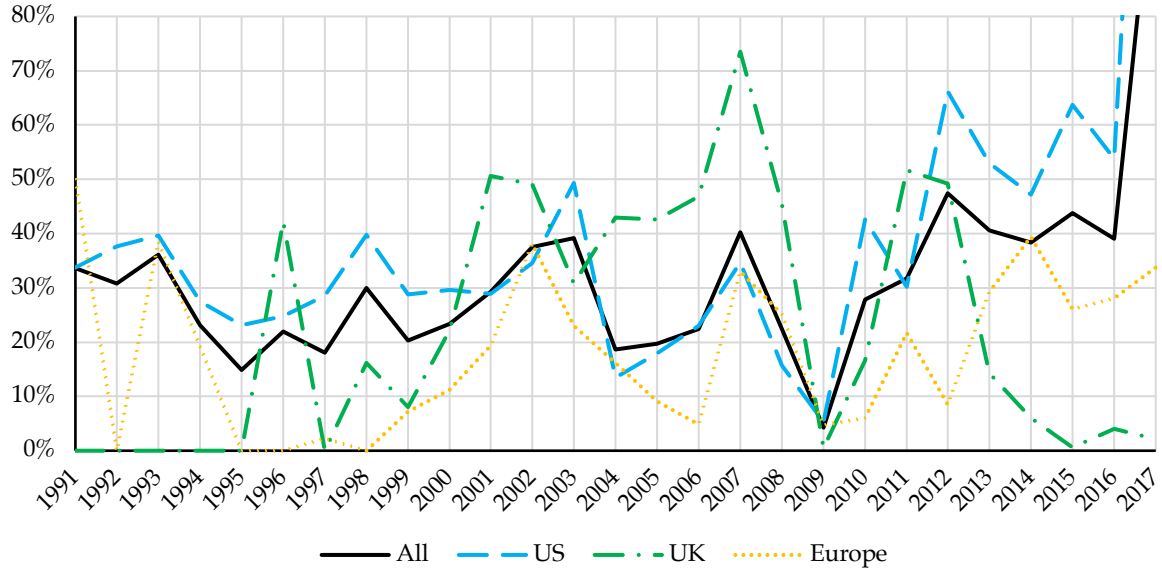
Notably, dividends surpass 100% of the firm's net income in some years for US firms, and even more so for UK firms (though they never do for European firms). In some cases, plotting these points on the graph above would require compressing the scale of the Y axis so much that legibility would be impaired for the rest of the data, including the global average. As such, they have been allowed to go off the chart. In 2017, the US average was 277%. In the UK, 1994 saw dividends averaging 533% of net income; in 2014, 213%; finally, in 2016 dividends were 264% of net income. This practice of paying out more than the firm has made is inherently unsustainable over the long term, but not unique to big pharma (as the S&P500 data in the above graph

shows in 2002 and 2008, recording 141% and 111% of net income respectively). However, it is notable that mean dividends so regularly exceed this proportion within big pharma that the graph above clearly fails to capture many of the more recent the data points for US and UK firms.

4.6.2 *Buybacks*

Buybacks are a more complicated and controversial topic. Much is made of the scale of stock repurchases in the literature, but often this tells only one side of the story. (Cornell 2005; Fried and Wang 2019) Firms often both issue new stock and repurchase existing stock in the same year, meaning that calculations can either use the gross number or use the net after subtracting stock issuance. As explained above, gross figures cannot be less than zero, whereas net figures will be negative when stock issuance outweighs stock repurchase.

Graph 4-U, Gross buybacks (% net income):

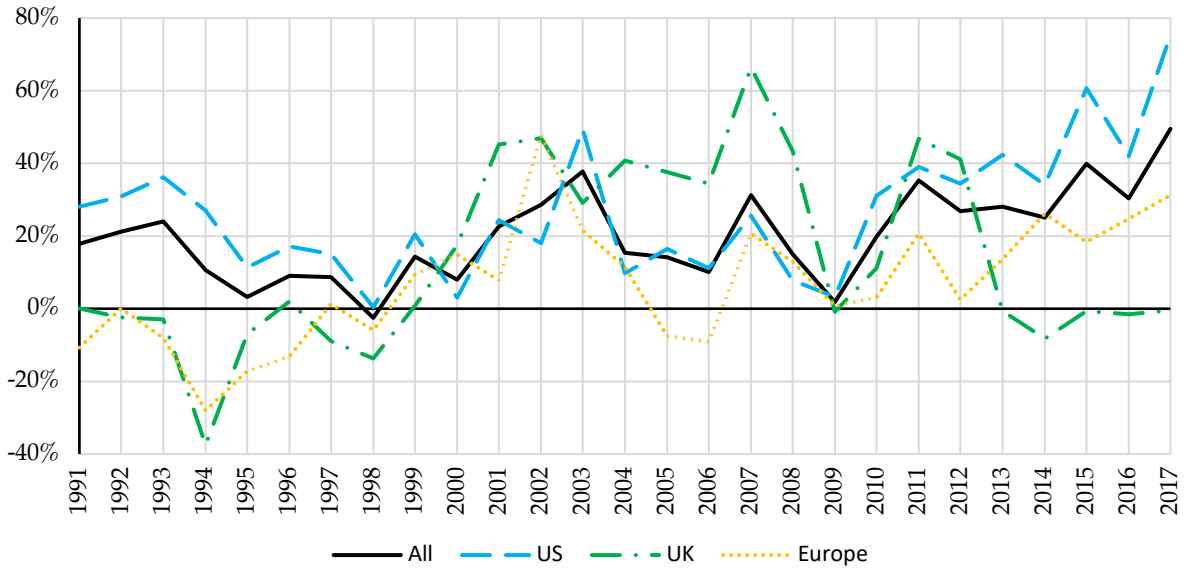


Gross buybacks are shown in the graph above, in proportion to the net income that theoretically funds them, similarly to the graphs showing dividends above. On the whole it does appear buybacks are growing proportionately to net income over time, but there is sufficient volatility in buybacks, and the apparent growth is sufficiently small that this is far from conclusive. For instance, stock repurchases were barely higher in 2016 than in 1993, and there are some noticeable outliers such as 2007 in the UK, 2009 globally, and 2017 in the US.

Evidently, 2009 saw a very low level of buybacks in all regions (and the lowest across the entire period for the US). This is hardly surprising—aside from general recessionary concerns, the period following the 2007–2008 global financial crisis was associated in particular with a 'credit crunch', so firms may have held on to cash to ensure liquidity as lines of credit had dried up. (Crawford 2009; Taub 2009) While dividends were not correspondingly cut back during this period, this may be explained by the expectations investors often have of consistent annual dividends, in contrast to buybacks which are more often seen as periodic events.

Contrastingly, US buybacks saw a major jump to 188% in 2017—the only time buybacks surpassed 100% of net income for any region (bringing the 2017 global average above 100% with it). Since 2017 is the final year of the period, there is insufficient data to conclude that this represents any kind of sustained trend. Some reasons this jump is likely temporary are discussed below.

Graph 4-V, Net buybacks (% net income):



Net buybacks are shown in the graph above, better representing genuine disbursement of firm funds by taking into account the flow of funds in each direction—from shareholders to the firm and from the firm to shareholders. After all, a firm could theoretically issue an arbitrarily large number of shares and then use the funds to repurchase the very shares just issued, and it would be extremely misleading to see this as a vast handout to investors, on balance. The net buyback data makes it much clearer (compared to the gross data) that firms are indeed channelling increasing proportions of net income to stock repurchases, as much of

the literature has indicated. (Grullon and Ikenberry 2000; Lazonick 2015; Palladino 2020a; Palladino and Lazonick 2022; Voss 2012) Both US and European firms clearly maintain higher levels in the final decade than they do in the first decade; the US also exhibits an upwards trajectory in in this later period, as compared to a downward trend in the earlier period. Nevertheless, some major variation remains, particularly in the UK, which has its peak buyback phase in the middle of the period.

It is also easy to ascertain from the net data that the apparently huge jump in repurchase of stock in 2017 is actually not so significant: much of it was outweighed by new issuance. At the same time, the global average and the average of US firms do reach their highest level in this year, so there is a genuine effect of some kind. This net effect seems to be primarily the one-off result of low profits in Johnson & Johnson (resulting in buybacks of 489%) and Bristol-Myers Squibb (who also made greater than usual buybacks in terms of dollar amount, resulting in a proportion of 245%). Abbott and Merck also made proportionately high buybacks, though Merck buybacks had been high for several years.

Of course, these observations explain the jump arithmetically, but do not explain *why* profits were low or gross buybacks were high in this year. That years, Johnson & Johnson recorded a global effective income tax rate of 92.6%, due to the 2017 Tax Cuts and Jobs Act in the US. The new tax regime came into effect at the beginning of 2018, but firms had begun to make provision for tax payments in advance. This was because the act offered a tax holiday on the repatriation of profits from abroad—firms anticipated major tax charges associated with returning overseas earnings to the US. Abbott, Bristol-Myers Squibb and Merck all found themselves in similar positions, also recording high tax liability.

The countervailing impact of stock issuance evidently makes a substantial difference when compared to the gross figure, at times: gross buyback global averages start the period around 30–35%, whereas net buybacks are not above 25% until 2002. At other times, the impact of stock issuance is less readily discernible—as in 2003, when the global average for both is a little under 40%. On the whole, net buybacks seem to illustrate slightly more clearly the increase in buybacks that has occurred over the period, with a larger gap between gross and net buybacks early in the period compared to later in the period—particularly in the UK and Europe. For these sub-samples, negative annual average net buybacks occur mostly in the first decade of the period; however, UK firms have returned to net stock issuance in the last half-decade, coinciding with a period of much-reduced gross buybacks. Notably,

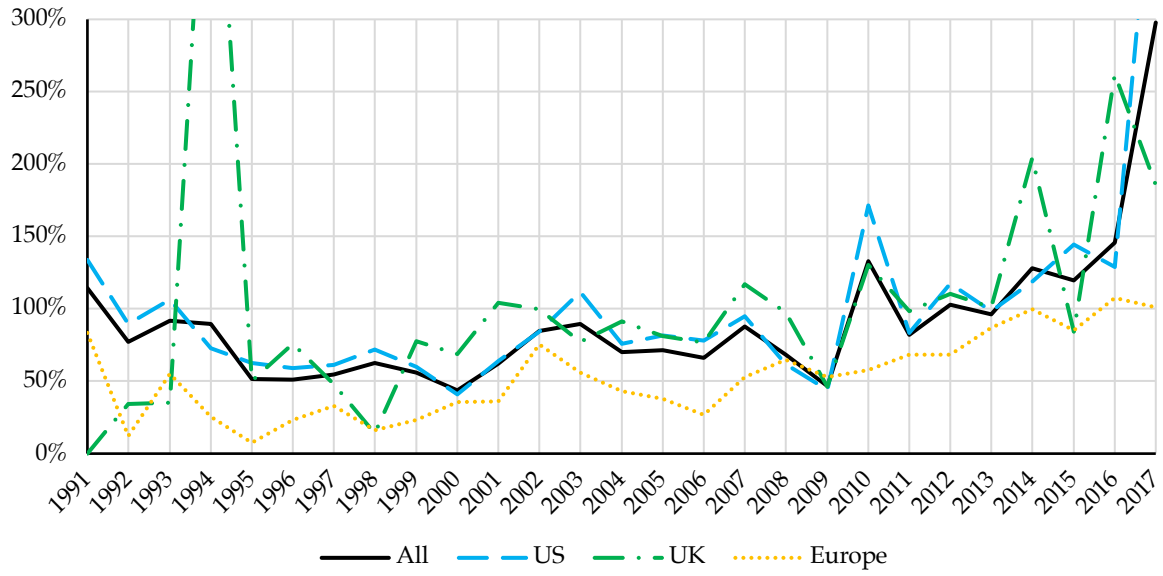
average net repurchases are never negative for the sub-sample of US firms (though they are occasionally negative for individual US firms).

The period around the great recession—already noted to have had low gross buybacks—is one example of gross and net measurements closely aligning. While firms generally drastically cut back on stock repurchases for a few years following the financial crisis, net buybacks reveal that they did not issue more stock at this time. This could be considered surprising, if firms were pausing their buybacks due to liquidity concerns—it seems like quite a coincidence if they were able to maintain the desired cash on hand by reducing average buybacks to almost zero but barely issuing any new stock.

Firms buy their own shares back for a variety of reasons, so it might be suspected that something else was going on in 2009. For instance, the potential tax advantages of buybacks have sometimes been recognised (Dobbs and Rehm 2005)—it could therefore be posited that buybacks will decline when firms' finances are such that they will not realise these advantages (such as when they are already expecting to make losses). While this may be true, experts have concurred with liquidity being the likely driver behind the collapse in gross buybacks. Howard Silverblatt, an S&P senior index analyst who has regularly commented on buyback trends assessed that "Companies are concerned about money." (Crawford 2009) Specifically, Silverblatt explained that "The need to conserve capital in the current recession, combined with the uncertainty of future cash flow, has made buybacks a high risk component for corporate planners." (Taub 2009)

4.6.3 *Total disbursement*

Graph 4-W, Net disbursement (% net income):

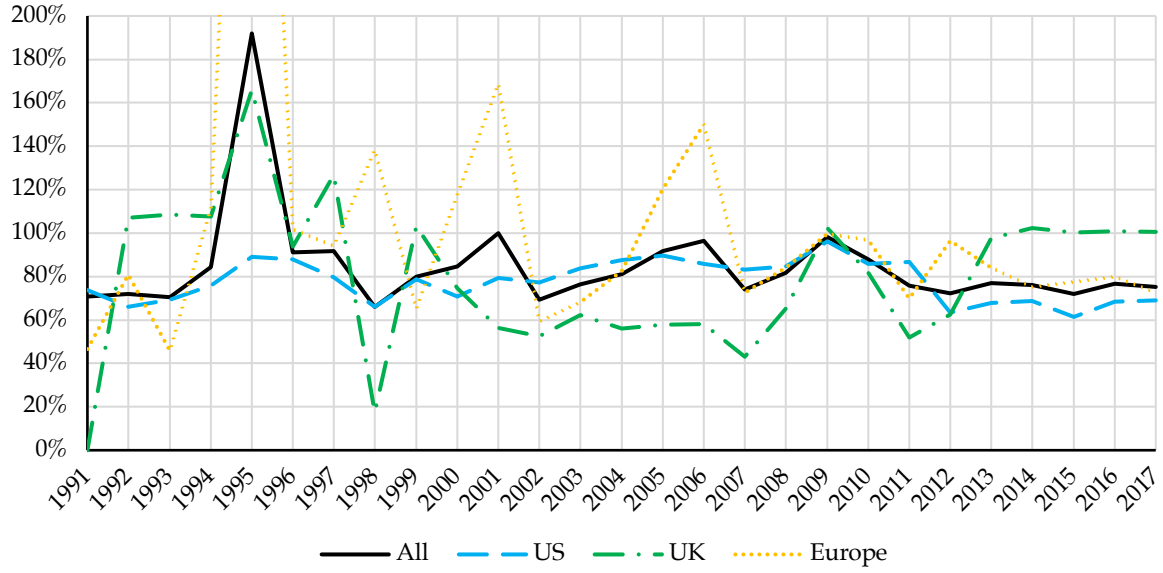


When disbursement through dividends and net buybacks are combined, they broadly appear to be broadly rising across all regions particularly from circa 2009—even if 2017 is disregarded as an outlier. While this rise aligns with the predictions of the shareholder primacy literature, it follows a nearly two-decade period in which the global average largely oscillated between around 50% and 100%, rather than rising. This calls into question the assumption that the transition from 'retain and reinvest' to 'downsize and distribute' in big pharma can be traced back to the 1980s, when shareholder primacy is often considered to have taken hold. (Grullon and Ikenberry 2000; Lazonick 2008b, 2013, 2015) The data presented here suggest that the major shift in corporate priorities towards short-term satisfaction of shareholders occurred later than this—in big pharma, at a minimum.

This combined metric also illustrates how unsustainable disbursement has been in recent years, with US and UK firms regularly paying out more than they have made over the final decade of the period, and by the end of the period even European firms are more or less paying out all of their earnings on average. Firms cannot keep paying out more than 100% of earnings forever, and this high rate of disbursement is particularly concerning given the nature of the pharmaceutical sector: capital-intensive and research-based, with long-term repayment of up-front investment. While it does not appear to have done so as of yet, if this trend continues for a long enough period of time it seems likely that payouts to shareholders above

and beyond net earnings could eventually crowd out other uses of funds, such as R&D.

