



**Should Infrastructure Regulators regulate Dividends?  
Hints from a Literature Survey**

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# **Should infrastructure regulators regulate dividends? Hints from a literature survey <sup>1</sup>**

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## **Abstract**

This paper synthesizes the theoretical insights and the empirical evidence on the various dimensions that drive and/or should drive the dividend pay-out decisions of regulated firms if the interests of all stakeholders are to be accounted for. It then explains why, from a regulator's perspective concerned with the fair treatment of investors as well as current and future consumers, most of the academic insights have been, so far, insufficient to guide, in practice, the assessments of dividend policies adopted by regulated companies. The survey concludes with a potential research agenda to help close the knowledge gaps

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## 1. Introduction

Dividends paid by regulated public service companies are becoming a regular source of conflict between consumers, unhappy with service delivery, and investors, increasingly keen on enjoying predictable and significant cash flows. This is illustrated by a recent “crisis” in the UK that started with the significant increases in dividends in 2017 and 2018 distributed by the regulated electricity and water utilities. It caused a political turmoil widely covered by the British media across the ideological spectrum because it happened at a time quality of services had been deteriorating and investments were slower than expected.<sup>2</sup> The situation also led to calls for (re-)nationalization of the privatized services by the left-leaning opposition parties.

But this is not just a British story. A similar scenario has been observed around the same period in discussions of dividends paid to electricity companies in Belgium, France and Spain, and as parts of toll roads contracts renewals in France and Spain.<sup>3</sup> In all cases, consumers have expressed frustration with what was viewed as an excessive concern for the interest of investors and an insufficient concern for the interest of consumers (and of taxpayers when subsidies or tax benefits were involved). In each of these cases, the trigger of the debates was also the combination of poor service quality or high price or toll levels, on the one hand, and, of high profits or dividends on the other hand.

Investors and operators have provided various justifications for the need to pay generous dividends. Most boil down to the need to compete for funds on international markets. Some academics (e.g. Helm (2018)) have expressed more technical and neutral views on the matter but they have focused on the UK situation.<sup>4</sup> Additional international academic perspectives are needed to validate these views and to account for the heterogeneity of preferences for the governance of regulated industries around the world. But the UK debates have already been useful and intense enough to produce a couple of main general messages that should apply quite broadly:

- if at least some fair share of the profits is turned into investment, or shared through lower user costs, there is no reason to be concerned with high profits and dividends consistent with risk perceptions in view of the unusual economic characteristics of the regulated sectors;
- if short term high dividends are systematically favoured over long term payoffs, there are reasons to be concerned with the ability to meet the demand for service quantity and quality, in particular if there is only limited scope to rely on subsidies to compensate for the socially inefficient financing strategies adopted by the regulated firms.

As discussed in this survey, in retrospect, the academic literature may have often supported relatively more the investors’ and manager’s perspectives. In most older papers dealing with regulated utilities or other public services, the main typical argument is that high dividends are needed to sustain the growth prospects of the business, maintain the existing assets and ensure the adequate financing of the investment needs.<sup>5</sup> More recently, the need to increase the incentives to attract private money to allow regulated firms to address the massive environmental concerns

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<sup>2</sup> See, for instance, Carrington (2017), FT (2017), Ford and Plimmer (2018) or Partington (2018)).

<sup>3</sup> In France, for instance, high margins and huge dividends by toll road operators have been subject to high profile debates in the media.

<sup>4</sup> Helm’s view is that the excessive distribution of dividends and is eroding the ability to finance much needed investments in the short run and the ability to produce the returns needed to pay dividends in the longer run.

<sup>5</sup> Throughout the paper it is useful to keep in mind that dividends as discussed in the empirical literature tend to represent a narrow view of the ways in which cash is distributed to shareholders. Cash can also be distributed through stock buybacks or through increases in shares distributed. In Spain for instance, Repsol, Ferrovial, ACS, Iberdrola or Telefonica have been giving the choice to their shareholders between pure dividends or new shares distribution. Since this is often ignored in empirical research, it is likely to the papers focusing on pure dividends only are underestimating the social inefficiency of corporate financing strategies.

associated with their industries has been a new justification for high dividends. In practice, however, for now, there is no evidence yet that high dividends deliver these payoffs.

In many ways, the core of the debate is the trade-off between the short-term and the long-term perspective because they concern industries in which heavy investment requirements, long term commitments, slow capital gains and regulatory controls are the norm. Coming up with a fair policy to minimize the tensions between a diversity of stakeholders with very different time horizons is not simple. For now, in many countries, none of the stakeholders seems to be happy. Many blame the lack of regulatory clarity or capacity. The recurring political turmoil can indeed partially be blamed on a limitation of the regulatory capacity. But part of the blame should also go to the poor guidance coming from the conceptual literature on the optimal treatment of dividends in the context of regulated industries.

To highlight the poor academic coverage of this specific regulatory challenge, the paper starts with a review of the recent changes in the financing sources relied upon by regulated industries. This is important since various sources can have very different impacts on the dividend pay-out decisions in regulated industries. In the process, it shows the diversity of possible drivers of these pay-outs identified by the finance literature. It also points to the limited coverage in this literature from a regulator's perspective. Section 3 summarizes the main concerns associated with dividends that regulators tend to be exposed to. Section 4 shows that the theoretical and empirical regulatory economics literature has not really been able to address many of these concerns. Section 5 suggests a policy-oriented research agenda to deliver more robust and transparent alternatives to the current very ad-hoc treatment of dividends in the design of sector specific regulations. Section 6 concludes.

## **2. Stakes and challenges of dividends decisions in regulated industries<sup>6</sup>**

Basic finance theory has established that there are many reasons driving the decision to pay dividends from a strict corporate financing and management strategy perspective. These are typically covered in corporate finance textbooks and are useful in regulatory assessments because they provide an inventory of the specific stakes and challenges that should influence decisions on the regulation of dividends in the sector. They are also useful to identify possible tensions between the concerns of the various stakeholders that a regulator needs to take into account.

