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The effects of strategy and institutions on value creation and appropriation in firms: a longitudinal study of three telecom companies

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THE EFFECTS OF STRATEGY AND INSTITUTIONS ON VALUE CREATION AND APPROPRIATION IN FIRMS: A LONGITUDINAL STUDY OF THREE TELECOM COMPANIES

Forthcoming in a special issue of the *Strategic Management Journal* on
'Question-Driven and Phenomenon-Based Empirical Strategy Research'

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Research Summary:

Strategic management has come to pay more attention to value creation and appropriation among the firm's stakeholders, including customers, capital owners, and employees. Existing research has conceptualized this as a strategic choice bounded by the bargaining power of each stakeholder group, which, we argue, risks misattributing outcomes by neglecting structural constraints. Instead, these dynamics need to be understood within the wider institutional context shaping the behavior of managers and stakeholders. Using a question-driven mixed-methods approach, we investigate the evolution of value creation and appropriation in three telecom companies located in different institutional systems—British Telecom, Deutsche Telekom, and Telecom Italia. Our findings suggest that national institutional and firm strategic effects must be considered together to understand patterns of value creation and appropriation among stakeholders.

Managerial Summary:

Using an emerging methodology, we quantify how three telecom firms (British Telecom, Deutsche Telecom, and Telecom Italia) have created and distributed economic value since privatization. Our focus is on explaining the extent to which various stakeholders—employees, customers, capital owners, and government—were able to appropriate the value created by the firms. Some similarities are found across the three companies, but we also found major differences. To explain patterns, we bring together (a) strategic decision making by managers within the firm and (b) constraints imposed by institutions outside the firm. We find both to be important, interlinked drivers of distributional patterns. The article gives managers and stakeholders a means to understand major changes and determinants of value creation and distribution.

1 INTRODUCTION

Strategic management is increasingly open to a stakeholder-centric perspective, reexamining core theories to recognize multiple claimants on a firm's profits (Asher et al., 2005; Barney, 2016). This extends to research on value creation and appropriation (VCA), where recent work has assessed the distribution of value among capital providers, employees, suppliers, customers, and government (Garcia-Castro & Aguilera, 2015; Lieberman et al., 2017, 2018). A key issue with the emerging stakeholder approach, however, is that it situates managerial decision making mainly in the context of the various stakeholders' bargaining power, with less regard for wider constraints. In this paper, we contend that strategic decision making and its impact on value creation and distribution need to be understood in a broader institutional context.

The institutional context is important because firms operate within distinct national business systems that shape the options available to managers, incentivizing some behaviors and discouraging others (Hall & Soskice, 2001; Whitley, 2007). Institutions structure the firm's relationships with its stakeholders and create pressure to return profits to some groups over others. Similarly, they shape the ability of stakeholders to appropriate value by, for instance, protecting minority shareholders or enhancing the power of organized labor. Disregarding these structural factors risks misattributing patterns of value creation and distribution to strategic choice alone. Rather, they are better understood as choices subject to institutional constraints.

While there are linkages between institutions and the VCA approach, they offer competing underlying logics of explanation—structure versus agency. Of course, these are not necessarily incompatible and, indeed, this reflects a debate in much of social theory. However, the different ontological assumptions pose challenges for hypothesis-testing research designs. This study, therefore, takes a question-driven approach, enabling us to contribute to a more comprehensive understanding of the phenomena of value creation and appropriation among

stakeholders of the firm.

Empirically, our objective is to examine the evolution of value creation and distribution in three telecom companies—British Telecom (BT), Deutsche Telekom (DT), and Telecom Italia (TI). All three companies began as state-owned enterprises, but subsequently followed different paths. BT was privatized in the mid-1980s and soon harbored ambitions to become one of the world's leading telecom firms. Instead, a global industry crisis deeply affected the firm, forcing it to sell key assets in the name of shareholder value and leading to strategic reorientation. More recently, a series of scandals in its services unit dented BT's profitability and necessitated a refocus on domestic consumers. In contrast, since privatization in the mid-1990s, DT pursued a more steadfast approach. The firm realized incremental efficiency gains, maintained a full-service portfolio through periods of crisis, and gradually built up its international operations to become a major global player. Meanwhile, TI has been on a somewhat disjointed path since privatization in the late 1990s. A complex ownership structure led to repeated acquisitions by various investor consortia, frequent restructuring, and strategic incoherence. To a large extent, the company survives thanks to state support and limited competition.

A basic examination of these different paths evokes national stereotypes—the focus on shareholder value and resulting short-termism in the U.K., incremental change and long-termism in Germany, and the role of insiders and the state in Italy—suggesting institutional factors at play. Indeed, the three countries are emblematic representations of different national business systems. In the comparative capitalism literature, the U.K. is considered a liberal market economy, Germany a coordinated market economy, and Italy a mixed-market economy (Amable, 2003; Hall & Soskice, 2001; Whitley, 2007). However, to understand the implications fully, we need to move beyond the basic assessment.

As the three firms had a common starting point (as state-owned enterprises) but then took

divergent paths, they are well-suited for our research purposes. Following privatization, market liberalization, and technological change created similar pressures toward efficiency and growth. Newly created gains in economic value were to be distributed among stakeholders—leading the various groups to seek to appropriate those gains and requiring distributional choices by top managers. The winners and losers of this distributional contest were anything but a foregone conclusion, however, given the different strategic choices made along the way and the different institutional environments in which the firms operated. Thus, two key questions inform the paper: (1) How have economic value creation and appropriation among stakeholders evolved in the three companies? (2) How can these patterns be explained through strategic choice and national institutions?

To answer these questions, we use a mixed-methods approach, combining a quantitative analysis of value creation and distribution with a qualitative analysis of the structural constraints and strategic decisions. Our analysis shows that patterns of value creation and distribution can often be attributed to managerial choices, but that these need to be understood in the context of institutional pressures and constraints.

The results contribute to two related literatures. First, these findings contribute to the emerging VCA literature in strategic management by demonstrating the need to integrate micro-level (strategic choice) and macro-level (institutional constraint) explanations in order to understand how firms create and distribute economic value. Considering patterns arising from institutional pressures is of particular importance when making comparisons between firms operating in different national business systems, as not all variation can be attributed to managerial choice or stakeholder bargaining power alone. Our findings also demonstrate how the stakeholder VCA framework can be employed beyond the sectors studied heretofore (Lieberman et al., 2017, 2018). Second, we also contribute to the comparative capitalism literature by

showing how the VCA approach can be used better to understand and measure the consequences of institutional pressures to reward some stakeholder groups over others.

Given the question-driven format of this study, we first outline our methodology before examining the three case studies. The discussion section then places our results in context of the strategic management and comparative capitalism literatures.

2 METHODOLOGY

The empirical setting of this study—the telecom industry—has been the subject of extensive research, upon which we draw. However, many of these studies focus on pre- and post-privatization and concentrate less on the long period of private ownership. In terms of countries and companies, there are articles that deal with one or two of our countries and with one or two of our companies (Börsch, 2004; Florio, 2003; Miaoli et al., 2006). To our knowledge, there are none that deal with all three companies, and none have an explicit focus on value creation and distribution. In other literatures, such as industrial relations and human resource management, there is research that deals with these companies, but not in great detail with TI and, again, with less of a focus on value creation and appropriation (Doellgast et al., 2016; Sako & Jackson, 2006).

We use a mixed-methods approach, combining quantitative and qualitative data from primary and secondary sources. Thus, we attempt to combine "numbers" and "narratives" to achieve an integrated analysis of empirical phenomena (Bucheli & Wadhwani, 2014; Froud *et al*., 2006). Historical narratives are being used increasingly in business research and are particularly well suited to explaining the content and context of business strategy (Gill et al., 2017; Hatch & Schultz, 2017; Mordhorst & Schwarzkopf, 2017). Pursuant of this, we first measure the creation or destruction of economic value by the firms and its distribution among

various stakeholders over time. This reveals who gains in periods of growth and who bears the brunt of setbacks. We then seek to explain the patterns through our historical narratives, focusing on strategic choices made by the firms and the pressures exerted by their institutional environments.

We use the stakeholder VCA method (Garcia-Castro & Aguilera, 2015; Lieberman et al., 2017, 2018) to measure value creation and appropriation. The starting point of this approach is the observation that the value created by a firm's activities must equal the value distributed to its stakeholders; the firm's revenues, thus, can be equated to the sum of payments made to stakeholders. The full stakeholder VCA model, which is discussed in Garcia-Castro and Aguilera (2015) and Lieberman et al. (2017, 2018), has considerable data demands: It estimates economic gain, using total output quantity and per-unit price, requiring homogenous output, and estimates returns to suppliers, using quantities and prices of purchased production inputs. However, few industries produce homogenous outputs to enable the former estimation, while few firms disclose detailed information to enable the latter.

Lieberman et al. (2017, 2018) use the airline industry as one case in which some such conditions approximate. A somewhat simplified model with lower data requirements can be estimated by excluding suppliers as a stakeholder group and using industry-specific price deflators to approximate the changing price of output. An empirical examination of three auto firms shows that this simplified model can be applied using publicly available accounting data and official price statistics (Lieberman et al., 2017). This approach forms the starting point for our study.

The VCA model uses a dynamic notion of economic value creation, that is, the incremental value created (or destroyed) from one period to the next, which Lieberman et al. (2017) term "economic gain." Taking changing input quantities into account, the approach

enables us to explore winners and losers in the distributional contestation over newly created value, along with shifts in distribution of existing value. By measuring value incrementally, the method also reduces measurement issues related to estimating the value going to consumers. This "consumer surplus" is usually calculated as the difference between the consumer's willingness to pay and the actual price paid. While the latter is fairly straightforward, the former presents significant measurement challenges (Garcia-Castro & Aguilera, 2015). The dynamic approach makes the assumption that willingness to pay remains relatively stable between two periods, making it possible to measure consumer surplus as the difference in price paid. In our case, this assumption applies to the average bundle of telecom services sold by the three firms, reflecting changing technology and consumer preferences over time. We discuss this assumption and our underlying reasoning in detail in the online appendix to this article.

Our model starts by estimating value creation using value added (V), which we define as revenue minus the cost of materials or services purchased.[1] In terms of value appropriation, we consider payments to capital, labor, and government. This is captured in the following equation, which represents the fact that incremental value created (on the left-hand side) equals incremental value appropriated (on the right-hand side):

$$(\Delta V/V) - S_L(\Delta L/L) - S_K(\Delta K/K) = S_L(\Delta w/w) + S_K(\Delta r/r) - (\Delta p/p) \quad (1)$$

The left-hand side represents the economic gain (loss) compared to the previous period; $(\Delta V/V)$ is the change in value added as defined above; $(\Delta L/L)$ is the change in the number of employees; and $(\Delta K/K)$ is the change in capital (net property, plant, and equipment + inventory).