Graph 4-X, Dividends (% net disbursement):



The graph above shows dividends as a percentage of total net disbursement (dividends + net buybacks). Comparing the two means of disbursement in this fashion reveals that there is no trend at a global level for buybacks to make up a larger or smaller share of total disbursement (discounting an outlier in 1995, driven by Europe and to a lesser extent the UK). This is because while buybacks have increased, dividends have also increased. The only regional average that appears to display a clear tendency upwards or downwards is Europe, declining due to the disappearance of spikes that were present from 1994–2006, in favour of maintaining what seems to be more of a 'baseline level' has been maintained.

The aforementioned European spikes rise above 100% of net dividends; UK dividends similarly rise above 100% during the 1990s, and again from 2014. This is possible because while dividends cannot be negative, net buybacks can when more stock is issued than bought. Such disproportion speaks to the widespread corporate norm of maintaining shareholders' dividends where possible, even if more equity capital is simultaneously being raised through net stock issuance.

Globally, dividends fairly regularly average between 70–90% of net disbursement, with less fluctuation in recent years. Dividends therefore continue to represent the majority of funds distributed to shareholders, despite a growing literature criticising apparently rising buybacks. The ratio of dividends to buybacks

also somewhat contradicts this literature's framing of the US as the centre of the ostensible buyback trend, as it is actually much more consistent in the US than in other countries (although dividends do seem to be less significant in the US in the final half-decade than they are in other regions and than they mostly were in the previous two decades).

There are several possible explanations for the clash between this critical literature on buybacks and the present findings. Firstly, the former may simply represent a storm in a teacup, exaggerating the true scale of a more moderate shift. For instance, Lazonick (2014, 2015) presents data which, impartially viewed, could be seen as little cause for belief in a major ramp-up of buybacks in recent decades. Rather, at least from the mid-90s and with the exception of a single-year spike, the relationship between dividends and buybacks could broadly be said to fluctuate, overall—though prior to this, stock buybacks were indeed proportionately lower. However, more recent data does suggest a sustained priority of buybacks over dividends for nearly a decade. (Palladino and Lazonick 2022) Secondly, overall corporate or stock-market trends may not closely track specific sectors of the economy; there could genuinely be a buyback mania, but big pharma may simply not be participating in it. This would explain why data from the S&P500 survivor group seems to tell a different story than that from the present big pharma sample. (Palladino and Lazonick 2022)

Thirdly, and perhaps most importantly, trends may differ slightly depending on how the data is analysed and presented. For instance, buybacks might be measured relative to different metrics (e.g. revenue, gross income, net income) in different studies, they might be measured in gross or net terms, or they might be measured in absolute values that are either nominal or real-terms; data might then be aggregated, or averaged to a mean or median; there are yet more potential decisions to make. Thus there are many permutations of possible findings working from the same reported raw firm-level data.

As such, it is quite likely that a primary driver of difference between the present findings and those influencing much of the financialisation literature is the choice to use net buybacks in computing the present data. By contrast, much of the literature compares gross buybacks to dividends and net income; (Grullon and Ikenberry 2000; Lazonick 2014; Lazonick and Tulum 2011; Palladino and Lazonick 2022) this is an inappropriate means of measuring flows of value out of firms to shareholders, since it ignores the corresponding inward flows which may counteract such payouts.

Nevertheless, it should be noted that some prior literature does indeed demonstrate the importance of buybacks partly through illustration of negative net stock issuance. (Lazonick 2008b, 2015)

4.7 Discussion

4.7.1 Financial rentiership

Overall, the evidence above is mixed in terms of its support for different characterisations of the pharmaceutical sector. It concords to a certain degree with the ideal-type of a conventionally financialised sector (one built on financial rentiership). Physical assets are in decline, with at least some forms of financial investments clearly on the rise. The accumulation of goodwill within the sector suggests growing significance of M&As over time, and disbursement to shareholders is high and increasing (to the point of unsustainability, over the long term).

However, on balance the evidence does not suggest the shift towards financial channels of accumulation that has been suggested by various scholars. (Demir 2007; Froud et al. 2001; Krippner 2005, 2011; Orhangazi 2008a) Rather, financial investments are in decline—at least across the latter half of the period. In particular, big pharma clearly employs different financialised strategies and techniques from the automotive sector, in which the literature has repeatedly emphasised the importance of financial assets and income. (Borghi et al. 2013; M. J. do Carmo et al. 2021; Froud et al. 2006; Froud, Haslam, et al. 1998, 2002) Firms are largely net borrowers (increasingly so), and are not holding securities for short-term active trading; in fact, financial investments are increasingly long-term. Income from financial investments seems to decline towards the end of the period and has neither crowded out R&D nor offset the cost of servicing debts. Some findings are ambiguous: increasing long-term borrowing might be understood as the entrenchment of careful financial planning and investment to fuel future profits; equally, it could indicate a 'worry about the cost later' mentality, particularly given the low interest rates prevailing throughout much of the period.

Taken together, these various findings do not easily conform to a financial rentiership thesis that envisages 'real economy' corporations slowly transforming into de facto money-lenders and hedge funds. Rather, the evidence seems to indicate that big pharma firms have adopted some but not all elements of what might be

considered the corporate financialisation 'package,' primarily those consistent with shareholder primacy (such as outsourcing functions of the firm while increasing disbursement to shareholders). Investment and disbursement patterns within this sector clearly deviate from the broader economy to some extent, as does the level and type of financial holdings. This accords with the idea, increasingly taking hold over the last decade or so of scholarship, that financialisation is variegated and contextual. (Auvray et al. 2021; Berghoff 2016; Bonizzi 2017; Epstein and Power 2002; Karwowski 2020; Powell 2013; Shah 2018; Ward et al. 2019) It also lends weight to suggestions that we should be cautious about blanket statements of non-financial firms becoming financialised, particularly if this is taken to mean financial rentiership. (Auvray and Rabinovich 2019; Christophers 2012, 2015b; Rabinovich 2019)

4.7.2 Intellectual rentiership

Meanwhile, the intellectual rentiership thesis closely fits many of the observations made above: goodwill and other intangibles are clearly rising over time, as is R&D expense. M&As aside, firms in the sample are net purchasers of intangibles from outside of the sample, which accords with the expectation that big pharma will maintain an in-flow of intangibles from smaller firms through buying rights to drugs and other specific intangibles. Firms are also increasingly taking on long-term debt commitments, which may be driven by the need to finance the in-flows of intangibles—and possibly to match the long time-horizons of R&D to long-term funding.

This assessment that some form of 'assetisation' accurately describes the state of big pharma as of 2017—and the process through which it has taken this form over time—should not be taken to undermine the reality of significant financial influence. Financial logics and conditions seem to have effected changes beyond what can be explained in terms of assetisation alone. E.g. higher levels of disbursement—increasingly in the form of buybacks—can be understood as appeasing shareholders (especially institutional and insider shareholders) at the expense of other stakeholders, such as workers or creditors, who might prefer the funds to be kept in the business and spent on other things or saved to increase liquidity. (Andersson et al. 2007; Charreaux and Desbrieres 2001; Fligstein 2005; Stout 2012c) This is in line with widespread assertions of increased financial pressures on firms, with shareholder primacy often accused of playing a major role in this increase. (Fligstein

and Shin 2007; Lazonick and O'Sullivan 2000; Palladino 2020b; Sneirson 2019; Stout 2012b)

In fact, it is notable that the strongest indications of financialisation in big pharma relate less to the manner in which assets are held or profits generated, and more to rate and form of value extraction by shareholders and creditors. This could explain the seeming emphasis on shareholder primacy and payouts (as opposed to channels of accumulation and financial assets/income/profits) in previous research on pharmaceutical financialisation. (Andersson, Gleadle, et al. 2010; Busfield 2020; Lazonick et al. 2017; Montalban and Sakinç 2013; Su 2012; Tulum, Andreoni, and Lazonick 2023; Tulum and Lazonick 2018)

Some prior literature *has* examined the ostensible growth of financial assets within the pharmaceutical sector, but these findings are questionable or of limited generalisability. For instance, a case study of one early-stage firm (Gleadle and Haslam 2010) showed cash as a percentage of sales increasing, but there is little reason to assume this is reflective of big pharma due to the different niche occupied by said firm. Nor was the data entirely convincing in establishing a sustained tendency: only five years of data were collected, and the firm was notably early in its life-cycle.

Klinge et al. (2020) also find rising financial assets, but their method is problematic: they measure cash and short-term investments both in absolute dollar terms and relative to fixed capital. The former choice is indifferent to inflation or enterprise growth; the latter is dubious since physical assets have consistently and significantly declined over the period examined (as a share of total assets). The choice to compare financial to fixed assets is doubly questionable given that Klinge et al. explicitly acknowledge R&D investment as a major component of big pharma productivism. The same study, however, notes the increasing importance of intangible assets (this time presenting the data relative to total assets).

4.7.3 Intellectual rents, financial payouts?

In other words, while the assetisation literature more accurately describes the role of financial and intangible assets in pharmaceutical business models, the financialisation literature is correct to identify what might be seen as financial *pressures* on firms. Specifically, the data above reveals that big pharma evince a rise (on the creditor side) in debt ratio, net debt and net interest expense, alongside growth (on the shareholder side) of disbursement through both dividends and

buybacks. It is worth recalling the thought that assetisation may form the basis for financialisation, providing the latter process with the necessary 'raw materials' on which financial speculation can take place, etc. (Baranes 2017; Leyshon and Thrift 2007)

All things considered, these mixed observations appear to support a synthesis of lenses from the financialisation and assetisation literatures. It seems that firm-level financialisation has commonly been understood from two perspectives. One such perspective focuses on the making of money out of money by firms; this draws particular attention to financial assets on the balance sheet and financial profits on the income statement, as well as financial innovation and the employment of financial techniques such as securitisation. The other perspective focuses on the extraction of money from firms; this foregrounds shareholders in particular but also takes account of creditors and occasionally the pressures created by other financial actors such as analysts.

Big pharma does not appear to be financialised in the former sense—perhaps the inherently R&D-intensive and long-termist nature of the sector has inhibited the pursuit of these strategies, or perhaps profit rates are higher than those that would likely be achieved through financial operations. However, big pharma does not seem to have been insulated from the latter kind of financialisation—increasing resources are devoted not only to shareholder payouts but also to debt payments. Meanwhile, increasing shares of total assets are allocated to intangible assets, though often the creation of these assets is effectively outsourced.

It therefore appears that the elements of assetisation recognised in the pharmaceutical sector may be fruitfully considered as one mode or perhaps implication of financialisation, where the latter concept is understood as a heterogenous assemblage of related but contextualised and qualitatively-different phenomena. While the exact relationship between financialisation and assetisation could be debated at length (especially given the various definitions used in the literature), a good starting point is Chiapello's suggestion (2023:2) that "Birch and Ward's assetization means financialized assetization of financial and intangible assets" (and that what assetisation adds to financialisation is "attention to intangible assets as well as financial assets").

4.7.4 The geography of financialisation and assetisation

Regional variation was also not entirely as predicted. In particular, the beginning of the period conforms much less than expected to the predictions about regional variation: Europe displays surprisingly high levels of financial stocks and flows, alongside lower levels of net PP&E than anticipated. It should be noted that several of the European firms are Swiss, and despite being presented as a CME by the VoC literature, Switzerland's large and sophisticated financial sector could render it an exception to the generalisation that Europe is less financialised. It is noteworthy in itself that almost all of the largest long-established pharmaceutical firms are based in national economies that host advanced global financial centres.

4.8 Summary

In summary, this chapter has presented a range of statistics describing the evolution of big pharma over 2 and a half decades. On the one hand, firms have taken on more debt and made greater payouts to both shareholders and creditors. On the other, their cash holdings have not tended to gain importance, and their financial investments seem to be largely in mundane, safe assets and are increasingly long-term. Meanwhile, more firm resources are being dedicated to innovation through both R&D spending and indirectly via asset acquisition; as such, intangible assets (including goodwill) occupy a greater and greater portion of the balance sheet.

These results demonstrates that if the industry can be said to have undergone financialisation, then this has certainly not taken the form of a major reorientation towards financial asset-holding and profit making, as has sometimes been supposed. Rather, the empirical evidence indicates that the world's top established drug companies can more truthfully be described through the notion of assetisation, with particular emphasis on intangible assets.

These findings, of course, relate specifically to the small group of firms that could be said to unequivocally constitute big pharma. Dynamics and business strategies within the broader pharmaceutical sector may be different for firms that occupy alternative niches within this ecosystem. The following chapter will examine other elements of this broader picture, discovering some of the ways that financial

pressures and logics can intervene via small firms (and funds, as external actors exploiting the financialised and assetised nature of the sector).

5. QUALITATIVE ANALYSIS: THE NARRATIVE

5.1 Overview

The following case study relates the career of Martin Shkreli (also briefly summarised in a timeline below), considering in particular what we can learn from the strategies he pursued as the CEO of several pharmaceutical firms. As explained below, Shkreli never assumed leadership of a firm that would be considered big pharma; rather, this chapter offers an examination of the business practices of smaller pharma firms. This broadens our view of the overall financialised pharmaceutical sector to incorporate more elements of this ecosystem, including how relatively R&D-naïve firms may nevertheless control drug distribution and pricing, with the potential for major detrimental impacts on patients.

In addition to this, Shkreli's background in finance—working for and then managing hedge funds—is discussed in terms of its relevance to understanding the financialisation of non-financial corporations, due to his (apparent) transition from the one 'world' to the other. As such, the case provides an expansive perspective on pharmaceutical financialisation, from the "speculative end" of financialisation's "value chain" (Leyshon and Thrift 2007:100) to the intangible asset curation and exploitation that can be understood as the overlooked "frontiers of financialization" (Tellmann 2022:33) in this context.

This analysis is therefore offered as evidence for two major elements of pharmaceutical financialisation in particular. Firstly, it illustrates the minefield of competing financial pressures that pharmaceutical firms must navigate, from demanding shareholders to often-unfounded attacks by short-sellers. Secondly, it shows cognitive financialisation in action—how the rise of managers with financial backgrounds may divert the firm's attention and efforts from traditional 'productivist' R&D strategies towards optimal commercial exploitation of existing 'undervalued' assets, and in some cases speculative financial operations (such as shorting competitors). Both of these elements together reinforce the growing importance of assets—particularly intangible assets—and the shift towards centring their creation, optimal exploitation, and trading.

[Table overleaf]

Table 5-A, Timeline of Martin Shkreli's career up to founding of Druglike:

2000	Martin Shkreli begins career as intern at Cramer Berkowitz
2006	Elea Capital Management founded with Shkreli as managing partner and fund manager
2007	Elea bankrupt, owing Lehman Brothers $2.3m
September 2009	MSMB Capital Management founded with Shkreli as managing partner and fund manager
February 2011	MSMB Capital ceases trading
February 2011	MSMB Healthcare founded with Shkreli as fund manager
March 2011	Retrophin founded with Shkreli as CEO
September 2012	MSMB-C and MSMB-H winding down announced to investors
September 2012	Retrophin goes public (via reverse merger rather than IPO)
March 2014	Retrophin acquires Manchester Pharmaceuticals, and thereby rights to Chenodal
2014	Retrophin puts Chenodal into closed distribution and increases price fivefold
May 2014	Retrophin acquires US rights to Thiola
August 2014	Retrophin puts Thiola into closed distribution and increases price twenty-onefold
September 2014	Retrophin fires Shkreli as CEO but invites him to continue as board member and senior adviser
Late 2014	Turing founded with Shkreli as CEO
August 2015	Turing acquires US rights to Daraprim
August 2015	Turing puts Daraprim into closed distribution and increases price forty-threefold
September 2015	Turing expelled from biotech industry body BIO

October 2015	Imprimis Pharmaceuticals announces plans to sell compounded pyrimethamine as an alternative (for some) to Daraprim
November 2015	KaloBios majority-owned by Shkreli, who becomes CEO
December 2015	Shkreli arrested, released on bail facing charges
December 2015	Shkreli resigns as CEO of Turing
December 2015	KaloBios fires Shkreli as CEO
February 2016	Shkreli pleads the fifth before House Oversight Committee congressional hearing
August 2017	Shkreli convicted of three out of eight charges
September 2017	Turing renames itself Vyera in the US (Swiss parent renamed Phoenixus)
March 2018	Shkreli sentenced to prison and fined
December 2019	CREATES act signed into law, ostensibly ending the closed distribution loophole
January 2020	FTC sues Shkreli for anticompetitive scheme
March 2020	Dr. Reddy's & Cerovene launch first generic pyrimethamine on the US market
November 2020	Retrophin changes name to Travere
January 2022	Shkreli is banned for life from pharmaceutical industry and from being an officer or director of a public company, handed further financial penalties
May 2022	Shkreli released from prison to halfway house, less than five years into his seven-year sentence
July 2022	Druglike founded with Shkreli as CEO

5.2 Shkreli's career in finance

5.2.1 Shkreli establishes himself in hedge funds

What follows is a case study of disgraced entrepreneur Martin Shkreli.[64] He earned himself a variety of colourful epithets in the media, many of them carrying disparaging intent. While more will be discussed below, a particularly well-known nickname was the "pharma bro." In many ways, however, this was inapt and misleading. Shkreli had not come to pharma from a background in chemistry, biology, or medicine, but rather via finance.[65]

In early 2000, Shkreli (aged 17) began his career at Cramer, Berkowitz & Co. (hereafter Cramer Berkowitz), a hedge fund established in part by Jim Cramer.[66] He remained there for several years, reportedly completing an internship and then working as an analyst and/or associate. At the same time, Shkreli was completing a BA in business administration at Baruch College in New York. At the age of just 19, while still at Cramer Berkowitz , he recommended a trade that raised eyebrows at the SEC. They investigated the possibility that he had inside information, but no illegality could be proven. After leaving Cramer Berkowitz, Shkreli moved through other firms for several years, including Intrepid Capital Management and UBS Wealth Management.