From a regulator's perspective, the main weakness of these views is that they tend to ignore the heterogeneity of concerns that are typically accounted for in regulatory decisions. These include political and social dimensions. Recognizing their importance is essential to understand the complexity of the optimal regulatory intervention on the dividend decisions. In many ways, they define multiplicity of goals and constraints that sector regulators face when considering the treatment of dividends.

Despite the political turmoil and the growing risk of negative regulatory reactions to turmoil related to dividends, the first regulator's challenge is to ensure that the sector continues to be quite attractive for investors when there is a political preference for relying on private financing of the investment needs of the sector. As long as interest rates are low, growth is slow and the economic prospects uncertain, this financing strategy can be successful in attracting private money and easy to endorse from a regulatory perspective.<sup>7</sup> This is because the regulated infrastructure sectors can

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<sup>6</sup> Despite the fact that the infrastructure sector is largely dominated by public enterprises, the number of countries in which the provision of regulated services is ensured by private firms or firms of mixed ownership represents a minority in most sectors. For instance, according to Küfeoglu, et al. (2018), the distribution of electricity is done by a private company in only 8% of the countries of a sample of 175 countries and by mixed ownership companies in 30% of the countries. This means that dividends to electricity distribution companies are a matter of concern in roughly 2 out of 5 countries of the world.

<sup>7</sup> This has been the case in Europe since 2008 for instance.

continue to deliver steady inflation-safe income streams thanks to the current design of price regulation adopted by most countries (inflation adjusted price or revenue caps or some hybrids that correct for inflation). And this, combined with the many tax advantages of dividends in many countries, is attractive to investors who prefer dividends to capital growth, and hence high yields (i.e. dividends rather than capital gains).

The specific characteristics of the investors interested in high yields should however matter to regulators more than they often do. In many countries, these investors are now typically large institutional funds and other actors active in shadow banking.<sup>8</sup> These new actors in the sector enjoy such a massive financing capacity that they can end up having significant control over the management of the regulated firms they finance and hence on the dividend decisions. Moreover, they also tend to enjoy some serious lobbying power with the political and regulatory authorities of the countries they invest in. This is linked to the high mobility of their funds and to their ability to control horizontally and vertically many of the activities of a specific industry through their investments. Cross-ownership of regulated industries has indeed increased with the presence of these funds, raising new competition and regulatory concerns.<sup>9</sup> The growing role of these new types of investors in the sector seems to have already impacted the dividend decisions of the sector.<sup>10</sup>

One of the key characteristics of these investors is their craving for stability and predictability in cash-flow. Any increase in uncertainty will lead to reactions, including in the way dividend pay-outs are decided. In a context in which the returns to investment in regulated industries are increasingly subject to uncertainty as a result of the continuous evolution of environmental regulation, the risks of underfunding under a business as usual scenario are considered to be both a possibility and a concern for sector specific regulators. And this concern is taking place at a time in which regulators are also increasingly aware of their reduced bargaining power with this new breed of investors. Their high mobility, their large relative importance and their preference for favouring short term over long term returns fuel the complexity of the regulators' challenge.<sup>11</sup>

In addition, the sectors they are regulating are particularly politically sensitive. Not having water or electricity tends to be seen as a violation of human rights, nothing less. This is why the context matters. If the increases in dividends are simultaneous to a deterioration of service quality and/or, a slowdown of investment, and an increase in average prices and/or CEO salaries, the odds of turmoil increase fast, as seen in the UK and some of the other European experiences.<sup>12</sup> In such a context, the increasing political sensitivity to the higher dividends is to be expected as they are perceived as incompatible with higher service prices and lower service quality in sectors representing between 15% and 25% of the expenditure of individuals, depending on their income level.

At the technical regulatory and social level, any mismatch between dividends and the evidence on the operational effectiveness of a regulated firm is likely to lead to concerns over the technical credibility and autonomy of regulators. Unless this triggers more detailed regulatory audits and a quicker regulatory intervention, regulators will be blamed for incompetence or capture. One of the reasons for criticizing the British regulators has been their slowness in noting the simultaneity of the

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<sup>8</sup> Based on data produced by the Preqyn research group, since 2010, close to US\$2 trillion have been allocated to infrastructure across investment types by institutional investors of various types, that's about US\$200 billion a year. This represents about 6% of the annual global investment needs of the world (between US. is a significant amount, considering that the annual global investment needs in the sector are around 3-3.5 trillion).

<sup>9</sup> See Schmaltz (2018) for a recent survey of these concerns.

<sup>10</sup> See Bertomeu-Sanchez (2019)

<sup>11</sup> See Schmaltz (2018)

<sup>12</sup> In the UK, dividends were actually still well below their level in the two years that followed the 2008 financial crisis (e.g. up to 9 % for United Utilities in 2009) before stabilizing around 4 and 5 per cent in recent year until 2017.

increase in dividends and leverage with increases in borrowing and little change in equity levels, combined with a deteriorating performance. Since this behaviour is consistent with the possibility that firms may be borrowing to pay dividends rather than to finance operational needs, it should have been assessed sooner. But regulators should not be the only ones to blame. Theory offers little guidance on this. And yet, it is part of an increasingly complex characterization of the financing challenges and options of regulated industries. And it is also part of an equivalently complex heterogeneity of concerns to address in the design of regulation, including concerns for climate change and consumer vulnerability.

The regulatory challenges associated with the assessment of dividend pay-out decisions are thus not minor. For now, the stylized facts point to incoherencies between the financing strategy of firms and their operational performance but there is no encompassing conceptual framework providing guidance on how to deal with this. The gap between regulatory economics and finance theory, on the one hand, and practice, on the other hand, has been a long-lasting issue which continues to be underestimated by many regulatory economists and ignored by investors. Yet, it has very concrete consequences for consumers (and taxpayers when subsidies are involved). Most of the discussions on the links between these two fields of research focus on the relevance of the cost of capital for the determination of the optimal rate of return and the average price to be allowed, accounting for the uncertainty that surrounds financing, production costs and demand prospects. But very little has been done conceptually on the relevance of dividends for the optimal rate of return while accounting for all the very concrete current and future operational demands.