The right-hand side of the equation expresses the distribution of these economic gains among stakeholders: $(\Delta w/w)$ is the change in wage rate (calculated as labor and related expense,

[1] Disclosure varies across the firms. For additional details, see the online appendix.

excluding executive pay,[2] divided by the number of employees); and ($\Delta p/p$) is the change in the relative price of the end product (calculated as the ratio of the CPI for communication to the general CPI, with all price indexes set to 100 at the beginning of the observation period). The change in pretax return to capital ($\Delta r/r$) is calculated as a residual.

S_L is the labor share of value added (calculated as average wage times number of employees divided by value added), and S_K is the pretax capital share (calculated as a residual so that $S_L + S_K = 1$). We estimate gains to government following Lieberman et al.'s (2017) approach, first calculating the change in tax paid from the prior period and then subtracting the result from the pretax returns to capital to estimate posttax gains to capital. Additional details on the above calculations are available in an online appendix. For an in-depth discussion of the approach, see Lieberman et al. (2017).

Using the above equation, we calculate the incremental creation and appropriation of economic gain from the beginning to the end of each time period. As the firms were privatized at different points in time, and also for data availability reasons, the periods following privatization differ. However, from 2001 onward, the periods match across the firms to allow better comparisons. The period 2001-2007 begins after a global telecom crisis and ends before the onset of the global financial crisis, while the period 2007-2015 covers the most recently available data. The periods selected also coincide closely with major strategic periods (as will be discussed later) to allow us to track the impact of strategic decisions on value creation and distribution.

Input data was obtained from Thomson Reuters Datastream and the firms' annual reports. We approximate changes in output prices by deflating the firms' value added by an industry-

[2] A large portion of executive compensation is equity based, which should be seen as coming out of returns to capital owners and should, therefore, not be included. As our data does not allow us to measure the equity-based portion of pay alone, we net out all executive pay for consistency.

specific price index. We use the OECD's consumer price index (CPI) for communications for each of the three countries for this purpose. All other items—wages, capital, and taxes—were inflation adjusted using the OECD's general CPI for the three countries. Data for BT was standardized by converting GBP to EUR at constant rates. All results are expressed in natural log difference percentages in order to improve comparability over time and reduce sensitivity to the start and end years chosen. Descriptive statistics for the three firms are shown in Table 1.

Insert Tables 1 and 2 about here

3 RESULTS: VCA IN STRATEGIC AND INSTITUTIONAL CONTEXT

The three firms in our study are united in their origins as state-owned monopolies. Although there is, of course, variation among state-owned enterprises, they are often characterized by overstaffing, inefficiency, and slow decision making (Amatori, Millward, & Toninelli, 2011). They have a shared set of burdens in the context of privatization and market liberalization, but also common opportunities—to create value through increased productivity, expand into new markets, and exploit nationwide networks that new market entrants cannot match.

The time period of our sample was characterized by rapid technological change in the telecommunication sector. This led to a substantial reduction in the resource inputs—capital investment and number of employees—required to provide a given bundle of telecommunication services. Large amounts of economic gain thus became potentially available to be distributed among stakeholders. Similarly, the sample period was characterized by deregulation of the telecommunication sector in most developed countries, including the UK, Germany and Italy. Thus, the three companies in our sample were influenced by similar forces, although the dynamics and distributions of the resulting gains differed greatly.

Liberalization and technological change contributed to a boom in the telecom sector during the 1990s, which ended abruptly with a global industry crisis in 2000-2001. Our results suggest that all three firms were able to capitalize on this boom and generated economic value after privatization. As Table 2 shows, BT and DT saw their highest levels of value creation in this period (59.5% and 59.1% respectively), with TI also showing strong gains (51.0%).[3] The winners of these gains, however, were quite different: While gains were shared widely—though with customers as the main beneficiaries—in BT and DT, capital owners appropriated most of the gains produced by TI, with customers seeing smaller gains and employees losing value shares.

The companies' fates diverge more distinctly after the telecom crisis of 2000-2001. Value creation over the period 2001-2015, which is directly comparable across the three firms, was highest in DT (92.4%), followed by TI (66.0%), and BT (38.7%). DT was the only firm in this period continuing to share gains widely among stakeholders, with different sets of winners and losers emerging in BT and TI. To explain these patterns, this section analyzes the VCA results and places them in the context of the three firms' strategic choices and their national institutional environments. The cases are divided into phases that correspond with historical junctures and mirror those used in the VCA analysis. A summary table is provided in the online appendix.

3.1 British Telecom

3.1.1 Period 1. Privatization to 1992 – growth in a liberalizing market

In 1984, the Thatcher Conservative government began the privatization of BT. Though initially

[3] These figures represent percentage increases (in log differences) of value added from the beginning of the period. To use BT as an example, over the period 1985-1992, the company created economic gains equal to 59.5% of value added generated in 1985.

dispersed widely, share ownership became more concentrated in the years following, as smaller public and employee owners sold shares and institutions increased their stakes. From the start, BT was listed on both the London and New York stock exchanges, signaling the firm's international ambitions. However, BT's structure, culture, and governance changed little. It remained highly centralized and bureaucratic, while the firm's directors came mostly from within the organization or from government. Strategically, the company remained focused on the fixed-line business and infrastructure upgrading.

Through the 1980s, market liberalization developed slowly, with the newly created regulator Oftel experimenting with limited licensing of other operators and modest price capping. BT initially operated in a duopoly with small new entrant Mercury, which acted very much like the incumbent and underpriced BT only moderately (Fransman, 2002). Although early competition in the U.K. was fairly tame, telecommunications prices began to fall in relation to general consumer prices (see relative price of end product in Table 1), thereby delivering value gains to telecommunications customers.

The firm grew rapidly in this period, creating close to 60% economic gain, by increasing capital and labor productivity: BT's capital turnover ratio increased from 0.78 in 1985 to 0.83 in 1992, while revenue per employee increased from €80,281 to €130,434 over the same period (Table 1). The remarkable increase in labor productivity was achieved largely through a drastic change in the makeup of the firm's workforce, cutting employment by 30% while significantly increasing average pay, suggesting a shift toward higher-skilled workers over the period.

Multiple stakeholders benefited during this period. Terms and conditions were negotiated with strong labor unions at company level (Harper, 1997), related to how employees were able to appropriate a quarter of the gains generated in this period. However, consumers were the largest winners. Their value share increased by 34.8%, amounting to more than half of the value

generated over this period. Other stakeholder groups also gained, though to lesser extent. Notably, capital owners appropriated only 9.4%, which is less than might be expected in the British shareholder value-oriented business system. The British state also gained to a small extent (1.9%) through taxation—it would not do so again for the remainder of the observed period.

3.1.2 Period 2. 1992 to 2001 – ambitious expansion and accelerated change

BT generated significant economic gains over this period (58.4%), comparable to the preceding period. Strong growth was enabled partly through higher revenue and improved capital productivity, but most importantly by higher labor productivity. Employment decreased significantly from 170,700 to 108,600, while revenue per employee more than doubled to €271,785. Average pay increased further, though to a lesser extent than in the previous period. While most job cuts were voluntary and negotiated with the unions, management increasingly asserted itself in this period, with more bargaining taking place at lower levels where concessions could be extracted more easily. Consequently, employees saw smaller gains (4.4%) despite being a key factor in enabling growth in this period.

BT's performance in this period is notable in light of accelerating changes in the firm's environment. From the early 1990s onward, regulator Oftel sought to further liberalize markets and intensify competition while placing more aggressive price caps on BT. Perhaps more importantly, telecom network technology became commoditized in this period, significantly lowering costs and barriers of entry for new competitors. A wave of challenger firms entered the market in the late 1990s and began to compete more aggressively (Fransman, 2002), leading to a significant fall in consumer prices. To illustrate, the average price of a triple-play telecom

bundle[4] decreased from just under €80 per month in 1992 to just over €60 per month in 2001 (see Table 1). Consumers were consequently able to appropriate two-thirds of the gains realized over this period—increasing their value share even more than in the prior period (43.4% vs 34.8%).

In this context of greater pressure, but also greater opportunities, BT developed an ambitious new strategy. It sold its manufacturing businesses and committed itself to service provision, including moving further into mobile. This was accompanied by restructuring along more modern multidivisional lines, but board composition changed slowly. The firm also aimed to become "*the* global telecommunications company" by making acquisitions worldwide, especially in the U.S. However, these efforts soon proved to be costly mistakes. Coupled with high prices paid for 3G licenses, BT was left highly indebted at the onset of the global telecom crisis in 2000-2001. The firm's debt-equity ratio increased from 0.19 in 1992 to 1.41 in 2001 (see Table 1). As a result, investors deserted the company's stock, leading to massive declines in the firm's share price up to mid-2001. That year, the company resorted to crisis measures and launched the biggest rights issue to date in U.K. history—an important signal to investors given the country's stock market-based financial system.

3.1.3 Period 3. 2001 to 2007 – recovery and reorientation

In the aftermath of the global telecom crisis, BT faced a series of challenges. The firm had lost investor confidence and needed to rebuild shareholder value. To this end, various parts of the firm were sold, both in the U.K. and worldwide, including incongruously its mobile division. The resulting reduction in capital increased capital productivity, as measured by capital turnover ratio, from 0.95 to 1.34 over the period. Profitability and return on equity (see Table 1) also

[4] Backward projection based on Ofcom 2015 international price benchmarking data and the OECD's CPI for communication.

improved markedly. Unlike in previous periods, however, BT was unable to improve labor productivity. Employment and average pay remained fairly stable over the period, while revenue per employee declined from €271,785 to €230,889. The firm's economic gains in this period (41.9%) were, therefore, more hard-fought than in previous periods. Unsurprisingly, given the focus on shareholder value in this period, capital owners were the main beneficiaries. Capital increased its share by 26.4%, appropriating almost two-thirds of value generated.

Changes in BT's regulatory and competitive environment also presented challenges. A tougher regulatory regime began in 2003, with the new regulator Ofcom becoming more assertive and taking aim at BT's "last mile" network (the local access system connecting users to the national network and, hence, giving BT significant market power). In 2006, Ofcom forced BT to create a separate division, Openreach, to manage this network and open it to competitors. Nevertheless, Openreach continued to be BT's most profitable unit on the back of charging competitors for access. Consumers still benefited from falling prices over this period, though to a much smaller extent than before (15.5%).

This period also marked a significant strategic reorientation, necessitated by the sale of BT's mobile unit. The company moved into IT consulting work and providing business-to-business services through its Global Services division, deemphasizing the consumer market. The crisis also had ramifications for governance and management. Major shareholders pressured the board to change top management and introduce more performance-based pay (Pollitt, 2003). CEO pay tripled over this period, as did the top executive pay multiple (see Table 1). Employees and the government, meanwhile, realized no gains.