In 2006, Shkreli established a hedge fund of his own: Elea Partners (also known as Elea Capital Management, hereafter Elea). He is recorded in court documents as the managing partner and portfolio manager of Elea, meaning that he was in charge of running the fund. The same is true of his later hedge funds, which will be discussed below. Elea collapsed in 2007, following what seems to have been a mistaken short bet on a generalised decline in the stock market. Lehman Brothers

[64] A separate appendix lists the non-scholarly sources used in the construction of this case study, including news articles, regulatory filings, court exhibits, social media accounts, patents, and other documents. Academic literature cited in this chapter appears in the bibliography.

[65] Ironically, despite serving as the head of multiple pharma firms, Shkreli may actually have less relevant training than many of his former compatriots in finance—Glabau (2016:¶5) claims that "In healthcare- or life science-focused firms or divisions of large [venture capital] firms, much of the staff has training in the life sciences or medicine, often holding PhDs or MDs, with a few MBAs as well."

[66] Cramer is best known as the presenter of financial programs on CNBC, including *Mad Money* and *Squawk on the Street*, but has an extensive career in finance and financial media beyond this: e.g. he co-founded financial news site *TheStreet* and authored books on finance.

(hereafter Lehman) successfully sued over money owed by Elea, and later in 2007 Elea was ordered to pay $2.3m to Lehman. However, the debt reportedly remains unpaid because of Lehman's own collapse not too long afterwards. Undeterred, Shkreli set up a second hedge fund in September 2009, with his friend Marek Biestek as co-founder: MSMB Capital Management (hereafter MSMB-C), named for its founders' respective initials.

The latter fund built on Shkreli's reputation for supposedly identifying over-hyped biotech stocks—a reputation he had fostered since his time Cramer Berkowitz (e.g. with his well-timed short recommendation regarding Regeneron). In fact, in a post he wrote on investment website *Seeking Alpha*, Shkreli publicly stated his intention to build a "track record" of good investment tips. While some say that "Shkreli had a really good knowledge of who was faking drug results and who was gaming the system," others have indicated that MSMB-C may (at least in part) have created self-fulfilling prophecies. As such, Shkreli's strategy at the time appears to have involved shorting stocks (effectively betting that they will go down in price)[67] and then attempting to influence the price in two ways.

The first method involved influencing other traders: aggressively targeting shorted firms with public criticism and rumours. Of the 15 firms he wrote posts about on *Seeking Alpha*, Shkreli recommended shorting all but two, with varying degrees of zeal. He was "positively sure" that Oncothyreon's main asset would not work; the "BEST CASE" (capitals in original) for Avanir was that shareholders would lose 40% of their equity; in the case of Cytori, he "would submit that these shares are worthless;" another "worthless" firm was Mesoblast; Zalicus received a slightly better assessment as a firm, although one of its main assets was "worse than worthless."

Shkreli also wrote for other sites, including a surprisingly up-front post on *The Street*, which opened with the line "My goal in this article is to persuade you to short Nektar Therapeutics" and stated that "As a short seller, I love it when companies waste their funds on meaningless programs." As well as attacking firms, Shkreli used social media and blogs to do the opposite—to talk up stocks that he liked. He

[67] Specifically, short-selling involves selling stocks that one has not yet purchased. This is done by borrowing stocks from their owner, selling them, buying them back at a later point (hopefully at a lower price), and then returning them to the original owner. This allows the trader to make a profit if the price falls and a loss if it increases, which is the inverse of the relationship between share price over time and profit if one bought first and then sold.

also disclosed long positions in BioMarin and Chelsea, of which he spoke in glowing terms, claiming that Chelsea was one of his hedge funds' largest investments and positing that it would "at least double by the end of the year."

The second method involved influencing regulators: lobbying the FDA not to approve products in the R&D pipeline of targeted firms.[68] One example of the latter strategy was Shkreli's trading of Mannkind (which he had also talked down on *Seeking Alpha*). In late 2010 Shkreli wrote to the FDA, encouraging them to reject Afrezza, an inhaled insulin product belonging to the firm. He attacked the quality of Mannkind's clinical trials (though he did acknowledge that he had a pecuniary interest). This approach seems to have been successful for Shkreli, at least some of the time: Mannkind's shares fell through 2011, and at the start of 2012 the FDA requested further trials, although the product was eventually approved in 2014. Neoprobe's lymphoseek was another case combining these features: a Shkreli short position, Shkreli talking down the stock (which was "worthless" in his assessment at one point), Shkreli petitioning the FDA, and the FDA ultimately issuing approval.

5.2.2 Shkreli runs into more trouble

The fund was running into trouble, and had less than $1k worth of assets in its bank and brokerage accounts by November 30th 2010. This shortage of funds did not preclude Shkreli continuing to exert pressure on other firms at the same time, although on this occasion he set his sights on big pharma rather than smaller players in the sector. Specifically, it was reported in December 2010 that he had prevailed upon Pfizer (in whom MSMB-C held shares) to appoint an outsider as its new non-executive chairman; *Forbes* later wrote that William Steere (former CEO) was removed from the board as a result of how Shkreli had "antagonized" the giant of the industry. Meanwhile, to resolve his own firm's problems, Shkreli resorted to fraud in order to raise more cash from investors. He told an investor just days later that the fund had $35m in assets, which influenced said individual to hand over an initial $1m, followed by another $250k in January 2011. In total, Shkreli managed to solicit ~$3m in this manner for MSMB-C.

MSMB-C made another bad bet, in February 2011, short-selling over 32 million shares in Orexigen Therapeutics. Shkreli proved unable to deliver the shares or

[68] This strategy would later gain the attention of scholars who saw it as a perversion of the regulatory process. (Feldman et al. 2017)

otherwise cover its position when the share price recovered, having lied that such shares were on hand to MSMB-C's brokers, Merrill Lynch. The latter was eventually forced to close out the position at a cost of over $7m, though following arbitration a settlement of $1.35m was agreed. MSMB-C made another $1m of losses around the same time, wiping out most of the additional investment the fund had recently received, and leaving it with less than $60k worth of assets in its bank and brokerage accounts at the end of February.

These events seem motivated by the establishment of what was commonly known as MSMB Healthcare (hereafter MSMB-H), which is described in court documents as having been founded "in or about February 2011" and was certainly operating by the end of March 2011.[69] The two funds were run in largely similar fashion, and MSMB-H was established only after MSMB-C had run itself into the ground financially twice. Clearly the explanation for the establishment of a second fund is that it allowed Shkreli to deceptively raise new funds from investors in significant volume, without having to answer difficult questions about the financial health of the first. Once again, investors would be lied to about Shkreli's track record, lied to about assets under management, not informed about the money owed to Merrill Lynch, and so on. Shkreli raised around $5m in this way for MSMB-H—though he had told one potential investor that the fund had $55m.

What was Shkreli doing with these hedge funds? How successful were his trades, long and short? While a firm shorted by Shkreli did generally see a fall in share price in the short term, it would often rebound in the long term: many of the products he slated were eventually approved. These outcomes were at odds with his public claims: that studies were inaccurate, products were deeply flawed, firms were (perhaps imminently) approaching bankruptcy, and share prices would decline to nothing. If it were charitably assumed that Shkreli was trading on the basis of genuine beliefs about the viability of products and firms, it would become difficult to explain the fervour with which he stated his views, and even more so his petitions to the FDA prevailing upon them not to approve particular products. After all, if there was a strong case not to approve a drug it seems unlikely that the FDA would need a hedge fund manager—one who did not have any qualifications or experience in the relevant sciences—to point this out to them.

[69] SEC filings reveal the existence of at least three MSMB entities. MSMB-H seems to have been the trading name for MSMB Consumer, though this is uncertain.

However, it should be remembered that the ultimate fate of a product or firm is of little concern to the (short-term) short-seller; rather, the change in share price during a certain period is what matters. Delay may be just as good as complete obstruction, even if the final outcome of regulatory review remains unaffected, since Shkreli's short positions would have been closed out before the ultimate FDA approval. As an article on investing website *Seeking Alpha* put it: "before this controversy [of the FDA's delays over Affreza] is settled, many shorts [of Mannkind stock] will begin to cover." A smart short-seller could therefore make money purely by temporarily muddying the waters regarding a firm's prospects.

Shkreli's behaviour seems to be consistent with such attempts at short-term market manipulation. In one of his *Seeking Alpha* articles, he wrote that shorting "overvalued" stocks "allows for any negative surprise at all (even a commentary from Seeking Alpha) to move the arbitrage closer to fair value." At best, Shkreli seems to have been knowingly putting his thumb on the scales: even if he did honestly deem that the firms he targeted were overvalued, his statement above implies that he believed his public statements on stocks in which he had a position could move the price to his own benefit. Most commentators were more cynical than this, and their case is convincing. Steve Brozak—an award-winning financial analyst specialising in health-related stocks—later commented that Shkreli did little more than "use an internet connection and social media" to "beat up on defenseless stocks."

5.2.3 Shkreli claims success (questionably)

In order to make sense of Shkreli's strategy and assess its success or failure, his claimed results—published on *Seeking Alpha*—are crucial. Despite Afrezza eventually being approved, Shkreli's short of Mannkind shows an Internal Rate of Return (IRR) of 173%, where an IRR of 100% means that the investment has doubled in value in 1 year; as for Neoprobe, Shkreli claims an IRR of 1401%, equivalent to a fourteen-fold increase in 1 year, and sagely comments "I will never make this much return this quickly again." Plainly, these are not the kind of returns that would be made by a short-seller of these stocks who believed that these products (and stocks) were headed for failure. All of these suspicions can be confirmed, as Shkreli even gave the dates of his trades: his short position in Mannkind lasted 60 days, while that in Neoprobe lasted 65.

In other words, Shkreli was repeatedly pursuing a tactic of putting negative pressure on a firm's share price for a brief period by talking the stock down, on whatever basis he could justify. He did this with the goal of maximising the return made from shorting said stock, regardless of the actual long-term prospects of his target. In this regard, he seems to have been successful, producing high returns and making few losses—at least when going only by the evidence he presents for the purposes of his aforementioned 'public track record' as of the 19th March 2012. However, around half of these trades were ongoing at the time, and one of these was losing money; Shkreli also did not publish the respective sizes of his stakes, which makes it difficult to assess overall success.[70] More importantly, there is no assurance that these represented all of his trades—it seems likely that they were only some of the bets he made. After all, the *actual* (then non-public) track record of Shkreli's firms tells a different story: it is now known that he had run investment funds into the ground.

All of this was a question of managing his image and controlling the narrative. Much of his behaviour was intended to create impressions and beliefs among others: of his career success, of outstanding returns for shareholders, of other firms teetering on the brink, and so on. Another such example of his misdirection and bravado was some desperate takeover bids by MSMB-C in the summer of 2011. In June, the fund attempted an $82m acquisition of SeraCare Life Science, offering a 22% premium on the going market rate for shares. The deal never completed, but the CEO did resign; in retrospect, CNBC accused it of being a "fakeover," and reported that shareholders and board members at the time had not believed in Shkreli's sincerity.

This was followed shortly thereafter by a hostile takeover bid for Amag Pharmaceuticals. Shkreli claimed that the fund would pay $378m for the firm, offering a 25% premium on the share price at the time; he also stated that if successful he would fire the upper levels of management, who he blamed for the company's malaise. This takeover bid was made in August 2011, in response to a proposed merger, while MSMB-C was still undergoing arbitration with Merrill Lynch over the potential $7m owed by the former to the latter. The proposed merger

[70] After all, a firm could hypothetically make 10 trades each yielding a 200% return, and one trade yielding a -25% return. On these facts alone the firm would appear to be offering unbelievable performance for investors, but this would be highly misleading if the 10 profitable trades involved a stake of $10k each (for a total of $200k profit) and the loss-making trade involved a stake of $1m (for a total of $250k). The net result would be a *loss* of $50k.

fell through, and so did Shkreli's offer. By September 2011, Shkreli had admitted as part of the settlement with Merrill Lynch that MSMB-C had $0 in assets, and it is now known that the fund had not even been trading since February.

It seems apparent that Shkreli never intended to complete the takeover, and certainly never had the means to—unless perhaps of course he could convince other people to part with $378m of their own money to sponsor him. Instead, it seems that there were two key factors motivating his actions. One was simply throwing his weight around—influencing the actions of executives at other firms. The other was to sustain the image of Shkreli's own success as a manager of other people's money and of his fund's growth and returns for shareholders. By throwing down the gauntlet with large sums of purely hypothetical money, a superficial impression could be created that MSMB-C had cash on tap; by trying to block mergers and oust executives, Shkreli assumed the air of someone who knew what was best for corporations operating broadly in and around the pharmaceutical sector.

By all appearances, meanwhile, Shkreli was pulling one of the oldest tricks in the financial trader's book to cover this record up: deny any losses and then try to win them back.[71] In fact, Shkreli was engaging in a variety of scams and schemes run by unscrupulous fund managers; in addition to soliciting investment under false pretences and misleading investors as to how well the fund was doing, he also made improper payments and illegitimately juggled funds between different firms to suit his own interests. To give one example, some investors paid into MSMB-H, only for their money to be 'loaned' to Retrophin as start-up capital—in the sense that Shkreli took it out of one back account and into the other without investors' knowledge. Broadly speaking, the arrangements have been described as Ponzi-like, with Shkreli accused of taking money from later firms to pay back investors in previous ones.

5.3 Shkreli's work at Retrophin

5.3.1 Shkreli founds Retrophin

The next step in this Ponzi-like sequence was Retrophin, a biotech firm founded as an LLC in March 2011, incorporated in September 2012, and taken public via a

[71] To give another example, Nick Leeson famously caused the collapse of the venerable and respected Barings Bank through similar means. It is a familiar pattern among what are commonly called rogue traders, though institutional factors arguably contribute to their seemingly 'rogue' behaviour.

reverse-merger into a shell corporation in December 2012. On September 10th 2012, Shkreli sent a "winddown" email to investors in his hedge funds, saying that the funds would be closed in order for him to focus on Retrophin. Of course, the MSMB entities did not have between them the assets that they claimed to have. As a result, Shkreli offered alternative means of payment to investors: they could forego cash payment and instead accept Retrophin shares (in whole or in part).

Closing the hedge funds did not prevent Shkreli from continuing to play the role of a financial trader—rather than switching horses from finance to pharma, he appears to have been branching out. In fact, SEC filings covering 2013 and 2014 show that Retrophin itself engaged in shorting other firms' stocks; Retrophin's outstanding short positions amounted to around $1.5m on December 31st 2013. Shkreli continued to publish short picks on *Seeking Alpha* during the period he ran Retrophin. He would also—like many CEOs—praise his own firm and try to foster excitement in its prospects. In some cases it was unclear whether comments were straight-faced or tongue-in-cheek: in one blog he implicitly referred to it as the "Best run orphan drug company in the world." Such self-promotion was no doubt aided by his inclusion in the 2012 *Forbes* '30 Under 30: Finance' list, an annually-published list of 30 highly-accomplished individuals under the age of 30 at the time of publication.

With Retrophin, Shkreli adopted a new business model and overall strategy, despite the continued shorting of rival firms. Ostensibly, the firm focused on developing treatments for rare diseases, and there is evidence that this may have been the long-term goal—Shkreli even involved himself personally in the R&D process. This decision is strange, given his lack of formal training in biology; Shkreli claims to have extensively taught himself chemistry, and these are good reasons to believe this. The name 'Retrophin' was a portmanteau of 'recombinant dystrophin', for which Shkreli claims to have written a genetic sequence; this could constitute a gene therapy for Duchenne Muscular Dystrophy (DMD), a life-threatening disease that currently has no cure and limited treatment options. Shkreli has also delivered chemistry lessons via online streams, and is also one of three people credited as "inventors" on patents relating to potential treatments for another genetic disorder, Pantothenate Kinase-Associated Neurodegeneration (PKAN). Retrophin also began testing some of these potential therapies: in March 2013, Retrophin claimed successful "proof-of-concept" from both in vitro and in vivo experiments attempting to treat PKAN; in August 2014, the results of a single-patient trial were first reported in a regulatory filing.