In sum, this diversity of challenges and perspectives to account for in the theoretical guidance on the optimal choice of dividends already hints at the complexity of any effort to improve the current theories and the supporting empirical evidence. But before getting to possible directions of this effort, it may be useful to review both the theoretical and empirical weaknesses.

### **3. On the distance between finance and regulation theory**

While there are many suggestions that the conceptual guidance provided to regulators on the desirable regulatory approaches to the assessment of the financing strategy of regulated firms is not precise enough, it is important to recognize that it is not the only problem. It is indeed the case that regulatory theory and practice have not sufficiently internalized many basic insights from finance theory and practice.<sup>13</sup> But there is also ample evidence that the available guidance, however poor, has not been internalized in standard regulatory tools as discussed next.

#### **3.1 On the misuse of standard regulatory tools**

The misuse of well-established regulatory theory is often anchored in a misreading of what the behaviour of dividends reflects. The misreading takes two forms in practice. The first is the result of an underestimation of changes in static and dynamic efficiency performance of the firms. Underestimating efficiency gains to be shared with consumers tends to lead to rents which are captured by investors through dividends (and CEOs through higher salaries). Consumers tend to lose out if no share of the gains trickles down through lower prices or better service quality. The second way in which dividends can be misread by regulators occurs when they fail to note that firms are cutting costs by cutting service quantity and quality—which is what seems to be happening more recently in many countries, although there is no formal assessment of this explanation on any of the countries so far, other than discussions based on basic correlations. Once more, consumers lose out.

Either way, focusing the regulatory attention on dividends or on short-term share prices would potentially ensure a fair treatment of all stakeholders in view of their correlation with the

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<sup>13</sup> And this includes the extent to which changes in operational and financial performance are related to the salaries of CEO. Since this discussion goes beyond the scope of this paper, we'll address it in a follow up paper.

monitoring dimensions that regulators are normally expected to track (efficiency, opex, capex, quality, ...). But doing so can also lead to predictable regulatory misreading traps. The main one is the risk of overemphasizing the analysis on a stock's current yield while underestimating the relevance of short term financial, operational and management decisions for the long-term. These short-term decisions are relevant to the future well-being of consumers but also to the long-term interest of investors, if the regulator manages to come up with fair, efficient and financially sustainable average pricing decisions.

Meeting the long-term needs of consumers should indeed guarantee the prospects for an increase in the company's value due to credible expectations of earnings growth. But how much of a difference this makes to convince investors depends on their rate of time preferences. This is increasingly hard to assess as the heterogeneity of financing sources seems to increase with the multiplication of funds specializing in infrastructure. But the trend seems to be that there is a growing gap between the short-term vision of many new actors and the long-term perspective that the regulators need to take in the interest of the current users and future citizens that are entitled to see their environmental concerns addressed as much as their service needs guaranteed.

The underestimation of the risks of time inconsistency in regulatory decisions implies a much more concrete and tangible risk for consumers and investors. This risk is the underestimation of the need to identify the use of short-term operational decisions (e.g. under-maintenance) as possible management instruments used to send misleading signals to investors to obtain short-term payoffs with high long-term operational and financial costs. The short-term optimism allowed by generous dividends can indeed be hiding a case for long-term pessimism justified by operational decisions with long-term consequences (e.g. investment strategies underestimating the evolution of demand or a slow technological switch to address environmental concerns). And these poor operational decisions, in turn, are likely to fuel concerns for regulatory corrections, including drastic ones such as the nationalization of firms, if the political tension becomes excessive.

### **3.2 On the case to better internalise finance in regulators' toolkits**

In addition to these very operational insights, the recent debate in the British context has also highlighted the weaknesses of academic research on the topic. Mainstream academic research on regulated industries has largely ignored the operational importance of the financing strategy of regulated companies, with the notable exception of the analysis of the cost of capital and its drivers. Despite the very large literature on dividends and the financing strategy of the firm, very little has been published with the regulators' concerns in mind.

The textbook discussions of the sector in the finance literature emphasize the fact that infrastructures offer low-risk investments because they are able to rely on a predictable cash flow which can be used to promise stable dividends. But they tend to omit that many of the regulated firms are also typically simultaneously highly leveraged.<sup>14</sup> And this can have significant financial and operational consequences. For instance, if borrowing is used to pay dividends, rising interest rates (e.g. due to higher risk premia associated with an uncertain political or foreign exchange context) can also increase borrowing costs which would cut earnings at a time in which dividends are increasing. In practice, it is tempting for CFOs to argue for a compensation through slower investment (in particular when the sector is subject to high powered regulatory regimes) or lower maintenance efforts to reduce operational expenditures (unless the design of regulation has explicitly accounted for those risks through service or operational obligations). But these are only a couple of the many ways in which the relationship between dividends, interest rates and utility stock

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<sup>14</sup> It also omits that high leverage can be due to regulatory uncertainty. Rao and Moyer (1994) showed for US regulated electric utilities that managers can mitigate the effects of unfavourable regulation through higher debt and leverage. The increase in leverage is limited by increased bankruptcy risk with higher levels of debt.

performance can interact to hurt operational and financial performance. There is hardly any coverage of these issues in the regulation theory used to guide the design of regulation of these industries—although there are a few important empirical papers discussed later in the survey.

When investment is not needed, the damage is mostly about the distribution of rents between stakeholders. But when investments are needed, failing to address the scope for arbitration between dividends and investment becomes particularly important. And in most countries, investment needs are quite significant in the sector as it is facing a number of important investment intensive changes. First, and most obvious in many ways, is the need to invest to correct the historically poor environmental management of the sector and the poor effectiveness of regulators to rely on regulated price signals to jointly stimulate technological change and manage the overconsumption of energies from fossil fuels. This concern has been there for a while but has been the victim of a significant volume of cheap talk. Policies and rules abound but regulatory decisions needed to turn the guidelines into practice are slower than needed to follow. Second is the increasing pressure to digitalize the sector. It is getting public and private firms in the sector to upgrade important parts of their technological basis. Digitalization offers new opportunities for cost cuts in operational and asset management, and improvements in productivity and network reliability which could eventually be shared with consumers. Smart regulation is one of the latest fads in policy circles concerned with regulation, but its implementation is also relying on costly investments which need to be accounted for in the timing of financing and the design of pricing.

