

**The transition from the national to the EU model of energy governance and its implications for energy firms, governments and consumers: A comparative analysis of the Greenstream and Galsi gas pipelines**

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## **Declaration of originality**

I, Roberto Cardinale, declare that all material presented in this thesis is entirely my own work. Where information has been derived from other sources, I confirm that this has been indicated and that all sources and quotations are cited.

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## **Abstract**

The thesis analyses the economic and political implications of the ongoing transition from the national to the EU model of energy governance, which began in the 1990s as an effect of the EU liberalization of the energy market. The EU model is based on the logic of market liberalization, which holds that consumers' interests are best served through market competition rather than protection of national champions. This policy has had the effect of encouraging cross-border mergers within the EU, while unbundling supply chains and depriving former State-Owned Enterprises (SOEs) of financial and political support. The thesis focusses on the effects of liberalisation on the markets for gas import. Analysing this aspect is crucial because of the large-scale effects it has on energy security, as Europe currently imports more than two thirds of the gas consumed, which in turn account for more than a third of the energy mix. Through a case study of undersea gas pipelines connecting North Africa to Europe, the thesis explores the effects of liberalisation on the interests of energy firms, governments and consumers. It finds that liberalisation (i) has increased transaction costs between exporting and importing firms, sometimes jeopardizing the realisation of transnational gas infrastructure; (ii) has allowed governments to veto divestments from assets that are strategic for energy security, but has prevented them from pursuing large-scale investments in the energy sector and ensure consumers' price affordability irrespective of market fluctuations; (iii) has reduced European firms' bargaining power vis-à-vis exporting firms, which, in the long term, will result in higher costs of import and higher prices for consumers. To overcome these limitations, the thesis proposes policies that reconcile the EU principles of market competition with the specificities of the European gas sector, which is a precondition for energy security, consumers' welfare and economic prosperity in Europe.

## **Impact statement**

The thesis contributes to different strands of academic literature. It also aims to inform policy-making at the national and EU level, and in mature as well emerging economies within and outside the EU, through a comprehensive framework that considers the interests of the main stakeholders in the economy and society.

The academic impact of the thesis has several dimensions. One concerns the debate on EU energy reforms. So far, this debate has focussed on the domestic market. The thesis shows that developing an effective regulatory framework also requires considering energy relations with producing countries. Another key dimension of academic impact is the theoretical contribution Transaction Cost Economics (TCE), particularly the extension of TCE to include diplomatic aspects. This contribution leads to bridging the literatures on energy economics and international relations in an innovative way, i.e. by adopting TCE's contractual perspective to interpret political-economic dynamics.

The insights of the thesis have important implications for both EU and national policy-makers. For example, the thesis outlines a EU energy diplomacy approach that supports European energy firms when operating in non-EU countries to produce and supply gas to domestic markets. This approach would contribute to energy security and incentivise new entrants in European gas markets to develop their own gas corridors, which is crucial for them to compete with former monopolists and to enhance market competition across the EU. Another key contribution concerns understanding the nature and role of State-Invested Enterprises (SIEs). The thesis suggests that EU energy and industrial policies would greatly benefit from coordinating SIEs in the respective markets. In fact, since SIEs are typically leaders in domestic and international markets and represent the interests of Member States, their coordination could make it possible to reconcile the interests and policy vision of EU institutions and Member States.

The policies suggested by the thesis consider the potential impact on the main stakeholders in the European economy and society. In particular, these policies aim to decrease the cost of energy imports, which affects economic growth; to increase the profitability of the energy sector, which influences investment in energy infrastructure and hence energy security; and to reduce energy prices, which have direct effects on consumers' welfare.

The thesis may also prove relevant for emerging economies. In fact, the case study on gas infrastructure connecting North Africa to Europe provides a framework through which both mature and emerging economies acting as counterparties across transnational supply chains can increase their bargaining power in commercial and political deals. From the viewpoint of emerging economies, this framework suggests policies that make it possible to benefit from stable energy exports and acquisition of new technology. Moreover, the analysis of the evolution from SOEs to SIEs in Europe may provide insights for emerging economies on how to plan their transition to advanced stages of development and sustainable energy systems.

Finally, the framework of the thesis can be used by stakeholders such firms, trade unions and consumer unions to interpret the ongoing transformation of the European energy sector.

## Table of contents

1. Introduction	9
2. Literature review	22
2.1.Literature on the profitability of transnational energy infrastructure	22
2.2.Literature on the government’s role in the energy sector	30
2.3.Literature on gas prices and consumers’ welfare	38
2.4.Literature on Transaction Cost Economics	43
3. The comparative case study: methodological framework	48
4. The profitability of transnational energy infrastructure: A comparative analysis of the Greenstream and Galsi gas pipelines	55
4.1.The transition from the national to the EU model of energy governance	59
4.1.1. The EU vs State industry dispute in an Advocacy Coalition Framework	59
4.1.2. The outcome of the dispute: evidence from Greenstream and Galsi	62
4.2.Greenstream’s profitability: a successful mix of traditional and innovative elements of governance	63
4.3.Galsi’s unprofitability: the lack of a diplomatic strategy	68
4.4.National vs EU energy governance from a Transaction Costs Economics perspective	74
4.5.Conclusions and policy suggestions	79