However, attempts to represent Shkreli as an innovative and self-taught scientist may be misleading to an extent. Of the two other "inventors" named alongside Shkreli for the potential PKAN treatments, one was Marek Biestek; this was his old friend and business partner—the MB or MSMB—whose background was also in finance rather than any relevant sciences. The other was Andrew Vaino, who does indeed have a track record in the pharmaceutical sector, having both prior published research and a prior patent. According to Shkreli's lawyers, it was his idea to look for a prodrug rather than a drug.[72] He also allegedly made other contributions, though these are of dubious value or veracity. For instance, it seems unlikely that he literally conducted pre-clinical trials, as claimed—if he did then their scientific value may be in question, and if (as earlier statements seemed to indicate) they were conducted by others then he has no claim to credit for them.

While it cannot be confirmed from the available documents and reports, it could be reasonably postulated that Vaino did most or all of the real scientific work, and that Shkreli and Biestek contributed very little, if anything to the patent. If true, the inclusion of Shkreli and Biestek may have ultimately been 'public relations', and the establishment of another type of public "track record," with which Shkreli seems to have been concerned. It is worth asking, after all, what contribution Biestek made, and whether this indicates low standards at Retrophin for crediting as an "inventor". Even if Shkreli could prove substantial input into the R&D process, the scientific worth would be dubious unless the output was shown to have successful practical applications; this was not the case with his preferred PKAN treatment (called fosmetpantotenate), which eventually failed to outperform a placebo in late-stage trials and was shelved by Retrophin.

5.3.2 Retrophin buys rights and hikes prices

Contrary to this image of being an innovative research-based firm, a major part of Retrophin's operations would involve buying up the rights to existing drugs. In February 2012, Ligand Pharmaceuticals licensed a pre-approval drug then known as DARA (now named Sparsentan) to Retrophin, who continued development. In March 2014, Retrophin acquired Manchester Pharmaceuticals, who held the rights to

[72] Whereas a drug contains the active ingredients intended to constitute the therapy, a prodrug is a substance which the body will metabolise into the active ingredient. In some cases, prodrugs may have benefits as compared to administering drugs.

two approved products: Chenodal (chenodiol/chenodeoxycholic acid) and Vecamyl (mecamylamine). In May 2014, these were joined by the rights to market Thiola (tiopronin) in the US, which Retrophin acquired from Mission Pharmacal.

It should be noted that generally these drugs were acquired from a firm who had either previously acquired the rights themselves or had launched a version of a new branded version drug after the originator's patent expired. DARA had been originated by Bristol-Myers Squibb before being held by Ligand. Chenodiol had been pioneered by Rowell Laboratories with their product Chenix. Mecamylamine was brought to market (as Inversine) by Merck, who sold it to Layton Bioscience, who sold it to Targacept, who withdrew it from the market before Manchester brought it back in the form of Vecamyl. Thiola's origins are unclear, but tiopronin seems to have been in at least investigative medical use by the early 1980s.

It should also be noted that under Shkreli's leadership, Retrophin specifically focused on the US market, generally eschewing the pursuit of other national markets. Retrophin's regulatory filings report the acquisition of only the US rights to Chenodal and Syntocinon (generic name: oxytocin), rather than global rights. Similarly, Retrophin refers to Vecamyl as "the only approved form of mecamylamine in the U.S." and only mention plans to continue supplying the US market. Filings also specify the acquisition of Thiola's marketing rights in the US; the Canadian rights were negotiated soon afterwards, but notably without any further payment. This pattern indicates that there was something specific to the US market which facilitated or enhanced the efficacy of the business strategy; this will be further discussed below.

After their acquisitions, Retrophin raised the price of first Chenodal and then Thiola by proportionately huge amounts. In the case of Chenodal, the price rose fivefold, while Thiola's rose more than twentyfold. Such decisions were not met with enthusiasm by many outside of the firm. In September 2014, *Science* published an article about the latter case by a respected writer working in the pharmaceutical industry; it was titled "The Most Unconscionable Drug Price Hike I Have Yet Seen."[73] Amidst claims of medical breakthroughs on the horizon, but with no proven "track record" of previous R&D success, Retrophin was clearly functioning on the basis of a business model that had little to do with innovation. Instead, it involved buying up

[73] It would later transpire that the writer, Derek Lowe, was wise to include the word "yet," as will become apparent below.

the rights to old drugs and then charging payers prices that would have previously been unthinkable to many (for these kinds of products).

Many were puzzled at how this could be done without being undercut by generic manufacturers. Of course, patents frequently prevent this kind of competition, but neither Chenodal nor Thiola was protected by a current patent, as they were old drugs whose patents had expired. Nor is their ability to monopolise the market explained by any form of market exclusivity like those sometimes offered by the FDA. In such circumstances, the announcement of a severe and permanent rise in a drug's price might ordinarily incentivise market entry by a generic competitor. Such an event opens up 'space' for a generic producer to price their own product higher than they otherwise could (while still competing on price with the brand-name producer), or to achieve a greater market share at the same price (as the greater savings relative to the brand-name drug become a more significant factor in decision-making by healthcare payers).

5.3.3 Retrophin maintains a monopoly through closed distribution

Patents and official exclusivities are not the only way to suppress competition, however; Shkreli had discovered another strategy to monopolise the market. Retrophin shifted both Chenodal and Thiola to closed distribution models: the drugs could only be sourced from a single distributor with whom the firm had partnered.[74] Since this arrangement increases the barriers and burdens involved with sourcing the drug, it would generally be expected to reduce sales. However, in some cases this disadvantage may be outweighed by advantages such as improved safety due to a greater ability to educate and monitor patients who have been prescribed a drug that carries significant risks.[75] In fact, closed distribution—also known by other names such as 'controlled distribution'—was originally intended for just such situations,

[74] Closed distribution is also known as limited or restricted distribution.

[75] Specifically, a closed distribution system is normally—although not always—associated with a Risk Evaluation and Mitigation Strategy (REMS). For instance, thalidomide is known to cause abnormal foetal development, and is therefore only distributed through a controlled system that is designed to prevent any patients using the drug from becoming pregnant (and likewise any patient who is already pregnant from using the drug). This was the restricted distribution system that triggered the Celgene v. Lannett case.

facilitating the use of drugs like thalidomide for useful purposes while limiting their potential unintended harm.

Closed distribution can also offer other advantages, such as ease of establishing patient communities for peer support, or setting up systems for easy and reliable prescription refill. However, Chenodal and Thiola had been in use for some time and it does not appear that any unusual concern about their safety had developed. Nor do the other advantages of closed distribution systems seem to obviously apply in either case (it is hard to believe, for instance, that one would need a support group for kidney stones). In fact, using a closed distribution model was recognised as a potentially risky move in Retrophin's regulatory filings:

> *"The outsourcing of our distribution function is complex, and we may experience difficulties that could reduce, delay or stop shipments of such products. If we encounter such distribution problems, and we are unable to quickly enter into a similar agreement with another specialty distributor on substantially similar terms, distribution of Chenodal® or Thiola® could become disrupted, resulting in lost revenues, provider dissatisfaction, and/or patient dissatisfaction."*

This arrangement, however, did offer a major advantage for Thiola and Chenodal—that of being anticompetitive. Retrophin explicitly noted this in a February 13th 2014 slideshow presentation to investors about the acquisition of Manchester Pharmaceuticals (and thus the rights to Chenodal), and implied much the same in another investor slideshow presentation, this time about the Thiola rights on May 30th 2014. The slides stated that "Closed distribution system does not allow for generics to access product for bioequivalence study." Moreover, this statement appeared on a slide that was not headed "patient education" or "safety" or even "risks," but rather "intellectual property." A similar presentation for Thiola was less explicit but indicated a similar intent: headed "Distribution and Intellectual Property," it claimed that "Similar to Chenodal®, Retrophin will move Thiola® into closed distribution." Such statements were clearly intended to convey an advantage Retrophin would hold over competitors, particularly given that these were presentations to investors.

5.3.4 *Retrophin plans ahead for the end of the monopolies*

The Manchester presentation also went on to say that "Retrophin plans to develop a once-a-day chenodeoxycholic acid and remove Chenodal from distribution at the appropriate time." While vague, this latter statement in the context of this slide context could suggest a plan to evergreen the product if the closed distribution approach failed. Potentially, this may be an unfair reading—the "appropriate time" in question may in fact have been a question of available resources and priorities within the firm, for instance. Supporting this, the presentation regarding Thiola comparably stated that "Retrophin also plans to develop a long-acting version of Thiola® for once daily dosing" and showed a timeline suggesting an extended-release product being marketed within just a few years of initial acquisition. On the other hand, this few years might be as long as Retrophin expected the closed distribution model to protect their revenues—maybe they anticipated some form of regulatory pressure, for instance.

Whether or not evergreening was ever on the cards, it is clear that the plan was to establish a de facto monopolistic status that excluded generic forms of Chenodal or Thiola. Any firm intending to produce a generic product to compete with Chenodal or Thiola would need FDA approval, which in turn would be dependent upon successful bioequivalence testing. Put simply, this testing generally involves demonstrating that two products using the same active ingredients are effectively interchangeable in vivo when administered at the same dose and similar conditions.[76]

[76] The actual definition is more complicated than this, since it allows for deviations such as intentional difference in bioavailability over time in the case of properly-labelled extended release formulations, or surrogate measures of bioavailability for drugs not intended to enter the bloodstream (e.g. topical ointments). According to the FDA:

> "Bioequivalence is the absence of a significant difference in the rate and extent to which the active ingredient or active moiety in pharmaceutical equivalents or pharmaceutical alternatives becomes available at the site of drug action when administered at the same molar dose under similar conditions in an appropriately designed study. Where there is an intentional difference in rate (e.g., in certain extended-release dosage forms), certain pharmaceutical equivalents or alternatives may be considered bioequivalent if there is no significant difference in the extent

In order to perform such comparisons, a prospective generic producer would need sufficient quantities of the name-brand equivalent drug to perform appropriate trials comparing it to their own. As a result, Shkreli's investors were assured in the Manchester presentation that "ANDA [Abbreviated New Drug Approval] filings are impossible unless generic company illegally penetrates specialty distributor" due to the closed distribution ecosystem. Retrophin's plan was evidently to exploit regulations designed to protect consumers from unsafe drugs, instead leveraging them to serve their own goal of monopolisation.

While these quotes make clear Retrophin's objective at the time, the strategy does not seem to have been as bulletproof as they indicated. It was claimed in the presentation that "Recent Celgene v. Lannett case establishes precedent," but this case was actually settled out of court and did not establish a legal precedent.[77] Moreover, the settlement the two parties agreed involved Celgene selling Lannett the pills they needed for their bioequivalence study, so even if the "precedent" referred to is a more informal one, the precedent would actually be in favour of the need to make product available for potential competitors' bioequivalence tests—the opposite conclusion to that apparently drawn by Retrophin and offered to investors. Again, this could be taken as evidence that the long-term plan was evergreening, and that closed distribution was simply a delaying tactic.

5.3.5 Retrophin fires Shkreli

Despite his resourceful schemes such as effectively turning regulatory bodies into market gatekeepers that served his own ends, Shkreli began to fall from favour

> to which the active ingredient or moiety from each product becomes available at the site of drug action. This applies only if the difference in the rate at which the active ingredient or moiety becomes available at the site of drug action is intentional and is reflected in the proposed labeling, is not essential to the attainment of effective body drug concentrations on chronic use, and is considered medically insignificant for the drug. For drug products that are not intended to be absorbed into the bloodstream, bioequivalence may be assessed by scientifically valid measurements intended to reflect the rate and extent to which the active ingredient or active moiety becomes available at the site of drug action."

[77] Another important observation is that the drug in question in that case, thalidomide, was restricted due to established major safety issues, so any hypothetical precedent would not necessarily apply to other drugs.

with Retrophin's board of directors and some of the major investors. One of the major points of friction was that he had been using his personal account @MartinShkreli to tweet in a manner they did not appreciate. The objectionable tweets included encouraging what he called "BIOBabes" at BIO2014 (a biotechnology industry convention) to "Stop by the Retrophin booth," as well as a superficially innocent "this is one of the best days of my life!" Many took the latter to be an implicit leak of insider information, signalling that Retrophin had successfully completed an as-yet-unannounced drug acquisition.

To add insult to injury, Retrophin were troubled around the same time by three anonymous Twitter accounts displaying irreverent and parodic behaviour. The IP address of one such account (@Thug_BioAnalyst) was embarrassingly traced to Retrophin's offices, which reportedly led to confirmation that all three accounts were being run by employees. @Thug_BioAnalyst tweeted praise of Retrophin stock and gave recommendations of other biotechs to short; its style and reference points were mimicked by the Twitter accounts @LegitBiotech and @CletusBurritus. The aforementioned anonymous Twitter accounts also tweeted praise for Retrophin and seemed to implicitly advise buying Retrophin. One @Thug_Bioanalyst tweet read "$RTRX damn bruh, if Cohen is buying then your boy is buyin too nahmean."[78]

All three accounts ceased posting on July 8th 2014, after Shkreli's dressing-down over his personal account and the three anonymous accounts. It would be reasonable to suspect that Shkreli was once again using social media to talk down the stocks his firm was shorting, or at least played some role in inspiring or overseeing the accounts—particularly given the slang-filled 'gangsta' writing style shared by the first two accounts. Not only does Shkreli have a now well-documented interest in rap music,[79] but his own (frequently unprofessional) online persona is at times similar enough to raise eyebrows. To give one example, around 2 months after @Thug_Bioanalyst tweeted that TherapeuticsMD sounded like a "thug short," @MartinShkreli tweeted a photo that he described as Retrophin staff "representing" at an industry event. One shareholder implied that they believed Shkreli was behind

[78] $RTRX was the Retrophin ticker symbol, and the 'Cohen' in question is most likely Steven Cohen, a renowned hedge fund manager who had invested in Retrophin, buying over 5% of the common stock.
[79] Shkreli famously bought a one-of-a-kind album auctioned by Wu-Tang Clan, he offered the same deal to Kanye West, and claims he was tricked out of $15m by someone claiming to represent West; also, a substantial share of Retrophin's total liquid cash at the time was reportedly once paid out for Jay-Z concert tickets.

the accounts in some form, or at least fostering an atmosphere that encouraged them, saying that after "this unprofessional Twitter stuff," they had begun "to question if he's mature enough to run the company."

Either way, Retrophin's board of directors found their patience with Shkreli running thin. Steven Richardson, then chairman of the board, met with Shkreli to warn him that the board were displeased and his position was in jeopardy. Richardson had discovered that Shkreli was encouraging employees to trade stocks by paying them commissions; when confronted about it, Shkreli denied it. The board removed Shkreli from his role as CEO on September 29th 2014. While the 'optics' of ousting Shkreli were beneficial, it is unclear how substantially Retrophin reformed its culture and strategy. Notably, the firm's investment policy was reportedly changed to prevent short-selling, which could signal a break with Shkreli's approach.

Running contrary to this, however, is the observation that Shkreli was not just the CEO but also the founder, and Retrophin was a young corporation. Shkreli had played an important role in assembling the board and selecting the staff; meanwhile, close allies such as Marek Biestek remained in key positions. Also, the firm sold a PRV to Sanofi in 2015—perhaps evidence of a tacit PRV-mining tactic, or perhaps merely smart exploitation of a potentially valuable asset for which the firm had little use internally. It is also important to note, in terms of Shkreli's potential continuing influence on the thinking of other board members, that they did not intend to excommunicate him entirely: Shkreli was encouraged to remain on the board and to act as a senior advisor. Shkreli was apparently affronted, refusing the offer, accessing company documents and computer servers, and saying that if Retrophin would not have him as CEO then he would start a new firm.

5.4 Shkreli's work at Turing

5.4.1 Shkreli founds Turing

Shkreli did just that almost immediately, beginning to set up Turing Pharmaceuticals (hereafter Turing) within about a fortnight, in late 2014.[80] Did Shkreli carry over the culture of financial trading he had overseen previously—and

[80] Turing is often reported to have been founded in early 2015 due to a February 2015 announcement that Turing was launching, but Swiss entity Turing Pharmaceuticals AG reports incorporation in 2014, and by October 13th 2014 www.turingpharma.com displayed a 'Turing Pharmaceuticals' logo.

in particular his shorting practices—to Turing? This seems plausible, though Shkreli may have learned some kind of lesson from his removal as CEO. Unfortunately, Turing was formed as a private wholly-owned subsidiary LLC, owned by a parent company registered in Switzerland, minimising its reporting to the SEC and other regulators. Neither private US firms nor Swiss firms are mandated to report the kind of information that it would be standard practice for corporations to report in the US, such as annual financial reports. As such, information about shorts or other financial trading is not publicly available.