The political support for these changes has not been as strong as expected by many sector specialists. And yet, if properly implemented, smart regulation could deliver lower prices for consumers relatively fast. In contrast, the price effects of the environmental concerns are still quite uncertain as many of the investment requirements are likely to be costly and slow to amortize. This may be one of the reasons for the slow pace at which political decisions on environmental matters are so slow to take place.

With or without political support, the impact of these changes and of the relevance of the uncertainty on the timing of their costs and payoffs cannot be ignored when assessing the adequacy of dividend payments and the use of borrowed money by regulated utilities. High dividends may simply be mirroring a poor internalization of the opportunities provided by digitalization and of the requirements to address environmental concerns. This also reflects the fact that research has so far not been very effective at addressing the many issues raised by the information revolution produced by digitalization.<sup>15</sup>

All things considered, despite the importance of the many issues revealed by the recent debates surrounding the British dividend crisis, the obvious fact is that the regulators of most countries still behave in similar ways with respect to dividends. Dividends continue to be quite high in most OECD countries, as regulated firms continue to have significant freedom to design their financing strategy and in particular their dividend policy, without concerns for its incidence on current and future users and taxpayers in a fairly politically sensitive sector.

While the case for regulators to do more and better on dividend monitoring seems to be strong in the current context, the redesign of regulation appears to be hard to endorse politically and technically. Part of this is linked to the need for regulators to consider many dimensions on which they have only partial information at best, as we discuss in section 3. Assessing the pros and cons of increasing the regulation of dividends is thus not a simple exercise, and any change in the current approach is likely to have serious implications for the sectors' financing and pricing options.

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<sup>15</sup> This is also a major gap in theory which goes beyond the scope of this paper but with potential implications. Research is under way in multiple directions, but few concrete policy guidelines have so far emerged and hardly any of these are directly linked to the financial strategy of regulated infrastructure operators.

The changes will also have to account for the fact that the optimal financing strategy will evolve with technology because the market structure and the case for regulation will also evolve with technology. For instance, for many regulated firms, regulated and retail activities still provide the main share of their total earnings, but this is likely to decline with the technological changes underway in the sectors. Competitive tangible assets are increasingly becoming an important source of revenue complements to those produced by the traditional non-competitive tangible assets. This should have an impact on the way the sector should be regulated. The extent to which firms can justify dividends based on increases in earnings in non-regulated parts of their business will demand more detailed cost accounting and assessments of financing relying on cross-subsidies. And it may also force regulators to start having more explicit views on the need for regulated firms to start betting on retained earnings in an environment in which interest rates are likely to pick up. Theory has very little to offer on these issues at this stage.

As regulators and their academic advisors start taking stock of the implication of these recent events and as they look for solutions, they are likely to have to internalize the main insights from the theoretical and empirical finance literature, and a few papers from the regulatory economics research. These are summarized in the following section. It provides partial guidance on the areas in which practitioners may need advice on. But it also shows that a lot of the academic analysis so far has focused on relatively narrow dimensions which may not do full justice to the specificities of the regulated industries.

#### **4. How much guidance from research on how to deal with dividends?**

To our knowledge, there is no analytical academic publication providing a normative assessment of the optimal regulation of dividends in regulated industries. The emerging discussion of infrastructure as an asset class and some of the discussions of project finance are leading to partial debates on the role of dividends to attract new types of investors or to keep some specific ones, but there is no normative discussion on the role of dividends from a social welfare perspective.<sup>16</sup> It is mostly on the financing of the sector and the financial returns produced by the sector. These discussions fit into the small volume of research that has tried to assess the extent to which dividend pay-outs are different in regulated industries as compared to unregulated industries. When compared to the large volume of research testing the relevance of the various theories explaining dividends for unregulated industries, the empirical research on regulated industries is actually quite modest since we only identified less than 20 papers over the 55-year period elapsed since the first published article by Dhrymes and Kurz (1964). Most is based on empirical studies of the electricity and gas utilities in the US.

Despite this small volume of outputs, this narrow research field has provided a number of results relevant to the current debates on the right approach to account for dividends in the regulation of any infrastructure service. These results can be complemented by insights produced by the more general literature trying to explain the motivation for the size and timing of dividends based on characterizations of firms according to a number of specific criteria, which are relatively easy to match with those defining regulated industries (e.g. size, leverage, liquidity, profitability, cash flow generation capacity, taxes, market-to-book ratio, management structure, CEO salaries...<sup>17</sup> These can be used to extrapolate suggestions on how to deal differently with dividends in regulated and

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<sup>16</sup> E.g. Weber and Allen (2010), Cassis et al. (2016) or Andonov et al. (2019)

<sup>17</sup> Until recently, infrastructure firms were typically associated with large size, high debt ratios; longer horizons for cash flow generation capacity. But technological changes are allowing changes in market structures, opening the door to smaller firm with very different financing and revenue generation characteristics. These do not cover yet significant parts of the market to alter the broad picture produced by standard statistical sources mostly based on the monitoring of large firms balance sheets.

unregulated industries. The focus of this note, however, is on the literature that has focused specifically on regulated industries.