3.1.4 Period 4. 2007 to present – changing focus

In 2008, BT was hit by a major accounting scandal in its Global Services division. The company

began a cost-cutting drive and reoriented its strategy. With its ailing B2B division and an increasingly aggressive regulator promoting competition and reducing Openreach's profitability, BT began to refocus on the consumer sector—with a growing emphasis on content through pay-TV. These areas are less regulated and allow the firm to offer bundled services so as to capture a higher share of consumer spend on telecom services. Despite the efforts, BT failed to create value gains in this period (-3.3%), as the company's revenues declined more than could be compensated through continued capital divestment or a smaller workforce. Indeed, from 2007 to 2015, both capital turnover ratio (1.34 to 1.31) and revenue per employee (€230,889 to €181,955) declined, indicating that BT reached productivity increase limits. Average employee pay decreased from €51,433 to €42,649 (levels last seen in 1992), suggesting a shift toward a lower skilled workforce or a tougher management stance. Employees, unsurprisingly, lost value shares in this period as a result (-2.0%).

Despite further regulatory tightening on the firm's key Openreach division, consumer prices declined only marginally over this period relative to general consumer prices. Consequently, customers did not benefit significantly in this period (3.6%). Data provided by market research firm IHS Markit shows concentration in the U.K. telecom sector over the period, with the number of major operators declining from 14 in 2007 to 11 in 2015. However, BT was unable to benefit from this, with the firm's estimated market share by number of subscribers declining from 20% to 14% over the same period (IHS Markit).[5] Taken together, these trends suggest that competitive pressures weigh increasingly on BT.

In 2016, BT acquired mobile operator EE Limited—a joint venture between DT and France Telecom—in order to rebuild its mobile capabilities and offer "quad play" consumer

[5] BT's market share roughly doubled following the 2016 acquisition of EE.

services. This also led to further ownership concentration, with DT owning 12% of the British firm as a result of the EE acquisition. U.K. and U.S. funds are also significant shareholders, though further down the ownership structure, BT remains widely held. Consequently, BT is subject to strong market pressures and the possibility of hostile takeover. While BT still makes small acquisitions outside of Europe, it has mainly regrouped in Europe and especially in the U.K. Putting a symbolic end to the firm's global ambitions, BT delisted from the NYSE in 2019.

3.2 Deutsche Telekom

3.2.1 Period 1. Privatization to 2001 – incremental change under heightened competition

The German government began to privatize DT in 1995 but retained a sizable stake in the firm—still holding 32% in 2017. Unlike the phased approach to increasing competition in the U.K., the German regulator exposed DT to competition relatively quickly, leading to early dramatic price decreases. From 1995 to 2001, prices declined by more than a quarter (Table 1). Consumers consequently realized sizable gains in this period (38.5%). Competitive pressures were exacerbated by technological changes making market entry easier for other firms. Mannesmann, an industrial conglomerate, emerged as a prominent early competitor (Fransman, 2002). As a result, DT lost 35% of its market share by the turn of the century (*Financial Times*, 2000).

Despite competitive headwinds, the firm was able to grow strongly and produce economic gains of 59.1%—more than in any other observed period—through capital and labor productivity increases. DT's capital turnover ratio increased from 0.50 to 0.80 over the period, which is comparable in magnitude to precrisis capital productivity improvements at BT. However, there were some important underlying differences: While DT was a larger firm than BT, generating close to double in revenue, its capital base was three times larger. The German firm, therefore, chose to make significant divestments to improve capital productivity. Capital

owners appropriated pretax gains of 16.8% over the period—more than a quarter of the gains generated.

Labor productivity increases were similarly hard-fought. Post privatization, DT was faced with overstaffing and low productivity. Large segments of its workforce enjoyed job guarantees, necessitating a consensual approach to restructuring and changes in the firm's workforce. Management created customer-oriented divisions, spun off the mobile unit, and decentralized its industrial relations. By moving from a single collective agreement to a more devolved structure, it began to differentiate wage levels by individual units and reduced the power of labor representation (Sako & Jackson, 2006).

These were DT's first big efforts to cut labor costs and to circumvent Germany's strong labor constraints, including national unions, work councils, and board-level employee representation (Börsch, 2004). In the late 1990s, management and unions agreed to job cuts on the condition of no compulsory redundancies, early retirement, and generous severance payments. Due to increased hiring elsewhere in the firm, total employment nevertheless increased over the period from 231,720 to 241,660. At the same time, average pay increased from €44,324 to €50,128, suggesting a move toward a higher-skilled workforce. This may, in part, explain how DT managed to grow revenue per employee from €163,554 to €199,905 over the period. Employees were able to appropriate gains of almost 4% in this period; less than might be expected in the German system where labor still enjoyed bargaining power, but likely reflective of management's new assertiveness.

3.2.2 Period 2. 2001 to 2007 – incremental change and acquisition-oriented internationalization

DT was severely wrong-footed by the global telecom industry crisis of 2000-2001. In a break

from the firm's previously cautious—but unsuccessful—internationalization strategy, DT had just completed a takeover of U.S. operator Voicestream, making it the world's second-largest telecom firm. Investors, however, viewed the deal as overpriced, punishing the company's stock (Goodman, 2001). DT also confronted mounting debts of more than €67 billion—much higher than the other two companies at the time. While high debts were common in the industry due to investment in new technology and 3G auctions, DT was additionally burdened with costs to update East German infrastructure.

The company's response to the crisis was one of steadiness and continuity. It remained committed to its full-service portfolio, continued to make acquisitions throughout Europe, and sought to reduce debts through cost cutting (Börsch, 2004). From 2001 to 2007, DT managed to grow sales and significantly improve productivity. The firm's capital turnover ratio increased from 0.80 to 1.42, while revenue per employee grew from €199,905 to €233,329. These improvements enabled strong economic gains of 58.4%, almost as high as in the prior period, with employees once again realizing moderate gains (3.2%). The German government extended its value share marginally in this period (1.0%)—the only time in the entire observed period it was able to do so.

DT's essentially unchanged strategy in the face of crisis stands in contrast to the major gyrations in BT at the time. As a listed company, DT also faced market pressures for shareholder returns, but it was shielded by the large stake held by the German government. Hence, despite capital owners being the largest beneficiaries of value creation in this period (40.1%), appropriating more than two-third of the gains created, DT was able to avoid more drastic measures—such as selling parts of the company as BT had done—to placate shareholders. At the same time, Germany's strong labor rights meant that quick, radical restructuring would not have been an option. In other words, DT had less room to maneuver and restructure, but also more

freedom to stay the course.

The company's competitive environment changed only moderately in this period. Consumer prices fell much less than in the immediate post-privatization period, with the average price of a triple-play telecom bundle falling by €4 to €70.80 from 2001 to 2007—similar to the moderate price declines in Britain at the time. In the context of increasing consumer prices in general, telecom customers saw moderate gains in this period (15%).

3.2.3 Period 3. 2007 to the present – efficiency-oriented restructuring

The appointment of a new leadership team in 2006 heralded a series of bigger changes at DT. Management pursued efficiency-oriented restructuring, seeking to reduce debt, costs, and employment. Confronting its overstaffing problem more head-on, the firm transferred 50,000 employees into a new services division that was subject to a less generous collective agreement. In the usually consensual German industrial relations system, this was a highly controversial move that engendered an increasingly fraught relationship between management and labor (Handelsblatt, 2007). Further, from 2007 to 2015, DT shed more than 17,000 employees and resisted any increase in average pay. Management's assertive stance toward labor is reflected in employees losing value shares for the first time (-0.1%), despite a modest productivity increase over the period to €250,070 revenue per employee. Meanwhile, top management was rewarded with a 50% increase in pay (Table 1). Together with slightly increased capital productivity, these changes resulted in economic gains of 34%—lower than in previous periods, but much higher than BT or TI over the same period.

The biggest winners in this period were consumers, whose gains increased by 27.8%, or more than three-quarters of value created, due to falling telecom prices in relation to overall consumer prices. The price of an average triple-play bundle fell by more than €10 to €59.64 in

2015, making Germany the lowest-priced telecom market among the three countries by the end of the period. The German telecom marked consolidated, with the number of major operators falling from 15 in 2007 to 10 in 2015. However, DT was unable to benefit from this. The company's market share by number of subscribers declined continuously from 43% to 36% (IHS Markit).

In the early 2010s, DT simplified its structure and processes as part of a wider efficiency-seeking reorganization (Ben-Hur & Anderson, 2011). It tried to divest its struggling T-Mobile USA unit to reduce debt, but was blocked by U.S. antitrust authorities. Without the prospect of selling the business, DT put T-Mobile on the offensive, made consolidating U.S. acquisitions, and worked to boost its subscribers and spectrum coverage. In 2016, DT sold its U.K. operations to BT, ending up with 12% of shares in the British firm. At the present, DT can be considered as a successful international player, with major operations throughout Europe and the U.S.

3.3 Telecom Italia

3.3.1 Period 1. Privatization to 2001 – the first takeover

In 1997, the Italian government privatized most of its telecom operations, which over the years it had combined as Telecom Italia. Major companies and banks bought shares, and employees received a small proportion. The Italian government retained a "golden share," giving it veto powers over major decisions. In the early years after privatization, management sought cost savings, market leadership in Italy, and expansion into markets in Europe and Latin America. Investors, however, saw the firm as lacking strategic consistency (Curwen & Walley, 2005).

Two years after privatization, TI was acquired by Olivetti, its main competitor, in a hostile takeover. Olivetti lacked resources, but financed the acquisition with debt and support from the Italian state. Completed in the heady days of the telecom boom, it became the largest

acquisition in Italy to date. Olivetti changed the board and installed its own CEO. Management sought to simplify the firm's complex structure, but then backtracked for fear of being accused of neglecting smaller shareholders (Curwen & Walley, 2005). Simultaneously, the firm acquired 3G licenses and several companies, further increasing its indebtedness to reach a debt-equity ratio of 4.28 in 2001—by far the highest among the three firms over the entire observed period. As a result, at the onset of the 2000 telecom crisis, TI was under severe pressure.

To deal with mounting debt, TI sought major cost savings through layoffs, disposals, and greater financial discipline. From 1997 to 2001, the company improved its capital turnover ratio from 0.90 to 1.42 through increased revenue and a smaller capital base—achieving higher efficiency on this measure than BT or DT at the time. Employment decreased by 10,000 workers, to 116,020 in 2001, with average pay falling slightly to €42,398. Labor productivity increased significantly in the process, from €200,785 to €280,055 in revenue per employee, making TI the most productive firm on this measure at the time. The firm consequently generated sizable economic gains of 51%. However, neither the Italian government (-5.4%) nor TI's employees (-0.7%) were able to appropriate any of these gains, while capital owners appropriated the majority (35.8%).