What is known is that Shkreli negotiated the transfer of several assets to Turing from Retrophin (including the aforementioned Vecamyl and Syntocinon, but not Chenodal or Thiola). It is clear that Shkreli's strategy for Turing was informed by his past experience with Chenodal and Thiola: Turing would buy old drugs, put them into closed distribution, and hiking their prices, because this had worked for Retrophin. An undated Turing slideshow presentation that was entered as an exhibit in court declared a "Track Record of Successful Transactions"—further evidence of Shkreli's concern about his "track record." It noted that the Chenodal price had been increased "5x with no pushback from payors," while the Thiola price was increased "21x with no pushback from payors." The move of both Thiola and Chenodal into closed distribution was described as taking place "to improve access *and extend the product lifecycle.*" (Emphasis added)

On August 7th 2015, Turing acquired the US rights to Daraprim (generic name: pyrimethamine). As with Chenodal and Thiola, the acquisition was not the beginning of the story. Pyrimethamine was an old drug, and its patent had long expired by the time Shkreli gained control of Daraprim. It was first developed in 1952 at Burroughs-Wellcome by Gertrude Elion, and approved by the FDA in 1953. It has been on the WHO's List of Essential Medicines since it was first published in 1977. Originally developed as a treatment for malaria, resistance has become widespread and its prescription for malaria patients has declined accordingly. However, it is still used—generally in combination with other drugs—to treat other parasitic conditions (primarily toxoplasmosis and cystoisosporiasis), and for some other purposes.

As had previously occurred with some of Retrophin's acquisitions, Turing stood at the end of a long chain of rights transfers. Burroughs-Wellcome had eventually became part of GlaxoSmithKline, which continued to market Daraprim. GSK sold the US, Canada and Puerto Rico marketing rights for Daraprim to CorePharma, who

transferred the rights to Amedra Pharmaceuticals, a sister company. CorePharma and Amedra were in turn acquired (along with other firms, via their parent company, Tower Holdings Inc.) by Impax Laboratories in March 2015. Impax then sold the rights to Turing a few months later, for $55m. As with Retrophin, Shkreli's leadership of Turing prioritised rights on the US market.

5.4.2 Turing exploits a new monopoly

Shkreli had begun to replicate the process he had undertaken with Chenodal and Thiola before the acquisition had been completed. As early as June, Shkreli instructed employees to implement a closed distribution system "as swiftly as possible." Kevin Mulleady (a Turing executive at the time) said that this plan was "exceptionally time sensitive," and the company's "#1 priority." Shkreli now had immense control over who could get their hands on the drug, allowing him to hike the price as he had done with Chenodal and Thiola. It was widely reported that the increase was ~5500%, whereas Turing suggest it was ~4300%—possibly media sources were working from a slightly outdated Impax price list. In any case, the price hike resulted in a single pill costing $750 at its peak; at this price, a standard course of treatment costs tens of thousands, but for some patients the cost could climb to hundreds of thousands.

The control over distribution that underpinned the monopoly would be taken very seriously: on one occasion in April 2018 (when Shkreli was no longer CEO, as will be explained later) the system had failed and five bottles of Daraprim had been purchased by a company that supplied drugs for bioequivalence trials. The bottles were intended for a generic drug company; Mulleady personally met the owner of the distributor and bought the bottles back before they were sold on to the generics manufacturer, for twice the price they had originally paid. Following this, the firm made reforms to the distribution structure and agreements with distributors, in an attempt to prevent this happening again.

The goal of the close distribution system was clearly the same as it had been for Retrophin—that of protecting against generic competitors by controlling the flow of Daraprim and setting up a clear paper trail that would record and prove any unapproved procurement. In July, Shkreli told an investor that "there are no incoming generics and now that it is closed distribution there will not be any going forward." He also added "even if we get 3 years, it is a great payout," a comment that should be considered in relation to the Thiola presentation's timeline for

introducing a potentially-evergreening extended release formulation. This protection against generic entry allowed Turing an effective monopoly on a market that consisted of over 8,821 prescriptions filled in 2014 (according to IMS health). Impax had already increased the price of Daraprim prior to its acquisition by Turing, but the latter made headlines in September 2015 when the price increased again, on an unprecedented scale. This steep increase in the market price was not motivated by increased costs of producing, distributing or marketing of the drug, nor rising overheads faced by Turing. In fact, the active ingredient remained easy to manufacture and provide at low cost.

Prices can be compared across countries (all converted into US dollars) to demonstrate how the US price for Daraprim set by Turing was completely out of line with factors such as the cost of production. GSK still held the marketing rights in many countries, and sold Daraprim in the UK at around 66 cents per pill, while in India generic pyrimethamine was available for around 5 cents per pill; in Brazil (where drug prices are controlled by the state) Daraprim was priced at 1.5 cents. By contrast, the list price of a single pill in the US had risen to $750; one source explained that "with the money used to buy one tablet Daraprim in the US, you can buy 45,000 in Brazil." Even in the US, where costs such as labour are higher, the pill was reported to cost only $1 to manufacture (although, of course, manufacturing costs are far from the only or necessarily the main component of corporate spending in the pharmaceutical industry).

It thus seems likely that one key reason for Shkreli's focus on the US market was its capacity to bear a higher price. This is partly a straightforward issue of global inequality—i.e. Americans are wealthier on average than citizens of most other countries—but it is also a product of national institutional and policy arrangements. On the one hand, the US market involves disjointed incentives and complex negotiations between producers, distributors, insurers, patients, and other actors; on the other, the US market is significantly less price-regulated than many others.

In a sense, Turing's decision to raise the US price of Daraprim considerably followed a precedent established by Amedra—Daraprim had cost around $1 per pill shortly before GSK sold the rights to CorePharma, who raised it initially to $10. IMS Health confirmed that the Amedra price hike had driven sales nearly tenfold from $667k to $6.3m between 2010 and 2011, while prescriptions remained fairly stable (around 12,700); by 2014 sales sat at $9.9m following another increase to $13.50, more than offsetting prescriptions falling by over a quarter. At the same time, Daraprim's

price hike was an extension of the pattern Shkreli had himself established at Retrophin. This was not only true in the sense that they represented a common strategy, but also that each price hike was proportionately larger than the last, by a large margin. While three events is a limited series from which to extrapolate a trend, it certainly looks as if Shkreli was becoming bolder and trying to see how far he could push the price hikes.

5.5 Shkreli encounters pushback

5.5.1 The public, the media and political figures push back

While Shkreli had suffered major setbacks before, in many ways this was the moment in which he really flew too close to the sun and set in motion the events that would lead to his undoing. The Daraprim price hike attracted voluminous media coverage and—despite some defenders (Plummer, Mitchell, and McMullen 2017)—prompted public outrage. It seems that the "pushback," as the Turing slideshow had termed it, had finally materialised. Much of this focused on the role and character of Shkreli personally, as Turing founder and CEO. Perhaps most famously, Shkreli was branded "The most hated man in America," a sobriquet still being applied as recently as 2022.[81] He also garnered descriptions such as "the worst person of 2015," "everything that is wrong with capitalism," and "the world's most punchable face."

The latter comment was emblematic of how many people were moved to contemplate physical violence by Shkreli's actions. In 2016, Shkreli would auction off the opportunity to punch him in the face, with the proceeds going to the family of a deceased friend; in 2018 even his own lawyer would admit "There are times I want to punch him in the face." In 2016, CNN presenter Jake Tapper memorably commented on air that he was sure "there are many ailing individuals out there who might like to remove Shkreli's smile with the business end of a shovel."

[81] Critics do not seem to be letting the issue go over time. For instance, since 2017 the Lown Institute (a healthcare think tank) has given out the 'Shkreli Awards' "To perpetrators of the ten most egregious examples of profiteering and dysfunction in health care."

The smile Tapper referred to was the smirk Shkreli notoriously wore[82] throughout a February 2016 congressional hearing on the rising cost of drugs, held by the House Oversight Committee. Shkreli appeared, but largely refused to participate, using his fifth amendment rights to refuse to answer questions. In 2015, Senator Bernie Sanders had rejected and returned a $2,700 donation from Shkreli, and in 2016 he tweeted comments such as "The American people are fed up with the blatant profiteering of pharmaceutical company CEOs like Martin Shkreli. It must end." Sanders was hardly alone in taking issue with the price hike.

Nor were these denunciations issued only by the 'usual suspects', predictable critics of corporate malfeasance such as activist groups or public figures on the political left. Donald Trump was forthright in his criticism, declaring "That guy is nothing," calling him a "spoiled brat" who "ought to be ashamed of himself," and labelling his actions "disgusting" and "a disgrace." Similarly, Umair Haque[83] commented that Shkreli "appears to be the lovechild of Voldemort, Scrooge and Faust," and mentioned him as an archetype of the "profiteers and raiders, looters and plunderers … slyly masquerading as capitalists."

5.5.2 *Big pharma pushes back*

Even the wider pharmaceutical industry lined up to distance themselves from Turing. At a conference, Merck's CEO said of Shkreli: "I think it is really important to our industry to make it clear that he is not us. We are a research-based pharmaceutical industry," a sentiment with which John LaMattina (former President of Pfizer Global Research and Development) largely concurred. Smaller firms also spoke out, with the CEO of Alnylam Pharmaceuticals stating "This is not what we do in the biotech industry," and implied that Turing had tried to "cheat the system." One CEO who chose to remain anonymous commented that "Turing is NOT representative of our industry... What he [Shkreli] is doing does not even come close to what our industry is about," describing him as "a disappointment" and his actions as "disgusting."

The industry body representing big pharma, known as Pharmaceutical Research and Manufacturers of America (PhRMA), was also clearly displeased—perhaps due

[82] A journalist covering Shkreli for Bloomberg left her job and her husband after falling in love with him; her memoir about her relationship with Shkreli is called *Smirk*.

[83] For context, the Thinkers50 list, which aims to identify the world's leading thinkers in management, ranked Haque as #45 in 2015, the year that Daraprim hit the headlines.

to concerns about the consequences for its members.[84] Its CEO indicated that these attitudes were shared by many in the industry: "I don't think anyone's been more offended by his actions than what I would refer to as legitimate research-based members of pharma." PhRMA itself was quoted as saying "Turing Pharmaceutical is not a member of PhRMA and we do not embrace either their recent actions or the conduct of their CEO," and tweeted "@TuringPharma does not represent the values of @PhRMA member companies."

While it is true that Turing was not a member of PhRMA (which primarily represents the largest American pharmaceutical firms), it was a member of the Biotechnology Innovation Organization (BIO), the body that tends to represent smaller firms like Turing—Retrophin was also a member. BIO's initial response on September 21st 2015 was cautious:

> *"As a general policy, BIO does not comment on matters related to individual company products or product pricing decisions, such as today's news about Turing Pharmaceuticals. That said, the focus of the biotechnology industry is to develop innovative therapies and cures for patients. This means it is imperative not only that we develop these new medicines, but that all patients have access to them, as necessary to meet their healthcare needs. This principle should apply to old medicines as much as to the new."*

It became clear that this would not satisfy critics, and the rest of the industry's desire to publicly distance themselves from Turing appears to have swiftly grown, since BIO had issued a second statement by September 23rd 2015:

> *"Turing Pharmaceuticals was a member of BIO for a brief period of time and is currently no longer a member. The company and its leadership do not reflect the commitment to innovation and values that are at the core of BIO's reputation and mission. For that reason, BIO determined, after a review of Turing's membership status, that the company did not meet our eligibility criteria, and we took action to rescind its membership and return its membership dues."*

[84] After all, PhRMA has also been criticised for its role in lobbying against measures that would help to control drug prices, (Saba 2018) and members have been implicated in their own pricing controversies. (Collington 2020; Roy 2017; Roy and King 2016)

5.5.3 *Explaining the pushback*

It is worth asking why other firms and CEOs had not met with such opprobrium and suffered entrepreneurial excommunication for broadly similar behaviour. (Gallant 2015) The closed distribution model would not explain this, particularly given that Shkreli's own prior acquisition and pricing activity with Retrophin had been overlooked by comparison. One notable particularity of the Daraprim case was the scale and speed of the repricing. Consumers are accustomed to pharmaceutical inflation rates running above general inflation, even into low double-digit figures.

Aside from this overall steep rise in prices, other cases demonstrate that there was already a pattern of rights acquisitions followed by what might be viewed as opportunistic price gouging. From 2006 the price of Xyrem increased repeatedly and manifold (at one point having increased eightfold in seven years), following the 2005 acquisition of Orphan Medical by Jazz Pharmaceuticals. Valeant Pharmaceuticals raised the price of a vial of Isuprel from $215 to $1,346 and of Nitropress from $257.90 to $805.61, after buying the rights to both from Marathon Pharmaceuticals in February 2015. Similarly, the price of a bottle of Vimovo increased repeatedly from $138 in late 2013 (when AstraZeneca sold the rights to Horizon Pharma), reaching $2,979 in early 2018. However, whereas previous hikes of this kind had often amounted to hundreds of percentage points (sometimes gradually over several years), Turing's was firmly in the thousands (and overnight).

Greater severity would understandably provoke greater ire, but this was by no means the only possible factor with explanatory power. The perceived vulnerability of patients was also a major concern. Reports at the time widely linked Daraprim with HIV positive patients, often going so far as to use terms such as "AIDS drug." While arguably incorrect or misleading, this framing reflected the generally robust response of the adult human immune system to the parasite that causes toxoplasmosis. That is, infection is generally only of major concern if the host is a young child or immunocompromised—with the latter group notably including HIV/AIDS patients. Daraprim (in combination with other drugs) is also sometimes prescribed to prevent against certain forms of pneumonia, which likewise mostly affects immunocompromised groups such as HIV/AIDS patients. This (not fundamentally dishonest, albeit frequently oversimplified) association with HIV/AIDS may have struck a raw nerve among some segments of the public, and would explain for example the extensive coverage given in some prominent LGBTQ+ news outlets.

Other discursive/rhetorical factors appear to have been important in determining public reactions. 'Financiers' and 'rentiers' (or people perceived as such by the general public) have rarely been popular figures, and this distaste was arguably intensified by the 2007–2008 global financial crisis. Shkreli's past career as a hedge fund manager is thus likely to have reduced any sympathy that would have otherwise been offered. Perhaps the larger factor, however, was his own personality. In addition to some earlier-quoted statements, some of his well-known tweets summed up his attitude: he called one journalist a "moron" and his response when asked about the Imprimis announcement was merely "lol."[85]

Another possible explanation for the unique "pushback" is the lack of FDA-approved alternatives to Daraprim for certain indications, whereas many of the other drugs that had suffered price hikes had filled a pharmaceutical niche that included other drugs, or were available in other forms. For instance, Chenodal (generic name: chenodiol) is used to dissolve gallstones, a function also performed by ursodiol (brand names include Actigall and Urso Forte). In the case of Vimovo, the same two active ingredients—naproxen (brand names include Aleve and Apronax) and esomeprazole (brand names include Nexium)—can be purchased separately at much lower prices. It would intuitively be expected that high prices of products to which there is no alternative would attract more criticism than of those that could be replaced with a functional substitute (even where the alternative is not bioequivalent and may not be an option for all consumers).

Some other variables would not explain the difference in response to the Daraprim price hike, because they were similarly observed across other different cases: acquisition by a non-originating firm (as was the case with Xyrem, Vimovo and Thiola), prior patent expiry (as was the case with Nitropress, Thiola and Chenodal), lack of bioequivalent generic competitors (as was the case with Thiola and Xyrem) and WHO essential medicine status (as was the case with Nitropress). However, it is possible (and perhaps even likely) that no one factor alone was responsible for the pervasive scorn that befell Shkreli and Turing as a result of the Daraprim hyperinflation. The confluence of these factors with the extreme jump in price and other specificities (such as the perceived link to HIV/AIDS) appear to have created a 'perfect storm' of controversy that no prior individual case would have measured up to.

[85] Shkreli was later banned from Twitter for behaviour that Twitter deemed to be harassment, targeted at a different journalist.

Another factor exacerbating the indignation and censure was that Turing's restriction of distribution additionally had the unintended consequence of curtailing access for some patients and healthcare institutions. For instance, it was reported that initially there were no mechanisms in place for providing the drug to homeless patients, since the systems were dependent upon delivering to a fixed address. These difficulties were not limited to particularly marginalised patients, however. In September 2015, The Infectious Diseases Society of America wrote to the firm not only condemning the price rise but also noting that doctors were—only the month after acquisition—already complaining of "distribution issues that are disrupting access." Turing acknowledged via a press release that "some healthcare facilities have encountered challenges securing" the drug.