Table 1 summarizes the information available on the academic insights on the determinants of dividends in regulated industries. It provides an encompassing snapshot of ideas and results and, perhaps more importantly, it illustrates the diversity of perspectives. It shows that research has emphasized in: (i) basic supply characteristics such as the size of the firms, the market structure in which they operate (i.e. as measured by the Herfindhal index and/or the degree of liberalization of the sector), and the investment needs to approximate the demand (and hence cash flow) prospects, (ii) financing characteristics such as the cash flow levels (e.g. the degree of liquidity of the firm) and risk patterns (e.g. firm specific betas), the debt level and its structure and the dividend demands of the investors (which can be approximated by the evolution of the speed of adjustment to a target pay-out ratio, which can be firm- or sector-specific depending on whether the life cycle assumptions can be accounted for or not), (iii) the regulatory governance, which includes the regulatory status (regulated or not and how) but also the extent to which the regulators could be captured (approximated by the quality of regulation in the sector or the country), and (iv) the ownership governance including the ownership nature (public vs private), the concentration of ownership, the share of internal internship and the nature of the agency relations (which boils down to the possibility of multiple two-way agency relationships between actors).

<b>Table 1: Drivers of dividend pay-out decisions in regulated industries analysed by the empirical literature</b>											
	<b>Nature of drivers</b>										
	<b>Supply side characteristics</b>			<b>Financing characteristics</b>			<b>Regulatory governance</b>		<b>Ownership Governance</b>		
	<b>Size</b>	<b>Market structure</b>	<b>Investment needs</b>	<b>Cash flow and risk pattern</b>	<b>Debt level and structure</b>	<b>Investors demands</b>	<b>Regulatory status</b>	<b>Regulatory leverage of firms</b>	<b>Ownership nature and concentration</b>	<b>Share of internal ownership</b>	<b>Nature of agency relations</b>
<b>Dhrymes and Kurz (1964)</b>	X		X				X				
<b>Michel (1979)</b>							X				
<b>Smith (1986)</b>								X			
<b>Baker et al. (1985, 1988, 199X, 2000)</b>	X	X		X	X		X				
<b>Moyer et al. (1989)</b>							X	X			
<b>Moyer et al. (1992)</b>							X	X			
<b>Hansen et al. (1994)</b>	X	X					X	X	X		
<b>Collins et al. (1996)</b>				X			X		X	X	X
<b>Gugler (2003)</b>							X				
<b>Armitage (2012)</b>				X		X					
<b>D'Souza (2015)</b>							X	X			
<b>Bremberger et al. (2014, 2016)</b>				X	X		X	X	X		

The literature considering the possible relevance of sector regulation for the dividend policy summarized in Table 1 started with a 1964 paper by Dhrymes and Kurz focusing on the US electricity utilities. In order to account for the observed variety of dividend payment practices in the firms of the sector, they considered several explanatory variables such as size, investment, indebtedness, liquidity position, control, and income variability. Their results suggested that a firm's dividend policy in a regulated industry is affected by investment, indebtedness, size, and the regulatory status of the firm.<sup>18</sup> These are all potentially useful control variables to consider under any more general diagnostic of the evolution of dividend policies. Some should also be quite useful for any regulator considering the extent to which it can try to influence dividend decisions if any of these variables is proven to be correlated with the dividend payments in the specific activities it is regulating.

The key point in terms of current debates is that, even if Dhrymes and Kurz only provided correlations between regulation and dividend pay-outs for their sample rather than causality, they hinted early on at the possibility that regulation can influence the dividend pay-outs. This early research provided two more useful specific hints, in more subtle ways, on assumptions to test when assessing the way regulation could influence the dividend pay-out decisions. First, since the correlation they find between dividend pay-outs and investment plans of utilities is negative for a given level of regulation, this could mean that imposing investment obligations, whether in quantity or in quality, may potentially lead to lower dividend pay-outs. And this could have an impact on the scope and sources of financing for the sector. Second, their result also suggests that the size of the effects depended on the size of the firms. From a policy perspective, this implies that imposing the same rules on small and large firms would not have the same effect in terms of investment incentives. Since small firms do not have the same access to capital markets, they are more likely to rely on retained earnings than larger firms and dividend caps would thus not be as effective. This is also something quite relevant in today's context, in which the unbundling of many services in the sector is leading to an increased heterogeneity in the sizes of firms.

Baker and various co-authors produced a sequence of papers over a 20-year period based on surveys of over 300 financial managers working in the NYSE. While the main focus was the identification of the factors driving the dividend decisions and the match with theoretical considerations, the paper also made an effort to isolate industry specific characteristics. This provided useful results on regulated vs non-regulated industries. Also useful was the effort to update the previous conclusions overtime. The first paper to argue that regulated companies were different in terms of dividend policies was Baker, Farley and Edelman (1985), confirmed by Baker (1988). Regulated firms appeared then to have higher pay-out ratios than the other firms in their samples. They used this to argue that the dividend policies of regulated industries should be analysed differently.<sup>19</sup> They added that the utilities' high dividend pay-out ratios may bias the type of shareholders interested, more specifically, they may be more attractive to shareholders preferring current income to future income. In a follow up updating paper, Baker and Powell (2000) got responses from 258 managers.

Many of the earlier results were validated in updates (the importance of current and expected earnings, the smoothness of dividends, the concern for the signalling value to investors and the stability of cash flows). The only significant change in the results was that they found few differences among the responses of managers in different industries, possibly as a result of changes in the

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<sup>18</sup> The link between investment and dividends was first established empirically by Lintner (1956) in his seminal paper. He argued that firms determine a target dividend pay-out ratio and policy to ensure that they can sustain its investment long-run growth target.

<sup>19</sup> The odd response of many researchers following these results was to exclude utilities from their samples...because they are different.

economic and competitive environment faced by utilities since the survey was conducted in the late 1990s, when the debates on deregulation were heating up around the world. Baker, Powell, and Veit (2002) followed up with another survey to include financial sector firms. From a sample of 188 replies, they added to earlier results the need to account for governance and legal concerns and that these dimensions were more important in regulated industries' dividend decisions. This was particularly strong for financial firms and banks who must meet some specific capital adequacy requirements. Since these requirements can also be relevant for infrastructure firms, it seems to make sense to, at least, consider the need to pick it up in the design of a possible regulation of dividends in the sectors. D'Souza, Jacob and Willis (2015) recently updated the early discussions on the role of market structure by looking into changes in US electric utilities' dividend policies following deregulation. They show that utilities continue to pay high dividends after the onset of deregulation.