Consumers benefitted (15.8%) from market liberalization and falling prices, but to a much lower extent than might be expected given the post-privatization context and technological commoditization. General consumer prices increased over the period at a similar rate as in Germany, but telecom prices fell only slightly: An average triple-play bundle decreased from €136.49 to €127.23 and remained much higher than in Britain or Germany at the time. Italy's high prices are reflective of slow deregulation and the resulting limited competition in the Italian telecom market at the time, which has been a recurring concern at the EU level.

3.3.2 Period 2. 2001 to 2007 – the second takeover

In 2001, Olimpia, a consortium controlled by the prominent Pirelli and Benetton families, launched a takeover bid for TI. Exploiting depressed markets and various control-enhancing mechanisms, such as pyramidal holding structures and dual class shares, Olimpia gained control with limited expenditure of its own money (Demattè, 2001). In 2004, TI announced a plan to remerge with its previously spun-off mobile unit TIM. The company took on further debt to finance the deal, which commentators thought pushed the firm to unsustainable debt levels at a time of incurring major losses (Decina, 2013). Additional smaller acquisitions and sales followed, as well as further restructuring prompted by the Italian government and EU regulators. The firm tackled its debt problem, reducing the debt-equity ratio from 4.28 in 2001 to 1.53 in 2007—an improvement for TI, but still higher than BT or DT at any point in their history.

In the early parts of this period, the company incurred heavy losses of more than €3 billion, but nonetheless generated sizeable economic gains of 64.6%. These gains were enabled by dramatic increases in capital and labor productivity. From 2001 to 2007, TI almost halved its capital base, thereby increasing capital turnover from 1.42 to 1.99 despite falling sales. The company also shed a third of its workforce and, thus, increased revenue per employee from €280,055 to €346,137. On both productivity measures, TI continued to outperform its British and German peers. Perhaps unsurprisingly, given management's cost-cutting drive, labor was unable to benefit from the productivity increase and failed to appropriate any gains (-0.1%).

Instead, capital owners were major beneficiaries of value creation in this period, realizing pretax gains of 25%—close to a third of all value generated. In the early 2000s, TI distributed large dividends to shareholders to allow the acquirers to pay debts and financial interest—to the detriment of the firm's financial position and investment (Curwen & Walley, 2005). It also changed its holding structure, which some criticized as giving preferential treatment to big

shareholders (Airoldi, 2009). By the end of the period, however, common shareholders received only a fraction of the returns per share that they had enjoyed at the beginning of the period (€0.35 per share in 2001 compared to €0.07 per share in 2007—see Table 1). This is in line with Italian institutional pressures to reward insiders rather than wider stakeholders.

Consumers were the biggest winners in this period. The Italian regulator, AGCom, became more assertive, increasing pressure on TI to lower network access fees and stimulating competition in the sector. Consumer prices began to give way more significantly in this period, with the price of an average triple-play bundle falling from €127.23 to €97.45. While still higher than in Britain or Germany, this brought Italian telecom prices somewhat more in line. Thus, Italian consumers saw gains of 39.8%, representing almost two-thirds of the gains produced over the period. The government also managed to appropriate minor gains in this period (2.7%).

3.3.3 Period 3. 2007 to present – the third takeover

In the mid-2000s, TI was repeatedly criticized for a lack of board independence, related-party transactions, and very high executive pay (Airoldi, 2009). The company's chief executive took home €15.23 million in 2007, equal to 362 times the average TI salary and far more than executive pay in BT or DT (see Table 1). In 2007, a consortium made up of another group of Italian investors and Spanish operator Telefónica bought the Olimpia consortium for a knockdown price. The transaction resulted in the consortium controlling the firm, despite owning less than a quarter of shares, again via control-enhancing mechanisms. The new owners appointed a new board and top management team. While the new board was more independent, some unusual practices in terms of owner interventions continued (Zattoni & Cuomo, 2016).

TI faced serious difficulties in this period. Big write-offs, license acquisitions, and declining share prices increased its financial fragility, which was compounded by a series of

financial scandals (Airoldi, 2009; Decina, 2013). In response, management sought greater financial discipline and synergies as well as further disposal of assets, including its media arm and most remaining foreign subsidiaries. Simultaneously, it forced large layoffs, reducing TI's headcount by almost 15,000 to 65,867 in 2015. With sales collapsing from €27.6 billion in 2007 to €15.2 billion in 2015, productivity nonetheless declined over the period. TI's capital turnover ratio fell from 1.99 to 1.30, while revenue per employee fell from €346,137 to €231,090—bringing it more or less in line with the other firms. Consequently, the company struggled to create economic gains over the period (1.3%).

The only winners in this period were consumers, who benefitted from more aggressive regulatory interventions. As a result, control of the last-mile network was transferred to an independent division, Open Access, in 2008. However, over the following years, regulators fined the firm for unfair practices, leading to EU demands for a more independent network and pressure for price reductions. Prices declined markedly from 2007 to 2015, with the cost of an average triple-play bundle falling from €97.45 to €78.10, while overall consumer prices continued to rise. Consumers, thus, saw strong gains of 34.9%—much more than British (3.6%) and German (27.8%) consumers realized over the same period. Competitive forces, therefore, appear to have played out later in Italy, which is also reflected in TI's market share by number of subscribers declining from 49% in 2007 to 39% in 2015 (IHS Markit). Thus, TI lost its dominance of the market later than BT or DT.

Other stakeholder groups saw their value shares decline over this period. Capital owners were affected most heavily (-32.6% pretax), which is also reflected in further dividend cuts for ordinary shareholders, who earned merely €0.01 per share in 2015. Employees, whose average salary declined from €42,106 to €36,917, also saw losses (-1.0%).

Another ownership change took place in 2014, when the investor consortium sold its

holdings to the French media conglomerate Vivendi. Soon after, in 2018, the U.S. hedge fund Elliot began an activist campaign to wrest control from Vivendi, accusing the French group of further eroding shareholder rights, stacking the board with its own executives, and conflicts of interest (Fildes & Agnew, 2019). The Italian government's "golden share" in TI has become crucial to deciding the company's future.

4 DISCUSSION

From similar beginnings, the three firms have also ended up in fairly similar places: as full-service telecom providers focused largely on their domestic markets, but with varying levels of international presence. However, they took very different paths along the way. BT produced large economic gains early on and shared these widely among stakeholders. The firm increased efficiency and cut employment, and benefits of competition and technological change accrued to consumers through quickly falling prices. The industry crisis hit the firm badly, however, requiring difficult choices to placate shareholders and to reorientate strategically. BT's turnaround efforts are ongoing. DT was similarly successful after privatization, but maintained growth into the most recent period. The firm moved incrementally, both in its strategy and in reorganizations. Gains were generally shared widely, but more recently management has asserted itself vis-à-vis labor. TI was acquired by various consortia every few years, resulting in frequent management and strategy changes. What remained remarkably stable, however, were the arrangements enabling insiders to reward themselves at the expense of others—particularly labor, which lost consistently.

Some overarching trends are evident despite noted differences in how the three firms distributed value among stakeholders. Customers have benefitted most consistently, appropriating a sizable portion of economic gains in all periods—sometimes even the majority of

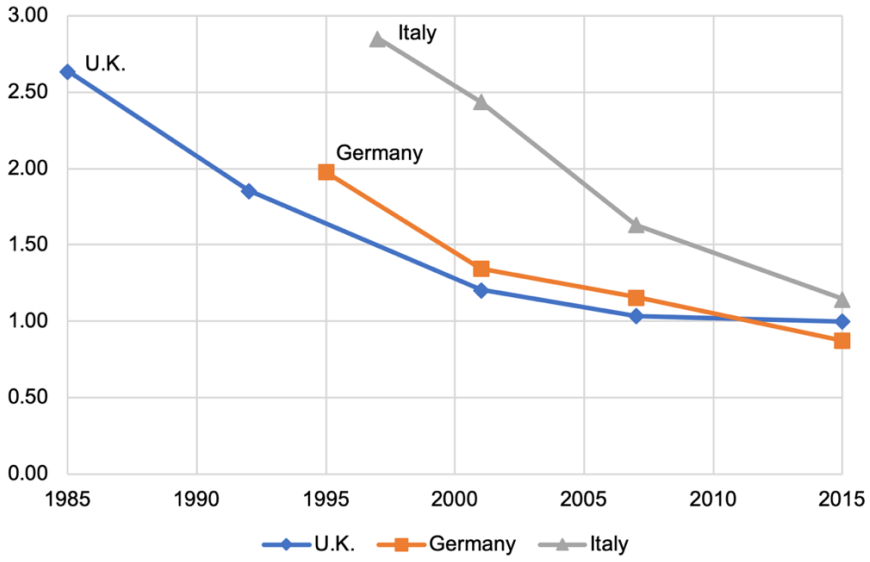
gains generated. We return to this in detail later. Capital owners also tended to fare well, but their gains were more variable, in line with overall value creation. Hence, they saw smaller gains (DT) or lost value shares (BT and TI) in the most recent period when all firms produced lower economic gains. Employees lost out in all three companies in the most recent period, though they fared well historically in BT and DT. Governments were generally losers in the distributional contest, only increasing their value share in exceptional circumstances.

It is noteworthy that all three companies struggled to create value gains in the most recent period. The reasons for this are complex and related to the firms' strategic decision making, but there are some commonalities. In the post-privatization era, productivity increases played an important role in enabling value gains in all three firms. They improved capital productivity by selling property and divesting legacy network infrastructure, and they increased labor productivity through a mix of layoffs and upskilling. In the early to mid-2000s, however, the firms reached the limits of these efforts, making further productivity increases more elusive. Technological changes also played an important role in driving gains in the 1990s and 2000s, with digitization and equipment commodification lowering costs and enabling new services. By the 2010s, however, technological advancements had slowed. Together with a maturing market environment that led to declining (BT and TI) or flat (DT) sales, these factors made the most recent period challenging for all three firms.

An important part of explaining patterns of value creation and appropriation in the three firms are changes in the regulatory and competitive environment—and the price decreases they entailed. These factors are intertwined: Initial deregulation created competition in the sector and lowered prices, which intensified more dramatically when technological changes allowed a wave of new entrants to compete, mainly on price. Last-mile network deregulation also spurred competition and reduced incumbents' profitability. Thus, telecom prices declined in relation to

overall consumer prices, creating gains for consumers and representing a major source of value creation in all three firms. Despite similarities in the general trajectory, a comparative perspective reveals important differences between the cases.