5.6 Compounded pyrimethamine emerges

Despite this collateral damage—or perhaps partly because of it—the closed distribution model was successful at curtailing competitors' access to the Daraprim. Initially competition came not in the anticipated form of a generic version, but the very limited form of compounding. In October 2015, drug compounding firm Imprimis Pharmaceuticals (hereafter Imprimis) announced that it would produce combined pyrimethamine/leucovorin—the latter is a drug included to help protect against the toxicity of the former. This compounded product would sell for $99 per 100-capsule bottle, meaning that for the price of a single pill sold by Turing at full price, 700 pills could be purchased from Imprimis (leaving cash to spare).

5.6.1 Pharmaceutical compounding

Drug compounding is the practice of using known ingredients to produce customised products designed for individual patients. This might involve producing a liquid version of a drug normally sold as a pill, a combination of several drugs in a single pill, or a version of a drug free from a particular dye or other incidental ingredient that the patient cannot consume (e.g. due to allergies). In some cases, compounding can also fill a gap in the market, supplying a drug that is beset by shortages or unavailable altogether for various reasons. Unlike drugs intended for the mass market, compounders' products are not subject to FDA approval as a

condition of marketing, in the way that drugs intended for the mass market would normally be.

Clearly, the line between compounding and illicit drug production is an important one, since without regulation, compounders could not only undercut big pharma on price while free-riding on their innovation, but also easily offer products personalised to suit the customer (e.g. different doses, flavours, or package sizes). Major holders of drug marketing rights stand to lose conceivably many millions or even billions of dollars if this were to happen. This is particularly true given the widespread practice among pharmacists of substituting products: unless a prescription specifies otherwise (which is relatively rare), pharmacists sometimes dispense a cheaper generic version of the drug prescribed, or substitute a different drug for the same indication (e.g. based on availability). With such a large difference in price, Turing would likely have lost most of their market share to Imprimis if substitution of compounded drugs were allowed.

As a result of these factors, The Federal Food, Drug, and Cosmetic Act exempts compounders' products from FDA approval only if "the drug product is compounded for an identified individual patient based on the unsolicited receipt of a valid prescription order or a notation, approved by the prescribing practitioner, on the prescription order that a compounded product is necessary for the identified patient, if the drug product meets the requirements of this section," and if certain other conditions are fulfilled, governing legitimate compounders and certain standards they must meet. Even with regulatory controls, compounded drugs often face more suspicion than commercially-available products, in part because of incidents such as the 2012 fungal meningitis outbreak traced to the New England Compounding Center. Additionally, compounded drugs are not necessarily covered by insurers—though in this case it was reported that some insurers had publicly announced they would cover the product.

Thus for many patients, there were—and continue to be—practical difficulties in accessing compounded drugs. Nevertheless, the decision by Imprimis to publicly announce that they would produce such a cheap alternative to Daraprim was clearly intended to make a point. The CEO of Imprimis commented that "There'll be many more of these" kinds of products, in the sense that "We are looking at all of these cases where the sole-source generic companies are jacking the price way up."[86] At a

[86] In fact, Imprimis would launch a compounded product containing the active ingredient of Thiola in 2016.

later date, the same CEO explicitly stated that his goal in compounding drugs like pyrimethamine was de facto generic competition "to counterbalance companies like Turing and others in order to address the growing drug pricing crisis in America.

5.7 Shkreli's apologia

5.7.1 Shkreli attempts to explain himself

It turned out that Shkreli was poorly equipped to manage the "pushback" he had provoked. One problem he faced was that he failed to cohere a narrative: various comments and statements he made following the price hike appeared to contradict each other. They can largely be divided into those that emphasised the potential medical benefits Turing could deliver (which were justificatory and humanitarian), and those that prioritised financial aspects (which were unapologetic and cynical). What both arguments demonstrate, however, is the forethought that went into the scheme and the extent to which Shkreli believed his actions were not only justifiable but rather praiseworthy and/or obligatory.[87]

On the one hand, Shkreli nurtured a reputation as a kind of pharmaceutical prodigy despite his lack of scientific background, casually tweeting comments such as "Spending a lot of time focusing on rare infections. African trypanosomiasis, schistosomiasis, Chagas. The world needs more treatments." Accordingly, he presented the Daraprim price hike as a necessary evil in order to advance medicine by funding the development of new treatments: "This isn't the greedy company trying to gouge patients, it is us trying to stay in business." Of Daraprim, he said "We know there's a better way to treat this disease… We're developing a drug that is better for them [patients]. They don't deserve a drug that's 70 years old. They deserve a modern drug." Overall, according to this narrative, "It's a great business decision that also benefits all of our stakeholders," and of course "Our first and primary stakeholder is patients. There's no doubt about that."

Sometimes Shkreli's actions went some way to backing up this philanthropic rhetoric. While at Retrophin he once spent a night getting a year's supply of a non-Retrophin drug to a dying child in Venezuela, at no charge, since Venezuelan hospitals had drug shortages. On another occasion he replied to a Twitter inquiry

[87] For a more detailed analysis of the rhetorical 'neutralisation techniques' used by Shkreli in response to condemnation of the price hike, see Grut (2019).

(about a drug he had worked on) within half an hour, apparently doing everything he could to get three children access to treatment. At Turing he pledged that nobody in need would be denied access to Daraprim. Though it did him little good in terms of his public image, he apparently set up his own non-profit foundation, and as mentioned above, he once even auctioned off the right to punch his face for a good cause.

On the other hand, Shkreli's mentality was often far from altruistic. Another explanation he once gave for why he set up Retrophin was that "There wasn't enough money in hedge funds… The Forbes top 50 is all company builders," although he did acknowledge that this could be seen as "the biggest dickhead answer ever." In February 2015 he described the business strategy of Turing, emphasising asset acquisition but making no reference to innovation:

> *"We look to buy dollar bills for 50 cents. Our focus is to be opportunistic. Our favorite thing to do is to buy forgotten and orphaned assets from Big Pharma—any drug that's had weak supply or weak support. Typically pharma is interested in divesting those, and often at a very low price."*

The ostensible necessity of profit maximisation due to his fiduciary duty towards shareholders was a point that Shkreli came back to repeatedly:

> *"We have shareholders just like every other company. And our shareholders want us to maximize our profits and lowering the price of our product is in direct contrast to achieving that objective. Under Delaware law, companies are by law required to maximize opportunities for shareholders... By law, you absolutely have to do what's good for your shareholders."*

On one occasion he commented "My investors expect me to maximize profits," while on another he said "Our shareholders expect me to make as much money as possible for them and that's the ugly dirty truth." Seeming somewhat frustrated with the need to justify himself in these terms, he eventually offered the following:

> *"If you want all corporations to not have the obligation to maximize shareholder duty [sic], we should take a big old vote and have the senate and congress change the law. But right now, that's the law and our job as executives of companies, to maximise shareholder's duty [sic]."*

What Shkreli failed to note in connection with this defence was that he was among those shareholders—one of the largest, in fact. As late as 2021, when Shkreli was already in prison, he was still reported to hold an estimated 40–44% of stock in the firm. This explains the phrasing of another comment he made (one that further calls into question his supposed philanthropic motives), in the run-up to Turing's acquisition of Daraprim: "Should be a very handsome investment for all of us."

A December 2015 Vanity Fair profile of Shkreli threw up particularly revealing remarks, showing how little his thinking was changed by the pushback. He dismissed the political concern over his actions: "Politics are well past logic. It's entertainment," and "Everything we've done is legal."[88] After all, "Rockefeller made no attempt to apologize as long as what he was doing was legal." In short, he said, "I don't mean to be presumptuous, but I liken myself to the robber barons."

That said, there was one respect in which he was affected by the reaction to Daraprim's price hike. Turing made some concessions on price, charging as little as half the full price to hospitals and offering some additional reductions to patients in other situations, though all reduced prices remained vastly higher than before the initial increase. When confronted with concerns about plans to raise the price *again* in December 2015—for fear of scaring away investors—Shkreli showed uncharacteristic restraint. "We can wait a few months for sure," he wrote.

5.7.2 Shkreli plays Robin Hood

Shkreli also attempted to excuse his conduct with reassurances that list prices did not reflect the actual cost to patients. Turing offered a promise to provide the drug for free to certain uninsured patients and a co-pay program that would limit out-of-pocket payments by patients to $10 per prescription. Furthermore, prices were cut by up to half for hospitals, and Turing apparently participated in government programs reducing costs to as little as 1 cent per pill for certain categories of patients. These commitments were not negligible—for instance, these government programs covered the majority of Daraprim sales at the time.

In fact, Shkreli once claimed that he was a pharmaceutical "Robin Hood," in the sense that he was "taking Walmart's money and doing research for diseases no one cares about." He asserts that due to the way the US healthcare is funded, any extra costs are inevitably (if indirectly) paid by other corporations (hence "Walmart's

[88] A court case would later disprove this, as mentioned below.

money"), via the health insurance they provide to their employees. This may have been another reason that Shkreli targeted the US market—this justification is dependent upon the institutional arrangements of US healthcare and the common ubiquity of employers providing healthcare insurance as a non-wage benefit.

The nominal price may not actually be directly paid by most patients—or even any patients—but this does not make it irrelevant. Rising prices clearly do impose burdens on payers, so the question is upon whom these burdens fall, and what form they take. Shkreli's professed belief here was that health insurers—who he intended to bear the high list price of Daraprim—are effectively funded out of corporate revenues since they more or less an unavoidable cost of doing business in nation with a mostly-private healthcare system. On this basis, Shkreli leveraged anti-corporate feeling to construct a highly positive (self-)image: "I think I'm a hero."

This apparently redistributive logic overlooks several possible alternative effects of price increases, such as declining quality of healthcare coverage, or increased costs being passed on to consumers via means such as co-payments. Firstly, governmental spending through Medicaid, Medicare or other programs that provide or subsidise drugs will generally be offset by increased taxation or reduced spending elsewhere in government budgets. Secondly, even where insurers do not require patients to pay a portion of the cost in the form of co-pays and deductibles, increased costs to the insurers will likely be passed along, driving up costs in the form of higher premiums. Either the state or private insurers could also impose stricter limits on what health costs are covered and/or for whom, and employers could opt for less extensive insurance benefits for their employees. Any of the above alternative responses from payers could reduce quality of life and even length of life for the public.

Moreover, if Shkreli was a "Robin Hood," then he was one who kept a cut of the proceeds: sales increased while prescriptions decreased, and his constant references to profits and shareholder value make clear that he was not a modern-day Henry Ford, shunning investors' interests for altruistic purposes. In fact, when asked at a Forbes healthcare summit whether he would do things differently given the chance to go back in time, he offered an answer based not on maximising the benefit to suffering children, but on fiduciary duty and the potential for even greater profits:

> *"I probably would have raised prices higher, is probably what I should have done. I could have raised it higher and made more profits for our shareholders. Which is my primary duty. And again, no one wants to say it, no one's proud of it, but this is a capitalist society, a capitalist system and*

capitalist rules, and my investors expect to me to maximize profits, not to minimize them, or go half, or go 70 percent, but to go to 100 percent of the profit curve that we're all taught in MBA class."

5.7.3 Shkreli 'saves' KaloBios

Shkreli promoted this image of himself, as a misunderstood saviour, in deeds as well as words. In November 2015, KaloBios was insolvent after its major pipeline drug had produced poor trial results; the firm had announced that it would be winding down operations. However, in a rare display of particularly bullish behaviour, Shkreli led "a consortium of investors"—including his MSMB partner, Biestek—who bought up around 70% of outstanding KaloBios stock (with just over 50% held by Shkreli himself). Shkreli claimed that he was "happy to save this company from the brink," having intervened at the last minute, after plans to enter liquidation had already been announced. Following Shkreli's investment, the share price rallied substantially: KaloBios had traded for as little as $0.20 on November 15th, following the winding down announcement; it was back up to $18.25 at the close of trading on November 20th, after the disclosure of Shkreli's stake. There are three main rationales as to why other investors may have begun to buy rather than sell, and at least two of them are focused primarily on financial operations and pressures.

Firstly, some investors seem to have suspected that Shkreli would use KaloBios as a vehicle to take Turing public. Shkreli had previously mentioned plans to organise an IPO for Turing, but did not proceed with this. Gaining control of KaloBios would have allowed him to achieve the end goal of going public by merging Turing into the publicly-traded firm—avoiding the IPO. If Turing was perceived as having greater value, investors may have bought into KaloBios in hopes of securing a portion of Turing's future value and profits. While this could explain some of the original ramp up of the stock, Shkreli himself denied this plan. He had explicitly and publicly stated that this was not his intention by the 19th of November, a week before the stock peaked—so either investors thought he was lying, or something else was pushing up the firm's capitalisation.

Another possibility is that much or all of the price appreciation merely indicated an honestly-held positive market assessment of Shkreli. Perhaps they simply saw him as a bright young CEO who could turn the firm around; after all, his involvement had apparently secured $13m of new funding within a week. When explaining his decision to invest he characterised lunzilumab as promising and

suggested that his motivation was guiding it through to market. Perhaps this was genuine and he thought KaloBios held assets whose value had been underappreciated by the market. Conversely, it may simply have been an attempt to influence other investors, with the goal of 'pumping' the stock for short-term gains, or put positive 'spin' on his image. Either way, perhaps many other investors believed him and reconsidered the potential of KaloBios' intellectual property—despite the fact that "All other pharmaceutical companies appear to have previously passed on the opportunity." Such a conclusion may have been aided by Shkreli's investment and/or his reputation (whether deserved or not) for identifying the promise of drugs or the weakness of their scientific data and basis.

The third perspective is that Shkreli may have simple organised a successful short squeeze. As above, Shkreli and his consortium buying up such a large share of a firm and making optimistic statements about saving it may explain the initial jump in price. However, since the firm had been approaching bankruptcy, there also appear to have been many positions open. This initial (proportionately large) jump in price could then have spooked some short-sellers, who would have felt compelled to close out their positions by buying, in order to minimise their losses. If this was true, a rush to buy could have created a temporarily self-sustaining upward spiral, as these buyers would have driven the price up, which in turn would have 'squeezed' more short-sellers. This would have been exacerbated by Shkreli's consortium now being in possession of a large chunk of total shares, presumably refusing to sell them and reportedly refusing to lend them to short-sellers either, which would have made it difficult for new short-sellers to enter the market and thus minimised downward pressure on the share price.

Whatever the true motive—or more likely, combination of motives—Shkreli was made CEO of KaloBios following the acquisition of a combined majority stake. He initially played a role in securing more financing for the firm as well as initiating negotiations on some potential drug rights purchases, including benznidazole, which had the potential to yield a PRV. It appears that he may have been acquiring another 'base of operations' from which to pursue the same strategy he had already enacted via Retrophin and Turing: what he had once described as "look[ing] to buy dollar bills for 50 cents."

5.8 Shkreli's luck runs out

5.8.1 Shkreli faces justice

The next twist in the tale was something few investors seemed to anticipate, however: Shkreli's tenure at KaloBios was cut short on the 17th of December 2015, when he was arrested on charges of securities fraud.[89] Specifically, the allegations against Shkreli were that he "engaged in multiple schemes to ensnare investors through a web of lies and deceit" including fabricating profit updates to investors, and "essentially ran his company like a Ponzi scheme where he used each subsequent company to pay off defrauded investors from the prior company." As mentioned above, Shkreli had already begun to behave dishonestly towards investors and manage funds inappropriately while running MSMB-C at the latest. This had not ended at MSMB-C, though he had concealed the true extent for a long time.

For instance, Shkreli had used subterfuge to return funds to investors in his hedge funds by instructing Retrophin to pay them for sham 'consulting' services that had never been rendered. Some had also been paid at least partly in Retrophin shares. Following inquiries by the SEC, Shkreli claimed that MSMB-C had $2.6m in assets under management (although it is now known that it had not traded since he had previously confirmed it had $0, and it still over money to Merrill Lynch); he then tried to fabricate a back-dated investment in Retrophin by MSMB-C in order to validate the appearance of assets held by the latter. Shkreli had also fraudulently transferred money from Retrophin to MSMB-H in 2012 to pay the money MSMB-C still owed to Merrill Lynch. Potential Retrophin investors were also told that he had an investment from well-respected former Schering-Plough CEO Fred Hassan, when in fact it was his daughter; clearly, this could have illegitimately influenced the decision of other investors. Shkreli's lawyer would later admit of his time at Retrophin that "not everything he [Shkreli] said was 100% accurate, but he was truthful to the mission of making Retrophin a success."