The set of results produced by Baker and his colleagues on the possible relevance of regulation were being refined by a number of authors trying to go beyond the basic market structure and signalling to investors' explanations. Moyer et al. (1989) found, with a much larger data sample, an equivalent responsiveness of the dividend policies of regulated firms to changes in policies adopted by state regulatory commissions in the US. But Moyer et al (1992), confirming early insights by Smith (1986), added a new twist to the analysis when they argued that their results implied that regulated firms have some margin to use dividend policies to impact the regulators. More specifically, they suggested that dividends could be manipulated to get the regulators to allow market discipline to dominate other concerns, and in particular when there is a need to raise new capital. In practice, this would allow the regulated firms to also ensure a more favourable average price or return in regulatory cycles. In other words, in an environment in which market rules dominate financing decisions, providing too much margin to the regulated firm to design its dividend policy, can also be interpreted as a willingness of regulators to give up on some of the control of the rents that can be produced by regulated industries.

The current relevance of this set of papers (and their validations by stylized facts in other countries, mostly noted in credit rating agencies reports on utilities that point to the fact that one of the risks is that regulatory intervention could interfere with the firms' leverage on price determination or investment decisions) is that they point to the importance of considering the two-way causality between regulation and dividends. In some ways, this sequence of papers was already hinting the need to be careful at any temptation to consider that correcting for regulation was enough to compare dividend policies in regulated and non-regulated firms. Extrapolating the policy implications of standard general theories of dividend distribution to the context of regulated industries may be quite misleading if there are two-way feedback effects between regulation and dividend policies.

Hansen et al. (1994) confirm this case for prudence in the treatment of dividend policies based on the US electricity utilities experience (once more) but provide additional dimensions to consider. They suggest that regulated firms may be acting indeed differently when they are subject to regulatory oversight and insulated from most market disciplines like takeovers. In other words, dividend policies are endogenous. What they added is that the drivers of the reaction may be predictable to some extent. Indeed, the reaction will change with changes in market structure and firm organization. More specifically, their results suggest that the nature of ownership and its concentration can determine the way firms react to regulation and to their opportunities to try to interfere with regulation.

The concern for an increased ownership concentration in the sector has been for some time a matter of concern for regulators. As pointed out by Della Croce and Yermo (2013) and recently by Andonov et al. (2019), institutional investors in this sector tend to represent an increasing share of

the financing of many firms in the sector. And this is irrespective of whether these investors are there because they are happy with the combination of low growth and high dividends (Huang and Paul (2017)) or whether they see the strong investments opportunities signalled by the high dividends (D'Souza and Saxena (1999) or Baker et al. (2013)). If this concentration is indeed increasing across countries, it is essential to see how it impacts the incentives to distribute dividends. In the Hansen et al. (1994) sample, the increased concentration of ownership was associated with a convergence of the pay-out ratios of the electric utilities towards the responses of unregulated firms. They explained this by the increased monitoring associated with increased ownership concentration and a resulting decline in the need for higher dividend pay-outs as a signal to the market to reduce the equity agency costs.

Collins, Saxena and Wansley (1996) questioned some of the conclusions on the competition between regulation and market forces through dividend policies implied by Moyer et al. (1992) and reinforced some of those reached by Hansen et al. (1994). To do so they detailed the specific characteristics of regulated firms and looked into the relevance of the agency-cost linked to the separation of managers and stakeholders to consider the monitoring dimensions of dividends. Relying on a sample of 500 firms, including a sample of 45 energy utilities in 1989-90, they showed that: (i) the average growth expectation for utilities was significantly smaller than for the unregulated sample (about a third), and (ii) the regulated firms were characterized by much lower average systematic risk level (beta averages of 0.77 vs 1.09 for unregulated firms). In addition, they had more shareholders on average than the unregulated firms of their sample. Most importantly, for the point they were trying to make, they argued that it was the level of insider holdings for regulated firms that made a difference (about 10 times lower than for unregulated firms (1.6% vs 16.1%)). The outcome was that the pay-out ratios for unregulated firms were 28.4 percent while for regulated firms they were then at 66.1 percent.

Analysing the implications of these differences pushed Collins et al. (1996) to argue that utilities' regulation may enhance the importance of the insiders in monitoring dividends rather than substitute them. This suggestion is reinforced by La Porta et al.'s (2000) outcome agency model of dividends in which minority shareholders pressure corporate insiders to increase dividends. But these implications are quite in contrast to Moyer et al. (1992) since they show the possibility of a complementarity between regulatory bodies for utilities and insiders, rather than a substitution role. This also implies that they need to consider the possibility of overshooting when designing regulatory interventions since insiders and regulators reinforce each other. The pro-active role of regulation is also highlighted by Gugler (2003) in the Austrian context where state-controlled firms were found to smooth and pay-out dividends significantly more than privately controlled firms. Similarly, Lin et al. (2017), analysing the Chinese experience, find that state-controlled firms with higher information asymmetry pay higher dividends compared to non-state-controlled firms.

However, these results are not as global as they may seem. They have to be placed into the right legal context as suggested by Farinha and Foronda (2009). They actually qualify the usual conclusions on the relationship between dividends and ownership concentration in two ways. First, they show that the conclusions are not the same in civil and common law countries. In civil law countries, dividend policy may mostly protect the rights of minority shareholders rather than majority shareholders. This is quite different for the monitoring role observed in Anglo-Saxon countries where, according to the agency costs of dividend argued by LaPorta et al. (2000), dividends are used to reduce the possibility that managers will manage funds in their own interest rather than in the interest of investors. Note that one side effect of the approach is that dividends are also designed to limit the risk of overinvestment when it exists. Second, in both systems, the relations between dividend pay-outs and shareholders is non-linear. In common Law countries, for instance, lower concentrations of ownership and better minority rights protection determine agency problems mainly centred on the relation between managers and shareholders. The relation is

negative between insider ownership and dividend pay-outs initially at low levels. It then becomes positive before becoming negative again at very high ownership levels. In civil law countries, minority shareholders tend to be less protected. In that environment, dividend payments increase first and as insider ownership becomes more concentrated, after a certain level, they become negative before becoming positive again at very high concentration levels.