To describe price changes in the three cases, we have drawn on two measures: the relative price of the end product and a backward projection of average triple-play bundle prices. The former shows the relative behavior of two price deflators—the CPI for communication and the general CPI—and is used in the VCA model to estimate consumer gains. The latter uses current prices indexed by the CPI for communication to give an indication of end-consumer prices. Combining both measures provides an effective way to illustrate true comparative price behavior in the three countries over time.[6] Using Ofcom's international price benchmarking data for average triple-play bundles, we calculate a relative price index for 2015 (U.K. = 1.00), which we then combined with the "relative price of end product" index for each country.



Source: own calculations based on OECD and Ofcom data (see text)

Figure 1 Relative telecom prices

[6] We thank special issue editor Marvin Lieberman for suggesting this analysis.

Figure 1 shows that deregulatory and competitive dynamics unfolded at different times in the three countries—and with different effects on consumer prices. The U.K. was first to privatize, and it deregulated market entry progressively throughout the 1980s and 1990s, while also imposing price caps on BT, leading to early price declines. Prices plateaued more recently with market consolidation. Germany followed a similar path with a slight lag, but prices continued to fall, coming out lowest among the three countries by 2015. Italian telecom prices developed differently. Last to privatize and slow to liberalize the crucial last-mile network, Italy's prices were historically much higher, suggesting market inefficiencies or large profits to be captured by a changing set of insiders—or both. Only more drastic regulatory interventions in recent years, in part forced by the EU, brought Italian prices in line with the other countries.

As the development of consumer prices—and the related creation of economic gains and consumer surplus—indicates, structural factors such as regulatory changes play an important role in explaining patterns of value creation and appropriation. Indeed, looking beyond sector-specific regulation suggests that the patterns revealed in our cases are, in many ways, characteristic of the wider institutional environments in which they take place.

In terms of value creation, BT's frequent strategic reorientation—selling its mobile arm, moving into consulting and outsourcing, reacquiring mobile capability, and finally refocusing on consumer services—is explained well by the U.K.'s liberal market economy environment. This institutional system offers firms a comparative advantage through dynamism: Companies are subject to stock market pressures, but able to respond due to transferable assets and deregulated labor markets. This allows firms to respond to changing market conditions more flexibly by repurposing assets (Hall & Soskice, 2001; Whitley, 2007). This is of particular importance in the context of rapid technological change and deregulation. Our analysis, however, shows that this agility does not necessarily translate into superior value creation. Indeed, while BT generated

sizeable economic gains in the first decade and a half after privatization, it has struggled more recently following a series of strategic missteps.

By contrast, DT's institutionally conditioned strategic steadfastness offered its own set of advantages for creating economic gains. Coordinated market economies are marked by debt-based financing and block holdings, which shield firms from stock market pressures and hostile takeovers; higher stability allows them to focus on long-term strategies to exploit specific assets and make commitments to their workforce in exchange for their acquiring firm-specific skills. These factors enabled DT to maintain its full-service portfolio through the telecom crisis, retain strategic assets in growth areas such as mobile, and, thus, grow steadily to become a major global player. However, they also presented a set of constraints, making restructuring efforts and tackling overstaffing issues more difficult and prolonged.

TI's frequent ownership changes, large swings in value creation, and challenges in pursuing a coherent strategy are congruent with Italy's mixed-market economy environment. This institutional setting is seen to provide insulation from short-term stock market pressures, as ownership is concentrated in the hands of families and/or the state, and outside financing tends to come from banks. Controlling shareholders usually have high bargaining power vis-à-vis smaller shareholders, top managers, and employees (Amable, 2003; Gambarotto & Solari, 2015; Zattoni, 2009). These factors have allowed TI insiders to exploit the firm for their gain while largely resisting outside pressures for corporate governance reforms.

Regarding patterns of value appropriation, institutional explanations go a long way to account for our findings in relation to gains to employees and, to a lesser extent, capital owners. In BT, employee gains start high in the first period, but by the final period are the largest losses of any of our firms. Labor gains in the British firm may be described as volatile and tied to overall firm performance—employees are able to appropriate gains in good times, but they lose

markedly in bad times, and the latter has become more obvious over time. It also highlights that a liberal market economy offers wide freedom of strategic choice to firms, which in the case of BT saw management yield to labor demands in the post-privatization era. Capital owners, meanwhile, appropriated the majority of the economic gains generated in the post-crisis period of 2001 to 2007. The company struggled considerably at the time, but issued new stock and sold its strategically important mobile unit in an effort to placate investors—consistent with institutional pressures to reward shareholders to ward off hostile takeovers and ensure future access to capital.

In DT, the patterns of value appropriation are consistent with Germany's stronger labor power in governance and industrial relations—labor staved off significant losses despite management's repeated attempts to reduce their power. Similarly to BT, DT also strongly rewarded shareholders after the global industry crisis. While somewhat contrary to the historical coordinated market economy variety, it may be reflective of increasing stock market pressures in the German system (Jackson & Sorge, 2012) and DT's exposure as a large listed firm. Crucially, however, DT did not have to resort to more drastic measures akin to those at BT.

In TI's mixed-market economy context, it is perhaps surprising that the state does not appropriate higher gains; but the state plays an important role throughout, especially in shaping governance and ownership and shielding TI from competitive exposure. The loss of share by labor in TI is the most consistent across the firms and likely reflects the weaker bargaining power of labor, especially compared with Germany. While job protection is relatively high in Italy due to legislation and constrained product market competition, employees' firm-specific investments and related salary levels are lower than in coordinated market economies (Della Sala, 2004). In TI, shareholder returns, as measured by dividends and share buybacks (see Table 1), declined over the observed period, which could reflect the institutional pressure to reward insiders rather than all (minority) shareholders. The power of insiders in the Italian system to extract value via

extensive private benefits of control (Zattoni, 2009) is a pertinent explanation for the fact that TI's capital owners appropriated a higher share of gains during growth periods than in the other firms.

However, we contend that national institutional explanations are not sufficient to make sense of distributional patterns; understanding them more fully requires consideration of strategic choices at the firm level. Thus, BT's and TI's failed acquisition strategy in the 1990s, compounded by overexuberant bidding for licenses, resulted in dividend cuts for shareholders, which never recover in TI. A more successful set of strategies pursued by DT—particularly a steadfast commitment to its full-service portfolio throughout the crisis and the move to an incremental acquisition-led internationalization strategy—meant that it created value more consistently than the other two firms, including returns to capital owners. Arguably, this enabled DT better to withstand the tougher competitive and regulatory regime in the most recent period. The general stability of gains to DT employees can be ascribed to the German industrial relations system—raising questions, however, over the marginal losses of value share in the most recent period. Firm-level strategic choices offer an explanation: DT management has sought to reduce labor's influence since privatization, but it was only in this period that management asserted itself more strongly and overcame labor's institutionally embedded power.

Our findings suggest that national institutional and firm strategic effects must be considered together to understand patterns of value creation and appropriation among stakeholders. Macro-level pressures and micro-level decisions nest within and affect one another—institutions constrain and enable strategic choice, but the latter can also circumvent or change the former. Put differently, the agency of managers is constrained and enabled by the structural features of their institutional environment, while leaving room for strategic choices.

Integrating an institutional perspective promises to advance the stakeholder VCA

approach and, by extension, a central strand of strategic management research. Explaining differential firm performance in competitive settings is a principal aim of the field (Durand et al., 2017), with established work examining how some firms are able to create more "added value" than others based on their market position and who within the firm's network is able to capture it (Brandenburger & Stuart, 1996; Gans & Ryall, 2017). More recent work on value creation and appropriation, upon which we have drawn, has shifted focus toward the distribution of value among the firm's more immediate stakeholders (Garcia-Castro & Aguilera, 2015; Lieberman et al., 2017, 2018). While early empirical applications of this approach have shown its utility, they have also shown its limitations. For instance, Lieberman et al.'s (2017) application of the framework to GM, Toyota, and Nissan does not take into account fully the differences between the U.S. and Japanese business systems. They find that returns to labor in the two Japanese firms are similar and stable over time, while varying much more in GM, which they suggest may be due to industrial relations dynamics. While this hints at the structural factors at play, Lieberman et al. (2017) do not consider to what extent distributional outcomes are due to strategic choice on the one hand or national institutional pressures on the other. An institutionalist perspective would point to the stabilizing effect of the Japanese business system, with long-term financing and relatively strong employee voice, compared to the more fluid U.S. system, where stock market pressures and the limited influence of labor unions lead to short-termism.

Not taking these institutional factors fully into account risks attributing outcomes to strategic choice where, in fact, managers may be constrained by structural factors. This is of particular concern for cross-country comparisons, where institutional differences are bigger and may introduce significant errors of interpretation if not fully considered, but may also apply to some extent when comparing across sectors or regions. Our findings suggest that these concerns are justified and need to be addressed by integrating an institutional perspective in the

stakeholder VCA approach.

This approach also promises to advance the comparative capitalism literature, which has considered distributional outcomes predominantly from a macro perspective—largely ignoring the role of managerial decision making (Bengtsson & Ryner, 2014; Judge et al., 2014; Stockhammer, 2017). Some earlier work associated with Beyer and Hassel (2002) and De Jong (1995, 1997) placed a stronger focus on the firm level, using accounting data to measure value distribution among stakeholder groups, including owners, creditors, labor, and the state. For example, De Jong (1995) examined how the major types of European capitalism produced different distributions of net value added, finding the Anglo-Saxon type to pay a larger share to owners compared to the Continental type, with the reverse being found for labor. However, this line of research falls short of investigating the impact of managerial decision making on distributional patterns. It is also limited by a static approach and not adjusting for changing production inputs. Our effort to integrate the stakeholder VCA model—an incremental and agency-focused approach—with institutional analysis, thus, also offers a new perspective to comparative capitalism research.

5 CONCLUSIONS

The creation and distribution of economic value among the firm's various stakeholder groups, including customers, capital providers, and employees, has recently become more of a focus in the strategic management literature. To date, this has been understood mostly as firm-level strategic choice bounded by stakeholder bargaining power. However, we have argued that these dynamics need to be located within the wider institutional context that constrains and enables managers and stakeholders. We used a question-driven mixed-methods approach incorporating the stakeholder VCA model to investigate the evolution of value creation and appropriation in

three national telecom companies. We found important similarities and differences across the firms that are best explained through the integration of institutional- and firm-level analysis.

Our study has sought to make a number of contributions. First, we have shown how an institutional perspective can be integrated with the stakeholder VCA approach. Our analysis suggests that both strategic choice and structural factors are important explanations for the observed patterns of value creation and appropriation. Indeed, they are deeply intertwined, as the case of DT's "steadfastness" illustrates, which means they cannot always be disentangled. Strategy and institutions must, therefore, both be considered to avoid misattributing value patterns to one or the other. Second, our results contribute to a more multidimensional understanding of firm performance that goes beyond measuring shareholder returns. We have shown how varying stakeholder groups have been able to share in the value gains created in the three firms—which a shareholder-focused approach would miss. This provides further support for the stakeholder-based reevaluation of strategic management's core concepts. Finally, we hope to contribute to the comparative capitalism literature by showing how the VCA approach can be used better to understand and measure the consequences of institutional pressures to reward some stakeholder groups over others.