Following his arrest, KaloBios fired him and once again faced dire financial straits. The firm's share price collapsed, falling by 50% before trading was halted.

[89] By this point, the Citizens for Responsibility and Ethics in Washington (CREW) had been calling for the SEC and DOJ to investigate Shkreli further for years, with limited success.

Shkreli also resigned from his role as CEO of Turing, which would rename itself in the US to Vyera around September 2017 (the Swiss parent company was renamed Phoenixus). If anything, it is surprising that Shkreli's (questionable) success had lasted so long: after all, his first hedge fund had collapsed entirely and his second had ended up in such dire financial straits that he resorted to fraud in an attempt to cover up his losses. Despite many people insisting on his genius, he had frequently been wrong about whether products would receive FDA approval, and TheStreet.com had awarded him the title of "Worst Biotech CEO of 2014." Retrophin and Shkreli had even taken legal action against each other after his removal as CEO, though this was eventually settled. All of this is to say nothing of the widespread hatred he had earned through his price hikes and his abrasive public persona. And yet, despite all odds, Shkreli's "web of lies and deceit" had paid off for the investor he was charged with having wronged: they had all got their money back and some received several times their initial investment.

In August 2017, Shkreli was convicted of two counts of securities fraud and one count of conspiring to commit securities fraud.[90] In March 2018, he was sentenced to seven years and forced to pay $75k in fines, after already 'forfeiting' assets valued at over $7m. In 2020, the Federal Trade Commission (FTC) accused Shkreli of an anticompetitive scheme (revolving around the closed distribution model) and sued him accordingly. Also in 2020, Retrophin changed its name to Travere, presumably in an attempt to step out of the former CEO's long shadow. A court document filed in March 2021 alleged that Shkreli had been continuing to direct Vyera's operations while incarcerated, including from a contraband mobile phone smuggled into the prison.

In January 2022, a court found that he *had* orchestrated an anticompetitive scheme and that his activities were "egregious, deliberate, repetitive, long-running, and ultimately dangerous."[91] The court handed down a broad ban on Shkreli's future involvement in the pharmaceutical industry and forced him to repay $64.6m in "wrongfully obtained profits" from illegally blocking generic pyrimethamine. He was also banned from serving as an officer or director of a public company and given an additional fine of over $1m. Remarkably, even these court orders restricting his

[90] Shkreli was found *not* guilty on two charges of conspiring to commit securities fraud, two of conspiring to commit wire fraud, and one of defrauding Retrophin.

[91] Despite Shkreli's insistence that the price hike was legal, this outcome did not surprise some experts. (Carrier, Levidow, and Kesselheim 2017)

business activities do not appear to have stopped his career in its tracks, though he has certainly been forced to adapt his plans.

In May 2022, Shkreli was released from prison to a halfway house. It is unclear what assets he may have retained, but at the very least he seems to have maintained connections that allowed him to raise funds: his new firm Druglike launched on July 25th 2022. In order to comply with his court-ordered bans, Shkreli cannot operate Druglike as a public firm nor a pharmaceutical firm. Instead, the company purports to be offering a blockchain-power, open-source decentralised computing network along with a web-based suite of software and tools, all aimed at facilitating drug discovery. Shkreli appears to believe that this complies with the orders, while the FTC disagree and have asked for him to be held in contempt of court. At the time of writing he continues to manage and promote Druglike despite the FTC's objections.

5.8.2 Generics enter the market

Despite all of the pushback, FDA-approved generic pyrimethamine entered the market only once Shkreli was in prison.[92] Dr. Reddy's Laboratories launched a product in March 2020, acting as the commercialisation partner for Cerovene. The announcement of the product's launch was accompanied by comments from Dr. Reddy's about the "relentless pursuit of this difficult-to-procure reference drug and its active pharmaceutical ingredients." Commenting on the approval, the FDA spoke disapprovingly of how "certain "gaming" tactics have been used at times to delay generic competition" and of "loopholes that allow brand-name drug companies to delay the generic competition." While Shkreli had recognised that Turing might manage only a few years of monopoly power, it is worth explaining how these firms were finally able to overcome the barrier that he had placed in their path.

The FDA had been monitoring the use of the closed distribution loophole since at least 2016; initially, the agency merely recorded complaints, but later went on to publish and repeatedly update a list of firms that had been subject to a complaint in an attempt to 'name and shame'. After several years of drafting and debating, the 'CREATES act' was signed into law in December 2019; this gave firms the right to effectively sue for product samples. The FDA considered that this recourse against abuse of controlled distribution was sufficient to prevent the loophole blocking

[92] Teva launched a generic tiopronin even later, in May 2021. Generic chenodiol still seems to be inaccessible on the US market.

market entry by generics, though it could of course still delay competition somewhat. Since the problem was deemed solved, the list of drugs allegedly affected by the loophole was removed from the FDA website.

5.8.3 Prices remain high

However, it appears that prices rise more easily than they fall. Turing has never reversed its own price hike and Dr. Reddy's generic was launched with a list price that was less than half Turing's peak price, but also still an increase of over 2000% compared to pre- Turing prices: Oregon's Department of Consumer and Business Services noted that the list price amounted to "a price per pill of $292.50." It is perhaps not surprising that even generic pyrimethamine is now so expensive, given the difficulty in attaining FDA approval, the cost of market entry, the continued paucity of competition, and the relatively small market for the drug.

As of April 2023, Daraprim costs $729.40–$774.20 per 25mg tablet, while generic pyrimethamine sells for $256.27–$299.52. The actual price paid may well be lower than list prices indicate—the product can be purchased for around $183 per pill with coupons—but similar defences could be offered of brand-name drugs, as explained above. Similarly, generic tiopronin has undercut Thiola prices, but they remain significantly higher than before the hike and the difference in price can be proportionately even less in this case: Thiola sells for $27.81–$29.32 per 100mg tablet while generics are priced between $9.67–$22.53.

That the market would bear a first generic competitor priced similarly to the brand-name drug would be predicted by the literature on generic drug pricing—products generally only become affordable once several different competitors have entered the market. If anything, though, this makes even more pertinent the question of why it took so long for a generic alternative to emerge. Note that Daraprim was not recently off-patent, but had been so for many years. A generic could easily have been produced at any point prior to the price hike; it is worth remembering that cheap pyrimethamine was available around the world, including other wealthy countries. As of October 2022, GSK continued to sell a generic version to the NHS in the UK at a price of around $0.50 per pill. However, clearly there was either insufficient incentive or insufficient capability to bring a generic to the US market earlier.

The most obvious explanation for the lack of competition *before* the price hike would be the combination of a small market and what was previously a relatively

low brand-name price point: the total volume of revenues (and thus profits) to be made from the market appeared to be low. While pricing above the brand-name version would theoretically be possible, very few doctors, pharmacists, insurers or indeed patients would voluntarily opt for a more expensive 'imitator' over a significantly cheaper branded 'original.' The rate of return on any investment in developing a generic would therefore be very low.

As such, it was only with the major price hike initiated by Turing that the market grew to a size worth 'sharing.' Now, competitors would have much more leeway with their pricing while still being more affordable than the name-brand version. The negative reaction Turing had received no doubt also indicated to competitors a high level of willingness among professionals, payers and patients to choose a hypothetical generic alternative despite a general tendency to prefer brand-name drugs.

Of course, as the examples above illustrate, generic competitors must generally charge prices substantially lower than the leading brand-name drug, but when prices are high enough this still allows surprisingly high prices to be maintained—and generic drugs are sold for profit just the same as brand-name ones, so where more can be charged, it will. While the US does tend to pay more than other countries for drugs, it is possible that more generic competition would drive US prices down—closer to UK prices, for instance. However, the above-mentioned concerns about sharing the market and return on investment arise once again as prices fall, so it is unlikely that prices will be forced back down to pre-2015 prices by market competition alone.

5.9 Discussion

The events of this case are dramatic, and colourful to say the least—few scholarly case studies can simultaneously encompass Lehman Brothers, dying Venezuelan children and Wu-Tang Clan. This should not distract from the very real insights gleaned by examining the career of Martin Shkreli, a case that lucidly demonstrates financialisation at work in the pharmaceutical sector. A former hedge fund manager turned pharma CEO predictably carried with him a mindset defined by the priorities and concepts he had absorbed from the culture and practice of the financial sector; this much seems obvious.

5.9.1 Cognitive financialisation

Evidently, Shkreli's business models and strategies were guided by a financial view of the firm as a bundle of tradeable assets on a balance sheet, and shareholder returns were at the forefront of his mind in constructing his unusual approach to running a drug company (in part, presumably, because he seems to have been a major shareholder in each case). This lends credence to claims that financial logics have infiltrated the management of non-financial firms and influence how they are run. (M. J. do Carmo et al. 2021; Donadone and Fantti 2016; Fantti and Donadone 2020; Vitols 2002) Moreover, financial pressures—including hidden ones, like his attempts to repay investors in his hedge funds whose investment he had secretly lost—clearly contributed to driving Shkreli towards what might be seen as a rentier model of pharma, targeting assets that had been 'undervalued' by an inefficient market. Nor did he leave financial speculation behind him when he began a career in pharma, overseeing Retrophin's shorting of competitors and possibly orchestrating an intentional short squeeze with KaloBios.

Managing narratives proved essential to Shkreli's operations in both finance and pharma, though this was something with which he noticeably struggled. Moreover, it was precisely the competing demands of financial logics that habitually undermined the image he had attempted to construct for himself as a brilliant self-taught scientist and philanthropist entrepreneur. Even the closed distribution model that Retrophin and Turing used to secure an illegitimate monopoly can be understood as an extension of what Shkreli had learned as a short-seller: that regulators' safety concerns can be exploited to serve investors by frustrating innovative efforts at other firms. This seems weaponisation of regulators may be an important element in understanding what Veblen termed 'sabotage'. (Gagnon 2007; Nesvetailova and Palan 2013; Nitzan and Bichler 2009; Veblen 1921)

5.9.2 Continuities with other cases

This case study is not merely a question of a single firm adopting unconventional strategies or an individual bad actor. Rather, it is indicative of what can go wrong—from the perspective of public health, though investors would surely disagree—when medicines are assetised due to financial pressures and logics. Even where generics are available, prices are stubbornly higher than they once were. A broader spillover within US pharma of the controlled distribution monopoly model

seems to have been forestalled for now by the CREATES act. While there is no doubt that Shkreli was the posterchild for reform, the law prohibits *any* firm from pursuing his signature strategy—in theory, at least.

In practice, even the ability to delay for months could allow significant rents to be garnered. Furthermore, it is likely that firms will eventually new means of establishing non-patent monopolies that get around CREATES, just as they continue to use evergreening to extend their patent monopolies, and a variety of other strategies to bolster their pricing power. (Jones et al. 2016) Firms can also use hybrid approaches such as patenting the REMS used to control distribution, which still allows for the exploitation of the same system, but with the added protection of a new patent (thus, essentially a form of evergreening). (Karas et al. 2018)

Shkreli's pharmaceutical firms offer firm evidence of a business model based on acquiring assets from which to derive rent—an approach that is hardly unique even in relation to healthcare innovation. To give just one example, Royalty Pharma was founded in 1996 by a former investment banker; it provides capital to firms and other institutions conducting drug discovery and development in exchange for royalty rights in their intellectual property. (Lim and Suh 2016; Lo and Naraharisetti 2013; Yanagisawa and Guellec 2009; Zeller 2007)

Shkreli's more hands-on style represents a refinement of this approach, as do his extreme price hikes and anti-competitive practices. Having said this, Collington (2020) suggests a link between financialisation and price hikes in the case of insulin, arguing that shareholders have used such pricing to extract additional value from consumers. It seems clear, in any case, that both Royalty Pharma and Shkreli's tactics represent the encroachment of financial thinking into healthcare, notably both resulting in a primarily monopoly-rent-seeking business model. (Carrier 1991; Coffman, Hoang, and Mendelsohn 2020; Plummer et al. 2017; Zeller 2007) Similar forms of assetised rent-seeking are seen in less extreme form in ostensibly innovative firms, as shown e.g. by Roy's (2017) case study of Gilead.

The question remains as to whether Shkreli's strategies are uniquely American—or whether they could be emulated by firms headquartered and/or operating in other national economies. The global pharmaceutical sector is primarily based in the US and primarily serves the US market, but it is nevertheless conceivable that these strategies could be exported to some extent. This would depend on fertile political-economic and institutional arrangements similar to those in the US: weak price regulation of drugs, non-IP means of defending monopolies against generic entrants,

a functioning market in drug rights, and the capacity of payers to bear higher prices. Moreover, the potential gains would likely be significantly smaller outside of the world's largest market. Thus, while there may be alternative possible instantiations of the underlying financialised management that Shkreli represents, it seems probable that there will be few imitators of the particular mechanisms by which Shkreli monopolised 'second-hand' drove up prices.

5.10 Summary

The case study in this chapter has illustrated some of the business models and strategies that exist at the juncture between contemporary finance and pharmaceuticals. Firstly—despite the previous chapter's findings that big pharma largely steer clear of explicit short-term financial speculation—at least some smaller firms do appear to engage in practices such as shorting the stocks of other drug companies. Shkreli's professional history demonstrates that even if the bulk of such speculation is practiced by explicitly financial entities such as hedge funds, firms that nominally produce medicines can also be used as vehicles to bet against their competitors.

Secondly, it is plain that a broader range of pharma firms place intangible assets at the heart of their business but do not necessarily *produce* such assets (or produce them but not frequently, efficiently or reliably enough to maintain competitiveness). This can be understood largely as an outcome of cognitive financialisation, and has created an active market in such assets, through both M&As and individual rights purchase or licensing deals. To reverse a formula from Hitt et al. (1996:1084), this case illustrates how the "context in which innovation is framed, the control mechanisms employed, and the design and process of innovation" affects managerial decisions to "engag[e] in the market for corporate control," not just vice versa.

Notably, both the strategies built on financial trading and those built on IP trading seem to work best when combined with the weaponisation of institutional context and in particular product regulation. As a result, their attractiveness and effectiveness is likely to vary significantly across space and time, due to differing institutional contexts and market conditions. In particular, the US was prime territory for the deployment of these strategies; in theory it should now be less so, due to CREATES. It is also evident that the financialisation and assetisation of the pharmaceuticals market can be detrimental to patients and healthcare payers, and that states can take steps to curb at least the extreme end of these trends.

6. CONCLUSION

6.1 Discussion and evaluation

6.1.1 Significance and relation to prior literature

This research project has made several original contributions to scholarship on financialisation, assetisation, and the pharmaceutical sector. Some corroborate common assumptions about transformations in corporate strategy, adding to existing evidence and demonstrating how general trends translate into specific contexts. Others contradict received wisdom or open up space for new lines of enquiry. The volume of both quantitative and qualitative data presented is significant, and both numbers and narrative play an important role in the project as a whole.

The quantitative data offers an overview of changes in big pharma's asset base, use of revenue, and disbursement to shareholders over a period of two and a half decades in which neoliberal financialisation has been at its apex. It clearly shows the inadequacy of framing the financialisation of non-financial firms simply in terms of financial rentiership, as some scholars have done. (Demir 2007; Hudson 2021; Jayadev and Epstein 2007) Rather, it lends weight to the arguments of scholars who have previously called into question the notion of widespread financial rentiership by non-financial firms. (Fiebiger 2016; Rabinovich 2019)

Similarly, the supposedly myopic disbursement of funds in favour of investment does not seem to be the systemic problem it is sometimes made out to be. (Demirag 1995; Haldane 2015; Lee et al. 2020) While the pharmaceutical sector may be peculiar, this view has also been challenged more broadly: Fried and Wang (2019) point out that from 2007 to 2016, firms paid out 41% of their net income and still increased their cash positions. This is not to say that greater proportions of income are not being paid out to shareholders and creditors, but this does not seem to have prevented firms from also spending more on research and refocusing their balance sheets around intellectual property. Shareholder primacy may come at the expense of other stakeholders, but the data presented herein do not indicate that it comes at the expense of innovation efforts.