The multiplicity of results implies a significant ambiguity as to what matters the most. This is what Armitage (2012) tried to address in the specific case of water regulation in the UK. He tested all the popular finance theories and explanation for the level of dividends (i.e., agency costs, signalling, pecking order, life-cycle of debt and tax) and found no evidence of their explanatory power in the context of the high dividends paid in British water sector at the time he wrote the paper. He found instead that dividends are best explained by a strong demand from investors and the desire of regulated firms to meet this demand. The outcome is also consistent with the life-cycle view of the relevance of the firm maturity that predicts high dividends from mature firms, as they are able to rely on substantial free cash flows. But he added, already then, that maintaining high levels of pay-outs for too long was unlikely to be sustainable if the investment needs are significant and there is a limited scope to further increase borrowing and leverage. If this explanation is indeed the right one, it adds to the case for regulatory intervention, in particular if the excessive demand is likely to threaten the operational performance of the utilities.

Cambini et al. (2014) and Bremberger et al. (2016) recently confirmed empirically that regulated companies are associated with higher dividend levels in continental Europe as much as the previous authors had demonstrated it for Anglo-Saxon countries (mostly the US). Bremberger et al. (2016) is particularly insightful in today's context. They present a simple model of dividend pay-out decisions linking decisions to risk levels, and since the choice of regulation has an impact on the level of risk, this allows them to compare the impact of low and high powered regulation (i.e. cost plus/rate of return vs price/revenue caps) and test their conclusions on a large sample of European electricity companies. They find that that the type of regulation made a difference to the level of dividends but that the impact of regulation depends on whether the utilities are private or public.

For private utilities, incentive regulation leads to higher dividend levels and less dividend smoothing than cost-based mechanisms. Their explanation is that, under cost-based regulation, the regulated price moves with ex post costs, allowing more stable cash flows, while under incentive regulation profits are driven by the firm's ability to achieve efficiency gains, which is less stable, and hence they need to adopt a dividend policy adjusting to earnings fluctuations. For public utilities, the regulatory mechanism makes no difference and thus smoothing is the norm. This essentially implies that the authorities give up on one of the possible instruments to stimulate investments when needed.

The authors emphasize that these results imply that sub-optimal dividend policies resulting from the wrong choice of regulation may limit or deprive the ability of a firm to finance its investment needs. Implicit in their evaluation is the observation that there is some margin to design a hybrid regulatory regime that could maintain the incentive to invest through retained earnings, while maintaining to some extent the incentive to control costs.

To sum up, the literature has indeed looked at a wide range of dimensions as possible determinants of the level of dividends pay-outs. It provides a lot of information that could and should be useful to the regulation of dividends if this regulation is decided by the authorities. But it does not add up to a general theory of dividends in regulated industries yet. The core finance explanations are all useful in some ways, but there is a case to try to produce more robust empirical evidence that accounts for institutional, political and contextual differences across sectors and countries.

## 5. Towards a general empirical model of the determinants of dividends

As suggested by Bremberger et al. (2016), to highlight the key drivers of dividend pay-out policies, it seems reasonable to anchor the analysis in the partial adjustment model suggested by Lintner (1956). It assumes that firms set their dividend pay-out policy annually towards a target pay-out ratio which reflects the demands of investors. For any year  $t$ , the target level of dividends is  $Div_{it}^*$  for firm  $i$  and it is assumed to be related to the current earnings,  $Earnings_{it}$ . The investors are assumed to have a desired pay-out ratio specific to each firm,  $\tau_i$ , but this pay-out ratio can also be sector specific if the life cycle concerns are ignored. At the firm level, as suggested by Bremberger et al. (2016), relying on a lagged dependent variable provides an approximation of the extent to which the expected ratio is achieved. Again, as suggested by these authors, it is easy to adjust this basic model to account for the various possible explanations.

To focus on the role of ownership, owner concentration, or the role of regulation, which are quite relevant in the context of regulated industries, it would seem pertinent to include a few more control variables. These controls could be used to test the relevance for regulated industries of the various possible explanations offered by the general literature on dividends summarized in Table 1. The meaning of each of the variables should be clear from the label we adopted, and the resulting model that would seem reasonable to estimate can be expressed as follows:

$$Div_{it} = a_{0i} + a_{1i} Div_{it-1} + a_{2i} Earnings_{it} + a_{3i} RegulationType_{it-1} + a_{4i} RegulatoryQuality_{it-1} + a_{5i} MktConcentration_{it-1} + a_{6i} Mkt liberalization_{it-1} + a_{7i} Leverage_{it-1} + a_{8i} Capex_{it} + a_{9i} Opex_{it} + a_{10i} Ownership_{it} + a_{11i} Ownership concentration_{6it} + a_{12i} Div_{it-1} \cdot RegulQuality_{it-1} + \epsilon_{it} \quad (1)$$

The equation raises a number of complex econometric issues, including various reasons to worry about endogeneity. But it would not really address the main issues raised in the introduction. Notably, it would not inform on the extent to which the decision to pay dividends implies a trade-off in terms of investment and quality of service. This demands a more structural approach. It also requires the inclusion of additional equations for the main operational variables affected by the dividend payment decision. This concerns notably the investment level (capex) and the quality of service (e.g. opex or more specific quality indicators). It could also include environmental impact indicators for the countries in which there is evidence that underinvestment linked to excess payments of dividends has been identified as an issue.