Limitations of our approach remain. Some are inherent to the VCA approach. While we have sectoral data on telecom prices to estimate consumer gains, we do not have firm-level data on prices and output quantities or actual measures of consumer willingness to pay. However, this is a common problem when dealing with industries or firms with heterogeneous outputs and remains a trade-off if we seek to include consumers as a stakeholder group and wish to apply the VCA model to a diverse range of empirical settings. Other limitations are inherent to comparative institutional analysis. Cross-country comparisons need to be made carefully on a like-for-like basis. In particular, researchers need to ensure that the institutional systems

considered are at similar levels of development, consider functional equivalents across systems, and use standardized, comparable data. Our analysis has also highlighted that strategy and institutions are mutually constitutive and cannot always be disentangled, requiring us to consider them in tandem. Disaggregating institutions and strategy would require a larger sample that allows us to generalize to a systems level based on how firms at large respond to institutional pressures. This question was not within the ambit of this article, but future research may seek to address it through a large-N comparative VCA approach. This could reveal the commonalities and differences in the evolution of value distribution among stakeholders across institutional systems. Finally, this study has considered only the telecom sector and cannot shed light on wider industry effects on stakeholder distribution of value. Sectoral differences in capital and labor intensity, rate of technological change, competitive environment, and collective bargaining coverage may be important factors, among others. Industry thus presents a potentially important dimension beyond the firm-strategic and national-institutional dimensions considered here.

From a practical point of view, our study can be placed in the context of one of the most important issues of our time: changing value and income distribution. Companies need to supply increasing amounts of information about their activities, not least on these matters. An approach such as the one presented here may help them in their deliberations. For their employees, it may also be of use in helping them and their representatives better understand where value comes from and how it is distributed. For policy makers, this article may contribute to novel approaches to measuring returns among stakeholders—and setting incentives for equitable distribution.

REFERENCES

Aguilera, R. and Jackson, G. 2003. 'The cross-national diversity of corporate governance: dimensions and determinants'. Academy of Management Review 28(3): 447-465.

Amable, B., 2003. The Diversity of Modern Capitalism, Oxford University Press, Oxford

Amatori, F., Millward, R. and Toninelli, P. (Eds.). 2011. Reappraising State-Owned Enterprise. New York: Routledge

Airoldi, G. 2009. Telecom Italia: the origins and the evolution until spring 2007, SDA Bocconi.

Asher, C.C., Mahoney, J.M. & Mahoney, J.T., 2005. Towards a Property Rights Foundation for a Stakeholder Theory of the Firm. Journal of Management & Governance, 9(1), pp.5–32.

Barney, J., 2016. Why Resource-based Theory Must Adopt a Stakeholder Perspective. Working paper.

Ben-Hur, S. & Anderson, J., 2011. Case study: Deutsche Telekom. Financial Times.

Bengtsson, E. and Ryner, M., 2014. 'The political economy of falling wage shares', New Political Economy, 20, 3, 406-430

Beyer. J. and Hassel, A., 2002. 'The effects of convergence: Internationalization and the changing distribution of net value added in large German firms' Economy and Society, 31, 3, 309-332.

Börsch, A., 2004. 'What happens after privatization? Globalization, corporate governance and adjustment at British Telecom and Deutsche Telekom'. Journal of European Public Policy, 11(4), pp.593–612.

Brandenburger, A.M. & Stuart, H.W., 1996. Value-based Business Strategy. Journal of Economics & Management Strategy, 5(1), pp.5–24.

Bucheli, M. and Wadhwani, D. 2014. Organizations in Time: History, Theory, Methods, Oxford University Press, Oxford.

Curwen, P. and Walley, J. 2005. Telecommunications Strategy: Cases, Theory and Applications. Routledge, London.

De Jong, H. W. 1995. 'European capitalism between freedom and social justice'. In W. Bratton, W., McCahery, J., Picciotto, S. & Scott, C. (eds.) International Regulatory Competition and Coordination. Oxford: Clarendon Press: 185-206.

De Jong, H. W. 1997. 'The governance, structure, and performance of large corporations', Journal of Management and Governance, 1, 5-27

Decina, M.M. 2013. Goodbye Telecom. Castelvecchi, Roma.

Della Sala V. 2004. 'The Italian model of capitalism: on the road between globalization and Europeanization?' *Journal of European Public Policy*, **11**(6): 1041-1057.

Demattè, C. 2001. 'Il caso Pirelli-Telecom: Una riprova del nodo scorsoio del capitalismo italiano', Economia & Management, 5: 3-12.

Doellgast, V., Sarmiento-Mirwaldt, K. & Benassi, C., 2016. Contesting Firm Boundaries. Industrial and Labor Relations Review, 69(3), pp.551–578.

Durand, R., Grant, R.M. & Madsen, T.L., 2017. The expanding domain of strategic management research and the quest for integration R. Durand, R. M. Grant, & T. L. Madsen, eds. Strategic Management Journal, 38(1), pp.4–16.

Fildes, N. and Agnew, H., 2019. Telecom Italia braces for culmination of bitter investor row. Financial Times. Published 27 March 2019.

Financial Times, 2000. 'Former monopoly loses significant market share'. Financial Times. Published 15 November 2000.

Florio, M. (2003). Does privatisation matter? The long-term performance of British Telecom over 40 years. Fiscal Studies, 24(2), 197-234.

Fransman, M. (2002). Telecoms in the Internet Age. Oxford University Press.
Froud, J., Sukhdev, J., Leaver, A., and Williams, K. 2006. Financialization and Strategy: Narrative and Numbers, London: Routledge
Gambarotto F. and Solari S. 2015. The peripheralization of Southern European capitalism within the EMU. *Review of International Political Economy*, **22**(4): 788-812.
Gans, J. & Ryall, M.D., 2017. Value capture theory: A strategic management review. Strategic Management Journal, 38(1), pp.17–41.
Garcia-Castro, R. and Aguilera, R. 2015. 'Incremental value creation and appropriation in a world with multiple stakeholders' Strategic Management Journal, 36, 1: 137-147
Gill, M.J., Gill, D.J. & Roulet, T.J., 2017. Constructing Trustworthy Historical Narratives: Criteria, Principles and Techniques. British Journal of Management, forthcoming.
Goodman, P.S., 2001. 'Deutsche Telekom Buys VoiceStream'. The Washington Post
Hall, P., and Soskice, D. 2001. Varieties of Capitalism. Oxford: Oxford University Press.
Handelsblatt, 2007. 'Aufsichtsrat segnete T-Service ab: Telekom darf im großen Stil ausgliedern'. Handelsblatt. Published 28 February 2007.
Harper, J. M. 1997. Monopoly and Competition in British Telecommunications, Cassell, London
Hatch, M.J. & Schultz, M., 2017. Toward a Theory of Using History Authentically: Historicizing in the Carlsberg Group. Administrative Science Quarterly, 62(4), pp.657–697.
Jackson, G., & Sorge, A. (2012). The trajectory of institutional change in Germany, 1979–2009. Journal of European Public Policy, 19(8), 1146–1167.
Judge, W.Q., Fainshmidt, S. & Brown, J.L., III, 2014. Which model of capitalism best delivers both wealth and equality? Journal of International Business Studies, 45(4), pp.363–386.
Lieberman, M. B., Balasubramanian, N., Garcia-Castro, R. 2018. 'Toward a dynamic notion of value creation and appropriation in firms: The concept and measurement of economic gain.' Strategic Management Journal 39(6): 1546–1572.
Lieberman, M. B., Garcia-Castro, R., and Balasubramanian, N. 2017. 'Measuring value creation and appropriation in firms: The VCA model' Strategic Management Journal, 38, 1, 1193-1211.
Miaoli, M., Paleari, S., and Urga, G. 2006. 'Changes in ownership and minority protection: Governance lessons from the case of Telecom Italia' International Journal of Managerial Finance, 4, 4.
Mordhorst, M. & Schwarzkopf, S., 2017. Theorising narrative in business history. Business History, 59(8), pp.1155–1175.
Pollitt, M. 2003. 'British Telecom: Searching for a winning strategy' Judge Business School, Cambridge.
Sako, M. and Jackson, G. 2006. 'Strategy meets institutions: The transformation of management-labor relations at Deutsche Telekom and NTT', Industrial and Labor Relations Review, Vol 59, No 3, April 2006, 347 – 366.
Stockhammer, E. 2017. 'Determinants of the wage share' British Journal of Industrial Relations, 55, 1, 3-33.
Whitley, R., 2007. Business Systems and Organizational Capabilities, Oxford University Press.
Zattoni, A. 2009. 'Corporate governance in Italy: The structural conflict of interests between majority and minority shareholders. In Lopez Iturriaga F.J. (ed.), Codes of Good Governance around the World, Nova, p. 281-316.
Zattoni, A. and Cuomo, F. 2016. 'An evolutionary overview of the ownership, governance and strategy of Mediobanca'. In C. Mallin (ed.), Handbook on Corporate Governance, Edward Elgar, Cheltenham, 7-34.

Table 1 Descriptive statistics (millions of Euro, CPI adjusted)

	BT					DT				TI			
	1985	**1992**	**2001**	**2007**	**2015**	**1995**	**2001**	**2007**	**2015**	**1997**	**2001**	**2007**	**2015**
Total Revenue	19,131	22,265	29,516	25,836	18,650	37,899	48,309	56,871	56,599	25,318	32,492	27,562	15,221
Value Added	17,586	20,676	24,117	20,519	14,422	32,579	34,809	39,300	39,492	24,092	28,778	22,683	13,634
Net Income	2,260	3,412	-2,655	3,641	2,231	2,927	-3,454	519	2,660	1,304	-3,090	2,148	-56
Capital[1]	24,659	26,688	31,220	19,330	14,208	75,529	60,379	40,021	38,004	27,987	22,958	13,853	11,673
Capital Turnover Ratio[2]	0.78	0.83	0.95	1.34	1.31	0.50	0.80	1.42	1.49	0.90	1.42	1.99	1.30
Market Capitalization	34,798	41,623	31,154	27,862	41,231	47,121*	81,436	59,629	62,859	1,363	10,494	24,944	12,245
Dividend & Buybacks per Share (EUR)	0.11	0.24	0.11	0.25	0.17	0.31	0.45	0.71	0.41	0.36	0.35	0.07	0.01
Debt	8,405	7,890	43,894	10,975	10,205	61,277	67,031	39,032	50,222	2,666	44,933	38,280	26,610
Debt-Equity Ratio	0.24	0.19	1.41	0.39	0.25	1.16	0.82	0.65	0.80	1.96	4.28	1.53	2.17
Return on Equity	16%	18%	-13%	98%	-	5%*	-7%	1%	12%	1%	-23%	10%	-4%
Number of Employees	238,304	170,700	108,600	111,900	102,500	231,720	241,660	243,736	226,332	126,097	116,020	79,628	65,867
Average Pay (EUR)	29,446	43,227	51,409	51,433	42,649	44,324	50,128	57,478	57,276	43,429	42,398	42,106	36,917
Revenue per Employee (EUR)	80,281	130,434	271,785	230,889	181,955	163,554	199,905	233,329	250,070	200,785	280,055	346,137	231,090
Top Executive Pay[3]	0.28	0.90	1.79	5.49	7.48	-	-	2.31	3.51	-	1.22	15.23	1.89
Top Executive Pay Multiple[4]	9.42	20.85	34.80	106.81	175.40	-	-	40.23	61.21	-	28.73	361.74	51.29
Consumer Price Index	56.8	85.1	100.0	111.1	135.9	92.1	100.0	109.9	122.3	91.6	100.0	114.0	129.5
CPI for Communication	124.1	131.2	100.0	95.2	112.3	135.4	100.0	94.6	79.7	107.3	100.0	76.6	61.4
Relative Price of End Product[5]	2.19	1.54	1.00	0.86	0.83	1.47	1.00	0.86	0.65	1.17	1.00	0.67	0.47
Average Triple-Play Telecom Bundle Price (EUR)[6]	75.32	79.65	60.68	57.76	68.16	101.33	74.85	70.80	59.64	136.49	127.23	97.45	78.10

Figures in millions of Euro, unless otherwise noted, and CPI adjusted (2001 = 100).