At the same time, the importance of intellectual monopolies is validated by the data. Specifically, the data on big pharma shows that the sector has recommitted

itself to the significance of IP, while developing new frameworks within which to generate it. This accords with prior observations of growing R&D expense within pharma. (Gleadle, Parris, et al. 2014) It also fits well with a growing literature attempting to articulate the relationship between financialisation and assetisation. (Archer and Cole 2021; Chiapello 2023; Leyshon and Thrift 2007; Serfati 2008; Ward and Swyngedouw 2018; Zeller 2007) This body of thought primarily attempts to explain this link in terms of the relationship between fictitious capital and a material basis, or a "value chain" extending between "the aggregation of assets" and "the spoils of speculation." (Leyshon and Thrift 2007:100)

Regional variation exists, but notably does not conform to preconceptions about the relative financialisation of different economies. This may be evidence of the way in which European big pharma, particularly Sanofi–Aventis are apparently "partly constrained to adopt Anglo-Saxon rules of corporate governance" and have "become increasingly financialized," due to the influence of foreign institutional investors. (Montalban and Sakinç 2013:1011) Similarly, by comparison to the US and UK, France has been shown to have higher financial assets relative to fixed assets (Lapavitsas and Powell 2013) and higher gross financial income. (Karwowski et al. 2020)

The qualitative data both broadens and deepens the picture, offering detailed insights into the way that financial thinking and financial pressures—e.g. shareholder primacy, the financial view of the firm as a bundle of assets, the development of financial trading strategies based on within-sector knowledge and reputation —influence smaller firms within the sector. Financiers pioneer new strategies with some success, but are perhaps even more beholden to shareholder primacy, whether due to external pressures or their own ideological commitment. Much like the quantitative data, the case study makes a strong case for the simple claim that "intangible assets become the basis for financialization" (Baranes 2017:352)—at least within the pharmaceutical sector.

Regulation has also been shown by the qualitative data to play an important role in determining the business strategies pursued within a financialised pharmaceutical sector. Traditionally, literature connecting financialisation to regulation focuses on either financial deregulation or financial means of circumventing regulation. (Crotty and Epstein 2009a, 2009b; Green 2016; Kneer 2013; Shah 1997; Shaxson 2011; Shaxson and Christensen 2014; Tufano 2003) By contrast, Chapter 5 has shown how firms such as Retrophin and Turing (as well as Shkreli's financial trading activities outside

of these firms) have actually leveraged regulation to their own advantage, making it into a tool with which to sabotage competitors' innovative efforts. This builds on recent literature noting some such strategies (Feldman et al. 2017) and helps to illuminate their nature and origin, emphasising a neglected aspect of the relationship between financialisation and regulation.

These findings reinforce the case for a contextually variegated conceptualisation of financialisation, primarily sectorally but also geographically. As Sawyer (2013:3) notes, "it is helpful to think in terms of different eras of financialization, different intensities, and different forms of financialization." Together, the quantitative and qualitative data demonstrate how financialisation and assetisation are intimately linked in the pharmaceutical sector, which has effectively experienced financialisation as assetisation due to its idiosyncrasies as a high-tech and highly-regulated sector in which IP makes or breaks fortunes. This brings to mind once again, and validates within a specific empirical setting, the observation quoted in Chapter 4 that "Birch and Ward's assetization means financialized assetization of financial and intangible assets." (Chiapello 2023:2)

6.1.2 Limitations

Every research design has its limitations, just as every theory does—"A map is not the territory." (Alfred Korzybski 1933:750) In other words no representation—no model, no sample, no summary of data—can fully capture the complexity, variety, contradiction, and general richness and subtlety of the full tangible reality that it represents. This principle can be applied at different levels of abstraction to inform extrapolation from the data presented herein.

Perhaps the most obvious application of this principle is that there are always issues of generalisability from a sample, particularly when that sample is small and displays fairly consistent characteristics. Neither the firms in the big pharma sample nor the firms headed by Shkreli may tell the full story of the financialisation and assetisation of the pharmaceutical sector. The findings based on the corporate accounts may not be fully robust against certain changes to sample inclusion criteria; this is particularly true for British and European firms, where there might only be a couple of firms included in the sample for any given year. Similarly, Shkreli's story may be truly exceptional, rather than reflective of a broader trend in similar-sized pharma firms subject to the same kinds of financialised leadership and pressures.

These concerns could be overstated. As shown in Chapter 3, there is a loose grouping of firms that stands head and shoulders above the rest within the pharmaceutical sector, consistently constituting the 'top' firms, and the sample chosen largely reflects this, rather than the entire sector. Similarly, Shkreli is represented herein not as typical but rather as an informative case study precisely *due to* his potential aberrance: not all cases need be average in order to be informative, and extreme cases such as his can more effectively make visible the tensions that finance may create and the conclusions towards which it may drive, even in more typical situations. At the same time, a continuity is apparent between Shkreli's leadership and the business models of firms like Royalty Pharma, or the trends revealed by the analysis of corporate accounts in Chapter 4.

Nevertheless, generalisability to the pharmaceutical sector as a whole is limited by the fact that this research has primarily examined the accounts of big pharma specifically, and the case of a particular set of related smaller firms; even together, these do not represent the full range of different firm sizes and specialisations within the pharma market. In particular, trends may well be different among generic pharmaceutical producers, or firms outside of the US and Europe.

Another concern about relating the map to the territory is that corporate accounts—particularly in the form used here, collected from Capital IQ—are abstracted statements, ostensibly representing reality in a simplified form. In the process of collating detailed records into legible summaries, details is lost. At best, they largely lack information that would be required to fully and concretely understand the business operations of a given firm; for instance, a firm may report high levels of short-term investments without it being clear exactly of what these are composed, and thus to what risks the firm is most exposed. At worst, accounts may be fraudulently constructed by firms, perhaps to disguise financial weakness. As discussed in Chapter 3, all of this is par for the course at this level of analysis—a limitation inherent within most of the research methodologies commonly used to study the economy—but there is no obvious reason to be particularly suspicious of the data used herein. Nonetheless, it is particularly important to consider that the types of intangible assets held and R&D conducted are unknown, and these categories may be misleading.

There is also a variety of accounting standards and practices used within the global economy. This means that the same business activity, conducted with the same goal in mind, can be categorised and recorded differently depending on the

location of the corporate HQ. As discussed in Chapter 4, R&D is one area where such divergences of accounting would occur even with the same exact business activity. Moreover, not only do different countries adhere to different systems, but sometimes firms operating within the same standards may make different judgements or decisions; this is particularly true of IFRS, which is principles-based rather than rules-based.

More abstractly, the non-identity of the map and the territory necessitates the interpretive act of relating the former to the latter: findings about the data become findings about the world, with varying degrees of confidence. Causation is almost always imputed rather than definitively established by any single study, especially in the absence of carefully-controlled environments, large samples and rigorous statistical methods. The quantitative data presented herein cover a significant period for firms from different regions, constituting at least the main core of what is commonly considered big pharma, and many of the trends seem self-evident. Similarly, the case study narrative covers a fairly long time period, is striking, accords with both intuitions and the broader literature to a large extent, and offers a wealth of information. These observations provide some confidence that both the quantitative and qualitative findings are adequately secure.

Despite this, some of the relationships or explanations inferred may be spurious. This is particularly plausible since the quantitative approach chosen herein is not one of direct correlation between a proxy measure of financialisation and the variables with which it co-varies. Instead, changes are simply observed over a period that has commonly been associated with financialisation, without the calculation of statistical outputs such as correlation coefficients and p-values. Similarly, the qualitative element of this research project may imply overly strong conclusions about the sector as a whole due to its use of a high-profile extreme case.

To summarise, the major limitations of this research project lie in the level of confidence with which conclusions can be asserted, as well as the extent to which they can be generalised. Some such limitations (e.g. the potential for accounts to be fraudulent) are inherent to popular methods of firm-level economic research, or are otherwise minor concerns. Others are more significant, including the difficulties of interpreting and comparing vague accounting categories such as ‘goodwill’, especially between firms that use different accounting standards. None of these limitations should invalidate the contribution of this research project, especially

given that no research stands alone and that decisively-established conclusions are rarely possible in real-world social-scientific research of this kind.

6.1.3 Further investigation

The findings and limitations of this research project suggest various potentially-fruitful avenues of future research. One obvious extension of this research project would be to compare at a firm level. This would provide more detailed insight and establish whether there are distinct models being used within big pharma, e.g. by heavily diversified firms like Johnson & Johnson or generics firms like Abbott.

Further research could extend the quantitative and/or qualitative analysis, examining the accounts of smaller firms—including those based in other regions and pharmaceutical sub-sectors (e.g. generics)—or tracing the contours of other cases. Further research could also investigate the relative merits of financialisation and assetisation as descriptions of other sectors, and the relationships between them in those sectors. The synthesis of findings from different contexts and cases may also prove fruitful; e.g. case studies exist discussing severe price hikes by Valeant. All of these would help to test the generalisability of the conclusions drawn herein.

While the significance of intangible assets has been proven, the vagueness of their specific composition endures. An investigation aimed at establishing the relative proportions of identifiable intangibles—e.g. patents, licences, trademarks and PRVs—would be valuable. In particular, it could help to explain the observed regional differences in terms of goodwill vs other intangibles if the composition were found to vary significantly by region. If not all assets held, then at least major assets bought and sold by both large and small firms could be tracked. This would also help to establish the size of the intangibles market within the pharma sector in terms of overall volume (rather than merely net significance to big pharma). No doubt other specific elements of corporate accounts could be examined in more detail in relation to financialisation and assetisation.

There is still much to understand about the sabotage of competitors within the sector. Various methods are known, including patent evergreening as well as the non-patent controlled distribution monopoly; in particular, further evidence on the blocking of regulatory approval via means such as controlled distribution would be promising. Such research could lead to a more extensive taxonomy of the different methods used within the pharmaceutical sector (and perhaps beyond), along with an understanding of the factors that influence their use. It could contribute a great deal

not only to the literature on pharmaceuticals but also to broader theoretical trends, including the revitalisation of Veblenian categories represented by contemporary institutionalists, CasP theorists and others.

Much important research and work—of a different sort—also remains to be done on how to minimise the negative impacts of financialisation and assetisation, such as the inaccessibility and high prices of vital medicines, or the failure to direct innovative potential towards the most urgent public health concerns rather than the most profitable markets. In particular, the question persists of how to motivate policymakers, regulators, and others with sufficient power to address these harms and shortcomings, considering that to a large extent "there is no alternative to this way of doing research and development in contemporary biomedicine" as it is currently configured. (Glabau 2016:¶)

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8. APPENDIX: SOURCES USED TO CONSTRUCT THE CASE STUDY

Shkreli's social media and other online profiles

https://twitter.com/MartinShkreli *
https://twitter.com/zkEnrique7 *
https://twitter.com/trashythecat *
https://twitter.com/msitoken **
https://twitter.com/thug_bioanalyst ***
https://twitter.com/legitbiotech ***
https://twitter.com/CletusBurritus ***
https://www.reddit.com/user/martinshkreli
https://www.youtube.com/@realmartinshkreli/videos
https://streamlabs.com/martinshkreli2/home
https://wakatime.com/@martinshkreli
https://github.com/martinshkreli/
* Shkreli has had multiple accounts—some of which disguised his identity to some extent—suspended from Twitter. ** @msitoken may not be run by Shkreli, but it shared information about the launch of Druglike, livestreams by Shkreli, and other content suggesting a likely close connection of some kind. *** As explained in the case study, these accounts appear to have been run by or otherwise under the influence of Shkreli. @Thug_BioAnalyst and @Legitbiotech have been deleted and @CletusBurritus has been suspended.

Shkreli's (relevant) posts on his own Substack blog/newsletter

https://martinshkreli.substack.com/p/mark-cubans-pharmacy-no-real-savings
https://martinshkreli.substack.com/p/trading-competition
https://martinshkreli.substack.com/p/feedforward
https://martinshkreli.substack.com/p/stock-market-anti-web3shkreli-peanut
https://martinshkreli.substack.com/p/january-2023-whats-new

Shkreli's posts on Seeking Alpha

https://seekingalpha.com/instablog/945131-martin-shkreli/1388561-investment-idea-updates-from-martin-shkreli
https://seekingalpha.com/article/272463-avanir-pharmaceuticals-compelling-short-sale-opportunity
https://seekingalpha.com/article/272708-the-short-case-for-neoprobe-skeptical-of-its-primary-assets-success
https://seekingalpha.com/article/273381-star-scientific-widely-shorted-for-good-reason
https://seekingalpha.com/article/273813-biomarin-fair-value-of-50-plus-a-step-by-step-analysis
https://seekingalpha.com/article/274002-neoprobe-follow-up-on-asco-citizen-petition-and-readers-comments
https://seekingalpha.com/article/276434-neoprobe-did-the-pivotal-studies-meet-their-primary-endpoints
https://seekingalpha.com/article/278121-the-short-case-for-zalicus-not-worth-its-market-cap
https://seekingalpha.com/article/281421-oncothyreon-phase-iii-unlikely-to-show-survival-benefit
https://seekingalpha.com/article/283109-chelsea-therapeutics-likely-to-double-on-safe-proven-asset
https://seekingalpha.com/article/285078-neoprobe-why-im-closing-my-short-position
https://seekingalpha.com/article/288209-the-short-case-for-mesoblast-little-upside-left-no-need-for-a-catalyst
https://seekingalpha.com/article/290223-human-genome-sciences-slow-benlysta-launch-results-in-good-short-candidate
https://seekingalpha.com/article/306481-closing-zalicus-short-position-a-lesson-in-getting-the-timing-right
https://seekingalpha.com/article/310348-avanir-closing-short-position
https://seekingalpha.com/article/318039-ampio-is-a-compelling-short-sale-idea
https://seekingalpha.com/article/320572-mannkind-is-simply-running-out-of-cash
https://seekingalpha.com/article/442271-cytori-is-a-compelling-short-sale-opportunity
https://seekingalpha.com/article/490841-biotime-is-running-out-of-time-short-sell-idea
https://seekingalpha.com/article/666541-nektar-phase-iii-trials-at-risk
https://seekingalpha.com/article/750481-debt-burden-makes-horizon-pharma-an-attractive-short
https://seekingalpha.com/article/4102224-martin-shkreli-this-week-in-investing-19

Shkreli's posts on The Street

https://www.thestreet.com/investing/stocks/nektar-therapeutics-is-a-short-11696938
https://www.thestreet.com/investing/stocks/oncothyreon-a-failed-drug-autopsy-performed-by-a-short-seller-11796979

Firm websites

Firm	Current website	Old website (defunct)
MSMB Capital	—	https://msmbcap.com
MSMB Healthcare	—	https://msmbhealthcare.com
Travere (formerly Retrophin)	https://travere.com	https://retrophin.com
Vyera (formerly Turing)	https://vyera.com	https://turingpharma.com
Shkreli Foundation	https://shkrelifoundation.org	Shkreli previously promoted his philanthropy at https://martinshkreli.com
Manchester	https://manchesterpharma.co.uk/	—
Ligand	https://ligand.com	
Impax (acquired by Amneal)	https://amneal.com	https://impaxlabs.com
Dr Reddy's	https://www.drreddys.com/	—
Cerovene	https://cerovene.in	—
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Patents

Patent #	Date filed	Inventor 1	Inventor 2	Inventor 3	Link
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House and Senate hearings (and associated exhibits)

Hearing	Date	Most relevant witnesses	Link
Examining the Impact of Voluntary Restricted Distribution Systems in the Pharmaceutical Supply Chain	22/03/2017	• Mr Bruce Leicher • Dr Gerard Anderson • Mr David Mitchell	https://oversight.house.gov/hearing/examining-impact-voluntary-restricted-distribution-systems-pharmaceutical-supply-chain/
Developments in the Prescription Drug Market: Oversight	04/02/2016	• Mr Martin Shkreli, Former CEO, Turing Pharmaceuticals • Ms Nancy Retzlaff, CCO, Turing Pharmaceuticals	https://oversight.house.gov/hearing/developments-in-the-prescription-drug-market-oversight/
Sudden Price Spikes in Decades-Old Rx Drugs: Inside the Monopoly Business Model	17/03/2016	• Howard Dorfman, former Senior Vice President and General Counsel, Turing Pharmaceuticals • Ronald Tilles, Interim CEO and Chairman of the Board, Turing Pharmaceuticals • Michael Smith, Co-Founder and Senior Director of Business Development, Turing Pharmaceuticals	https://www.aging.senate.gov/hearings/sudden-price-spikes-in-decades-old-rx-drugs-inside-the-monopoly-business-model

Current price listings

Up-to-date prices were gathered from https://pharmacychecker.com

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	Filing type	Filing date	Link
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MSMB Consumer	Form D	26/09/2011	https://www.sec.gov/Archives/edgar/data/1526313/000101359411000440/xslFormDX01/primary_doc.xml
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Turing Pharmaceuticals AG (now Phoenixus AG)	Form D	06/08/2015	https://www.sec.gov/Archives/edgar/data/1650139/000165013915000001/xslFormDX01/primary_doc.xml
	Form D amendment	19/08/2015	https://www.sec.gov/Archives/edgar/data/1650139/000165013915000002/xslFormDX01/primary_doc.xml
Retrophin (formerly Desert Gateway, now Travere)	10-K	28/10/2010	https://www.sec.gov/Archives/edgar/data/1438533/000122527910000204/f101025desertgateway10k02282.htm
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