If this additional empirical test of the drivers of the apparent negative correlation between dividends and the achievement of regulatory goals was to be confirmed by the structural model, it could be used to distinguish between the dimensions on which a regulator may have some leverage from those which are defined by context. Once this distinction has been made, the next step would be to test the extent to which there is scope for an explicit form of regulatory intervention which would allow some sharing of dividends between all stakeholders. This is what profit sharing or sliding scale mechanism have been aiming at in the last 20-30 years.<sup>20</sup> They ensure that when the regulated firm's profits (or rate of return) exceed a pre-set upper bound (or rate of return), it will have to cut prices. The symmetric adjustment takes place when profits or returns are below the pre-set level. The mechanism allows profit gains (and losses) to be shared between the supplier and the consumer.<sup>21</sup>

While the sharing spirit is obvious in these approaches, it never dealt with dividend pay-outs explicitly. Yet, a sharing mechanism anchored in dividend distribution rules were tried already in the

<sup>20</sup> See Burns et al (1995, 1998) and Lyon (1996) for a supportive view of sliding scales and Meyer and Vickers (1996) for a less positive perspective.

<sup>21</sup> For more details, see for instance Burns et al. (1995) or Mayer and Vickers (1996)

mid- 19<sup>th</sup> century and early 20<sup>th</sup> century according to Hammond et al. (2002). At that time, regulation of the manufactured gas distribution sector (town gas) in England was subject to a sliding scale mechanism in which the dividends distribution was linked to the fluctuations in gas prices around some standard price or base level price. The regulatory mechanism was asymmetric (and not mandatory). The base dividend rate was set at 10% but if prices rose above their base level, the dividend rate was cut according to an explicit formula, while in the event of gas price drops, the dividend rate did not increase. For every penny charged above (below) the base level, the maximum dividend rate was reduced (increased) by 0.25%. With this mechanism, firms were able to increase their prices when costs increased while users were able benefit from lower prices while dividends were still being paid out. Lowering the average price below the base level allows the firm to distribute a fixed share of the difference as additional dividends or employee bonuses or some mixture of both. The main challenge was to set the right base price and dividend rate in a coordinated way.

More recently, dividends have also been built in various forms of regulatory mechanisms which boil down to re-interpretations of profit-sharing mechanisms. In Argentina, for instance, in 2017, the decision was taken to allow dividends to be paid by gas companies only after their delivery of their investment commitments. All profits will be assigned to a Fund for future dividends which will be available once the sector regulator will have assessed that investment commitments have been delivered.<sup>22</sup> In Spain, the regulator introduced in 2019 new legislation to constrain the financing strategy of regulated energy companies. The constraints cover dividends but also debt levels, cash flows, EBITDA and financial costs, and are designed to ensure that the firms have the financial capacity to finance their investment requirements.

The Argentinean and Spanish experiences show that the concern for a mismanagement of dividend policies in the design of regulation can be internalized through changes in the regulatory framework. The solutions they have adopted are however quite different and to some extent ad-hoc. Other countries are working on equivalent controls of dividends. For now, these are only first steps, but within a couple of years, it should be possible to produce reasonable partial or preliminary evaluations of the impact of regulatory controls of dividend policies on the investment and quality performance of regulated companies.

## **6. Concluding remarks**

The most obvious insight provided by the survey is that there is little precise guidance from the academic literature on the interactions between infrastructure regulation and the dividend payment decisions in the sector. Until recently, most of the insights were largely extrapolated from broad comparisons between regulated and unregulated firms. It is only recently that academic research has made the case for assessments focusing explicitly on the behaviour of regulated industries with respect to their dividend pay-out decisions.

Considering the case for a closer monitoring of dividends in regulated industries is particularly important in a context in which there is evidence that higher dividends are correlated with lower investments and possibly lower service quality in various dimensions. In view of the current significant investment needs of regulated industries linked to environmental and technological concerns, a more careful look at the details at the sector level seems to be important indeed.

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<sup>22</sup>e.g. <https://econojournal.com.ar/2017/04/las-empresas-reguladas-comenzaron-a-ganar-plata-pero-no-pueden-distribuir-dividendos/>

More empirical research is needed but there is also a case for more conceptual analysis of the dividend pay-outs specific to regulated infrastructure services. An increase in the empirical analysis of dividend policies and of the various ways in which regulators are trying to ensure that they do not penalize users in favour of investors is necessary. But there is also a need to consider more carefully their normative implications in the context of industries delivering public services with strong social dimensions and significant spill-over effects on the rest of the economy. For now, regulators looking for simple guidelines will not be helped by a large share of the available research outputs, as they cater more to the private welfare of investors and managers than to the social welfare accounting also for the concerns of current and future consumers.

The growing evidence on the substitutability between dividends and investments provides the basis of this possible research direction. Suggestions such as the inclusion of dividend covenants that specify a maximum on pay-outs to effectively impose a minimum investment requirement were promising early ideas which have not really been followed up carefully (e.g. Smith and Warner (1979) and Kalay (1982)) and are currently being tested in some countries (e.g. Argentina and Spain). However, well intended these initiatives may be, they may lead to their own share of issues. For instance, restrictions on dividends are likely to penalize firms with lower growth options, which tend to be the incumbents in this sector. This may be one of the reasons why so many are not diversifying in other businesses, which may raise concerns with perverse cross subsidies in the industry. Also, as pointed out long ago by Smith (1986), higher dividends tend to force utilities to raise funds more frequently in the capital market and this is important to regulators as it provides evidence on the firm's cost of capital to be used in the regulatory price setting process.

Coming up with the right balance in the concrete design of regulation is unlikely to be easy. As Helm (2018) puts it, regulated firms focus on two options: (i) cut dividends and increase investments, which may reduce access to capital markets or (ii), manage to meet with the dividend demand and maintain access to the capital market. It is this "dividend trap" that research needs to address with all stakeholders in mind, including consumers who currently only see the increases in regulated prices as the solution to the under-performance in investment and quality as the price to pay to maintain access to capital markets. Ultimately, the answers to the dilemmas raised by this trap are likely to come from a better internalization of corporate financing concerns in the design of sector regulation and a better awareness of the social issues that regulation is expected to address as part of the concerns to be dealt with in corporate financing decisions, including the levels of dividends paid, their timing and their purpose.

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