** 1996 data.*

[1] Capital = Net Plant, Property & Equipment + Inventory.

[2] Capital Turnover Ratio = Revenue / Capital.

[3] Single highest executive pay package including direct and equity-linked pay.

[4] Single highest executive pay package as a multiple of average employee pay.

[5] Relative Price of End Product = CPI for communication / CPI, normalized at 1.00 in 2001.

[6] Estimated monthly price for a weighted average basic triple-play telecom bundle. These are calculated using Ofcom international price benchmarking data for 2015, which we then project backward using the CPI for communication index for each of the three countries.

Sources: Thomson Reuters Datastream, annual reports, OECD, Ofcom.

Table 2 VCA analysis results (log difference percentages)

	BT					DT				TI			
	1985-1992	1992-2001	2001-2007	2007-2015	2001-2015	1995-2001	2001-2007	2007-2015	2001-2015	1997-2001	2001-2007	2007-2015	2001-2015
Economic Gains	**59.5**	**58.4**	**41.9**	**-3.3**	**38.7%**	**59.1**	**58.4**	**34.0**	**92.4%**	**51.0**	**64.6**	**1.3**	**66.0%**
Gains to Employees	15.3	4.4	0.0	-2.0	**-2.0%**	3.9	3.2	-0.1	**3.2%**	-0.7	-0.1	-1.0	**-1.9%**
Gains to Customers	34.8	43.4	15.5	3.6	**19.1%**	38.5	15.0	27.8	**42.9%**	15.8	39.8	34.9	**74.7%**
Gains to Capital (Before Tax)	9.4	10.7	26.4	-4.8	**21.6%**	16.8	40.1	6.2	**46.4%**	35.8	25.0	-32.6	**-6.7%**
Gains to Capital (After Tax)	*7.6*	*12.9*	*26.8*	*-4.3*	***22.5%***	*20.9*	*39.1*	*6.5*	***45.8%***	*41.2*	*22.3*	*-29.6*	***-5.9%***
Gains to Government (Tax)	*1.9*	*-2.2*	*-0.3*	*-0.6*	***-0.9%***	*-4.1*	*1.0*	*-0.3*	***0.6%***	*-5.4*	*2.7*	*-2.9*	***-0.8%***

Figures in natural log difference percentages.

APPENDIX

THE EFFECTS OF STRATEGY AND INSTITUTIONS ON VALUE CREATION AND APPROPRIATION IN FIRMS: A LONGITUDINAL STUDY OF THREE TELECOM COMPANIES

This appendix provides additional detail on the following:

(1) The VCA model, assumptions, and specification of variables

(2) Input data items and sources used

(3) Data tables showing input data and VCA computation

(4) The three firms at major stages

1. The VCA Model

Our VCA model is an adapted version of the 'simplified' model presented in Lieberman *et al.* (2017), as used in their auto industry case. Compared to the 'full' stakeholder VCA model (see Garcia-Castro and Aguilera, 2015; Lieberman *et al.,* 2017, 2018), which requires homogenous outputs to estimate consumer surplus and also quantities and prices of purchased production inputs to estimate supplier returns, this model can be estimated using more readily available accounting data. The trade-off is that it excludes suppliers as a stakeholder group. It also makes the assumption that consumers' willingness to pay remains relatively stable over time, allowing us to estimate consumer surplus as the change in prices paid.

We apply this assumption to the average bundle of telecom services sold by the three firms, reflecting changing technology and consumer preferences over time. In short, this was primarily fixed-line telephony in the 1990s, shifting to mobile and broadband in the 2000s, and towards business services and 'quad play' (fixed-line, mobile, broadband, and TV) in the 2010s. The average bundle is reflective of the changing composition of the firms. Segment reporting data for the three firms shows that they derived over three quarters of revenue from fixed-line in the mid-1990s. In the early 2000s, fixed-line made up about half of revenues, with strong growth in wireless. More recently, the firms show a much more diverse pattern of revenue generation, with wireless as the single largest segment but also significant revenue from wholesale, business services, and other activities.[1]

[1] A methodological challenge arising from the changing composition of the firms is that new or divested parts may have different levels of productivity, which could affect the VCA estimates. One way of dealing with this would be to run the VCA model on a unit-basis. However, none of our firms disclose labor, capital, and other inputs on a per-unit basis. Even if they did, many of these inputs—network engineers or infrastructure—would be shared between units, which would also affect the estimates. Furthermore, segment reporting has changed over time and is inconsistent between firms, ultimately making per-unit analysis impractical. Although, within the ambit of this article, we cannot assess the extent to which changing firm composition affects VCA estimates, future research may wish to do so using simulation techniques. We thank an anonymous reviewer for this point.

The assumption that consumer willingness to pay for this bundle remains roughly stable over time rests on several factors. First, consumer willingness to pay for a single type of service, such as fixed line, likely declines over time. As technology matures and becomes less expensive to produce, competition will increase and erode prices, thereby pushing willingness to pay for established services down. Second, technological advances bring new types of services to the market, which command higher prices than more mature services and are often additive rather than substitutive. Today's typical household will have broadband and mobile phones in addition to a traditional fixed-line connection. Third, improved technology increases product quality—such as higher bandwidth—over time thereby increasing willingness to pay.[2]

We argue that, in combination, these three factors largely cancel each other out, not least because the improvement and diversification of services is a strategic response to declining consumer willingness to pay for individual, mature elements of their service. This should lead to willingness to pay for a bundle of services that reflects the technological standard of the time to remain more or less stable. To be sure, these countervailing trends may not always be in sync—sometimes willingness to pay for the bundle may decline before the firms are able to add new services to the bundle that raises willingness to pay again, or vice versa.

Data from the European Telecommunications Network Operators Association as well as the British industry regulator Ofcom broadly support this view. While consistent historical data for the immediate post-privatization era is not available, data for the last decade shows some declines in household spend on telecom services in the early 2010s, but also remarkable overall

[2] Following Lieberman *et al.* (2017), we use a communication sector-specific price deflator from the OECD to measure actual consumer prices and control for changes in composition and quality. This approach ensures that any remaining, underlying changes in product quality, and hence change in value going to consumers, do not affect inter-firm comparisons.

stability due to additional revenue sources such as broadband and pay-TV offsetting declines in fixed-line and mobile. Violating this assumption could lead us to over- or underestimate consumer surplus and, as a consequence, the residual category of gains to capital owners, but it would not affect our estimate for overall economic gain or for other stakeholder groups. Given the challenges involved in measuring consumers' willingness to pay, this remains a limitation of the VCA approach—especially if we seek to apply it to a wider range of industries than those considered in the literature so far.

Our model is captured in the following equation:

$$(\Delta V/V) - S_L(\Delta L/L) - S_K(\Delta K/K) = S_L(\Delta w/w) + S_K(\Delta r/r) - (\Delta p/p)$$

The variables are defined as follows, with $(\Delta x/x)$ denoting the change over the period (calculated as natural log differences in order to improve comparability over time and reduce sensitivity to the start and end years chosen).

	Variable	Definition
V	Value added	= total revenue – materials or services purchased
L	Labor	number of employees (full-time equivalents)
K	Capital	= net property, plant and equipment + inventory[3]
w	Wage rate	= (labor and related expense – total executive pay) / L
p	Relative price of end product	= CPI for Communication / CPI, with both indexes set to 100 at the beginning of the observation period
r	Pre-tax return to capital	calculated as residual
S_L	Labor share of value added	= w*L / V
S_K	Pre-tax capital share of value added	= 1 – S_L

We estimate gains to government following Lieberman *et al.*'s (2017) approach, i.e. as a *post-hoc* estimation. First, we calculate the change in income tax paid from the prior period (trK). We then divide trK by V to estimate gains to government. Finally, we subtract trK from the pre-tax returns to capital (rK) to estimate post-tax gains to capital (r*K).

[3] We use net PPE + inventory as a measure of capital input into the firm's productive activities, in line with previous literature (e.g. Lieberman et al 2017). Given long-term trends towards increasing use of intangible rather than physical assets, this measure may to some extent underestimate true capital input. Alternative measures of capital, which include intangibles, however, are potentially more problematic. Intangibles and in particular goodwill, which are part of intangibles but not always reported separately, are a distorted measure across companies. Companies that acquire other firms frequently would be able to recognize goodwill and thus increase their intangible assets, whereas those that do not will have lower intangibles as internally generated goodwill (own brands) cannot be recognized. Furthermore, intangibles are a more recent accounting concept and therefore not available across the entire time period considered. We conducted a robustness test using total assets. The estimates for overall value creation as well as the share going to capital owners (the residual) is affected by using this measure. For most periods the level of economic gains produced are similar to our PPE + inventory method and relative patterns also generally hold—with the exception of the period ending in 2001 for all three firms, where the Total Assets method shows significantly lower economic gains than before. As the firms' annual reports show, this was due to the acquisition of 3G licenses, which were soon after significantly written down. This reverts to our previous point on the problematic valuation of intangible assets, which here drives the fluctuation in total assets and hence our results. More generally, the use of Total Assets is problematic as it includes not only capital employed in a productive capacity (such as equipment) but also cash reserves, which aren't currently used in a productive capacity. In other words, an excessive cash balance is idle and says more about a company's ability to finance its operations or future acquisitions of productive assets than the amount of productive capital input. In summary, although the PPE + inventory method may to some extent underestimate capital, it is less susceptible to changing accounting methods and spurious valuations than alternative measures which could be a source of larger measurement error.

2. Input Data Items and Sources

Our VCA model relies on publicly accessible accounting information as input data. The following items were used:

Item	Definition	Source
Total revenue	Total sales receipts	Thomson Reuters Datastream, annual reports
Materials or services purchased	For BT and TI: payments to other telecom providers. For DT: material costs[4]	Thomson Reuters Datastream, annual reports
Number of employees	Number of employees on full-time equivalent basis	Thomson Reuters Datastream, annual reports
Net property, plant and equipment	Value of all buildings, land, machinery, and other physical capital owned by the firm, net of accumulated depreciation	Thomson Reuters Datastream, annual reports
Inventory	Value of all finished goods, work in progress, and raw materials on hand	Thomson Reuters Datastream, annual reports
Labor and related expense	Total salaries, wages, benefits, and other compensation paid to employees of the firm	Thomson Reuters Datastream, annual reports
Total executive pay	Total direct and equity-linked pay to the executive directors of the firm	BoardEx, annual reports
Income tax paid	Income tax provision	Thomson Reuters Datastream, annual reports
CPI for Communication	Consumer Price Index for the telecom sector, rebased to 100 at the beginning of the observation period, for the UK, Germany and Italy	OECD (COICOP Division 8)
CPI	General Consumer Price Index, rebased to 100 at the beginning of the observation period, for the UK, Germany and Italy	OECD

We deflated total revenue and cost of materials or services purchased by the CPI for Communication in order to approximate changes in output prices. All other monetary items were deflated by the general CPI. Data for BT was standardized by converting GBP to EUR at a constant rate of GBP 1 to EUR 1.42 (computed as the average GBP/EUR exchange rate over the observed period).

[4] We use payments to other telcos for BT and TI, but material costs for DT as a result of data availability. Only TI reports both for some years, showing them to be of comparable value and to change similarly over time. We thus decided to use them interchangeably as disclosed, but only use one of the two for TI, presuming that we underestimate to some extent the true cost of bought-in goods and services in BT and DT, thus keeping the extent of the measurement error as consistent as possible across the three firms.

3. Data Tables: Input Data

	BT Group plc					Deutsche Telekom AG				Telecom Italia SpA			
	1985	**1992**	**2001**	**2007**	**2015**	**1995**	**2001**	**2007**	**2015**	**1997**	**2001**	**2007**	**2015**
CPI	100.0	149.7	176.0	195.7	239.3	100.0	108.6	119.3	132.8	100.0	109.2	124.5	141.5
CPI for Communication	100.0	105.7	80.6	76.7	90.5	100.0	73.9	69.9	58.9	100.0	93.2	71.4	57.2
FX Rate (GBP/EUR)	1.42	1.42	1.42	1.42	1.42								
Total Revenue*	7,653	13,337	20,786	20,223	17,851	34,907	48,309	62,516	69,228	23,180	32,492	31,419	19,718
Material Costs*						4,900	13,500	19,315	20,924				
Payments to other Telcos*	618	952	3,802	4,162	4,047					1,123	3,714	5,562	2,056
Value Added**	9,990	16,631	29,932	29,740	21,660	30,007	47,120	61,830	82,067	22,057	30,873	36,214	30,866
Number of Employees	238,304	170,700	108,600	111,900	102,500	231,720	241,660	243,736	226,332	126,097	116,020	79,628	65,867
Income Tax Provision	760	947	574	470	303	1,932	692	1,150	961	1,716	530	1,352	283
Labor & Related Expense (excl. Executive Pay)	3,985	4,189	3,169	3,259	2,477	9,452	11,148	12,895	11,928	5,004	4,468	3,037	2,219
Average Wage	16,722	24,538	29,182	29,128	24,162	40,790	46,133	52,907	52,703	39,687	38,514	38,137	33,682
Net PPE + Inventory	14,007	15,159	17,734	10,980	8,071	69,567	55,613	36,862	35,004	25,683	21,019	12,683	10,687
Relative Price of End Product	1.00	0.71	0.46	0.39	0.38	1.00	0.68	0.59	0.44	1.00	0.85	0.57	0.40

All monetary figures in millions of EUR and CPI adjusted unless otherwise noted
** in millions of EUR or GBP, nominal; ** in millions of EUR and CPI Communication adjusted*

3.1. Data Tables: VCA Computations

		BT Group plc					Deutsche Telekom AG				Telecom Italia SpA			
		1985	**1992**	**2001**	**2007**	**2015**	**1995**	**2001**	**2007**	**2015**	**1997**	**2001**	**2007**	**2015**
V	Value Added	9,990	16,631	29,932	29,740	21,660	30,007	47,120	61,830	82,067	22,057	30,873	36,214	30,866
L	Number of Employees	238,304	170,700	108,600	111,900	102,500	231,720	241,660	243,736	226,332	126,097	116,020	79,628	65,867
K	Capital	14,007	15,159	17,734	10,980	8,071	69,567	55,613	36,862	35,004	25,683	21,019	12,683	10,687
	Taxes Paid	760	947	574	470	303	1,932	692	1,150	961	1,716	530	1,352	283
w	Average Wage (EUR)	16,722	24,538	29,182	29,128	24,162	40,790	46,133	52,907	52,703	39,687	38,514	38,137	33,682
p	Relative Price of End Product	1.00	0.71	0.46	0.39	0.38	1.00	0.68	0.59	0.44	1.00	0.85	0.57	0.40
S_L	Labor Share of VA	0.40	0.25	0.11	0.11	0.11	0.31	0.24	0.21	0.15	0.23	0.14	0.08	0.07
S_K	Capital Share of VA (Residual)	0.60	0.75	0.89	0.89	0.89	0.69	0.76	0.79	0.85	0.77	0.86	0.92	0.93
(ΔV/V)	Change in Value Added*		0.51	0.59	-0.01	-0.32		0.45	0.27	0.28		0.34	0.16	-0.16
(ΔL/L)	Change in Employment*		-0.33	-0.45	0.03	-0.09		0.04	0.01	-0.07		-0.08	-0.38	-0.19
(ΔK/K)	Change in Capital*		0.08	0.16	-0.48	-0.31		-0.22	-0.41	-0.05		-0.20	-0.51	-0.17
(Δw/w)	Change in Wage Rate*		0.38	0.17	-0.00	-0.19		0.12	0.14	-0.00		-0.03	-0.01	-0.12
(Δp/p)	Change in Rel. Price of Product*		-0.35	-0.43	-0.16	-0.04		-0.39	-0.15	-0.28		-0.16	-0.40	-0.35
	Economic Gains*		**59.5**	**58.4**	**41.9**	**-3.3**		**59.1**	**58.4**	**34.0**		**51.0**	**64.6**	**1.3**
	Gains to Employees*		**15.3**	**4.4**	**0.0**	**-2.0**		**3.9**	**3.2**	**-0.1**		**-0.7**	**-0.1**	**-1.0**
	Gains to Customers*		**34.8**	**43.4**	**15.5**	**3.6**		**38.5**	**15.0**	**27.8**		**15.8**	**39.8**	**34.9**
rK	**Gains to Capital (Before Tax)***		**9.4**	**10.7**	**26.4**	**-4.8**		**16.8**	**40.1**	**6.2**		**35.8**	**25.0**	**-32.6**
trK	Increase in Tax Paid		188	-373	-104	-168		-1,240	459	-190		-1,186	822	-1,068
r*K	Gains to Capital (After Tax)*		7.6	12.9	26.8	-4.3		20.9	39.1	6.5		41.2	22.3	-29.6
	Gains to Government (Tax)*		1.9	-2.2	-0.3	-0.6		-4.1	1.0	-0.3		-5.4	2.7	-2.9

** natural log difference percentages*
All monetary values in millions of EUR, unless otherwise noted

4. The three firms at major stages

BT	1985-1992	1992-2001	2001-2007	2007-2015
Ownership	From state to widely held ownership	Increasing concentration among institutional investors	Increasing concentration in insurance and investment funds, DT and Orange	Same
Corporate governance	Executive and non-executive independent directors	Executive directors change in the boardroom; new equity incentives	Same	Accounting scandal in Global Services division
Strategy	Cautious strategy aimed at developing fixed network	Focused on services and international acquisitions	Sale of mobile division, focus on consulting and MNC services	Refocus on consumer sector via 'quad play' services and content
Organizational structure	Centralized and bureaucratic	Multidivisional structure with international division	Same	
Industry	Phased introduction of competition	Deregulation and increasing competition	Ofcom established, pressure to ease access to last mile network	Tougher regulation; Openreach unit spun out
DT		**1995-2001**	**2001-2007**	**2007-2015**
Ownership		From state-owned to state-controlled listed company	State-controlled listed company	State-controlled listed company
Corporate governance		Two-tier board with employee representation, codetermination	Change of CEO	Stronger leadership
Strategy		Fixed and mobile telecom services, from international alliances to acquisitions of mobile companies	Same; cost cutting and offer of system solutions	Same, plus high investment in T-Mobile USA
Organizational structure		Creation of customer–oriented divisions, more and more autonomous over time		One company to reunify all divisions
Industry		Relatively fast removal of monopoly status		
TI		**1997-2001**	**2001-2007**	**2007-2015**
Ownership		From state-controlled to coalition of shareholders, state retains golden power	Consortium of entrepreneurs through control enhancing mechanism	Consortium of banks and Telefonica; entry of Vivendi; entry of Elliot
Corporate governance		Board represents coalition of controlling shareholders, CEO becomes controlling shareholder	Executive chairman as controlling shareholder through control enhancing mechanism	Board represents Italian banks, Telefonica, and minority shareholders
Strategy		From large and vertically integrated monopoly to international group	Focusing on telecom services through divestment of companies and assets	Focusing on telecom services in Italy and Brazil
Organizational structure		Vertically integrated	Created three divisions: fixed, mobile and network	
Industry		EU pressure to privatize		Last-mile network spun out due to regulatory pressure

Sources: company reports and other documents, press

References

Garcia-Castro, R. and Aguilera, R. 2015. 'Incremental value creation and appropriation in a world with multiple stakeholders' Strategic Management Journal, 36, 1: 137-147

Lieberman, M. B., Garcia-Castro, R., and Balasubramanian, N. 2017. 'Measuring value creation and appropriation in firms: The VCA model' Strategic Management Journal, 38, 1, 1193-1211.

Lieberman, M.B., Balasubramanian, N. & Garcia-Castro, R. 2018. 'Toward a dynamic notion of value creation and appropriation in firms: The concept and measurement of economic gain' Strategic Management Journal, 39, 6, 1546–1572.