5. The Italian and French governments' ability to pursue policy objectives under partially liberalised energy markets: Insights from Greenstream and Galsi gas pipelines	83
5.1.The economic, social and political objectives of SOEs	87
5.2.The economic, social and political objectives of SIEs	90
5.3.SIEs' international business and foreign policy implications for Italy and France: insights from Greenstream and Galsi	94
5.4.The potential industrial policy role of European energy SIEs in the 21 <sup>st</sup> century: insights from recent trends in global strategic markets	101
5.5.Concluding remarks	121
6. The transition from the national to the EU model of energy governance: future implications for European consumers	117
6.1.World gas markets compared: Insights from the US and East Asia	120
6.1.1. The US gas market	121
6.1.2. The East Asian gas markets	125
6.2.The European gas markets: The cases of Italy and France	127
6.2.1. The Italian market of gas import: the partial transition from the national to the EU governance	128
6.2.2. The French market of gas import: a strong heritage from the national model	135
6.3.The long-term welfare of European consumers: Insights from the Neoclassical and Transaction Cost Economics	141
6.4.Conclusions and policy suggestions	149

7. Final remarks on the partial transition from the national to the EU model of energy governance	154
7.1.The energy firms' viewpoint	160
7.2.The governments' viewpoint	167
7.3.The consumers' viewpoint	177
7.4.Theoretical contribution to the debate on the EU gas market liberalisation and to Transaction Cost Economics	185
7.5. Policy suggestions	193
Personal Interviews and speeches	200
References	201

## **1. Introduction**

In 1992, the Maastricht Treaty established the European Union (EU), laying the foundations for the creation of the European Single Market. This was a turning point in the process of European economic integration, started in the aftermath of World War II in the belief that increasing economic interdependence would lead to peace and prosperity. The creation of the European Coal and Steel Community (ECSC) in 1951 and Euratom in 1957 signals that the energy sector was central to the earliest steps in the process of European integration and has been a core element of the EU's political stability and economic prosperity. Surprisingly, the energy sector has been also among the last sectors to be liberalised and included in the EU Single Market policy. As a result, its history and role in European integration show substantial differences when compared to other sectors, arguably because of its strategic relevance in economic and political affairs.

The liberalisation of the energy sector started in the mid-1990s and it is still ongoing. Its logic is based on the assumption that consumers' interests can be best served by forbidding governments to protect national champions from competitive market pressures. The policy has had the effect of encouraging the opening of national markets to European competitors, while at the same time unbundling supply chains and depriving State-Owned Enterprises (SOEs) of political and financial support. The thesis addresses the economic and political implications of energy market liberalisation, which has generated a partial transition from the national model of gas governance, based on state-owned monopolies, to the EU model of gas governance, based on competition among privatised energy firms.

More specifically, this study analyses the ramifications that this transition has had in terms of alternative ways to organize the supply chain of gas production and transmission, and

of different forms of ownership structure in former SOEs<sup>1</sup>. The thesis focusses on unbundling and (partial) privatisation of former SOEs, which are two pillars of the Single Market policy. Unbundling consists in the separation of upstream, midstream and downstream, which, before the liberalisation, were jointly operated by a single firm, namely the former State monopolist. More specifically, unbundling consists in the spinoff from the former monopolist of midstream assets, particularly the national grid and import infrastructure. In the EU policy reforms' logic, this would prevent the former monopolist from granting favourable access to the grid to its subsidiaries operating in the upstream and downstream at the expense of new entrants, thus hindering market competition (Florio, 2013). Unbundling national gas grids and import infrastructure became legally binding for EU Member States with the third directive on gas market liberalisation<sup>2</sup>. In contrast, privatisation of SOEs is not mandated by specific EU provisions. However, when governments still retain significant voting stock in former SOEs, they have available special powers, including veto powers to prevent potential hostile takeovers (Adolff, 2002). When this power is used systematically to prevent firms from other Member States from accessing the domestic market, the European Commission (EC) reserves the right to intervene and exercise pressure on the Member State to reduce its shares to a level at which such powers cannot be exercised.

The study explores how unbundling and privatisation affect the profitability of transnational energy infrastructure, the policy objectives that governments can pursue in and

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<sup>1</sup> SOEs are business enterprises on which governments exercise substantial influence through full ownership or by retaining majority or minority shares. In line with the definition provided by the OECD (see Christiensen, 2011), this chapter refers to SOEs when the government holds a majority share (superior to 50% of total shares), and to SIEs when the government holds a minority share (inferior to 50% of total shares). However, SOEs' and SIEs' nature and objectives may vary extensively, depending on their mandate, ownership structure, sector, stage of economic development, political culture and other factors (Peng et al., 2016; Cardinale, 2017; 2019b; Florio, 2013). See Section 2.2 for a more extensive discussion of their nature and typologies.

<sup>2</sup> The third EU directive on gas market liberalisation (2009/73/EC) calls for ownership unbundling, which consists in a legal constraint for the former monopolists to spin-off strategic infrastructure such as the national grid, storage and import infrastructure. The third directive differs substantially from the previous one, which envisaged as mandatory only the legal unbundling, namely the need to create separate companies to manage such assets, but with the possibility to control them as subsidiaries or through majority shares.

through the energy sector (e.g. energy security, market competition, geographical access, economic growth), and the gas prices paid by final consumers. These three aspects are considered because they correspond to the main problems faced by each of the key stakeholders in the transition: energy firms, governments, and consumers.

The implications of liberalisation constitute an important research question because of the significant impact it might have on energy costs, which in turn affect economic growth; on the profitability of the energy sector, which influences the investment rate in energy infrastructure and thereby affects energy security; and on energy prices, which have direct effects on consumers' welfare.

Recent contributions show that liberalisation of the European gas markets did not bring the expected efficiency improvements. For instance, due to the oligopolistic market structure in the upstream, unbundling often increased double marginalisation (Davies and Waddams, 2007; van Witteloostuijn et al., 2007; Jamasb et al., 2008). In a similar way, privatisation has not generated a positive effect—even causing a deterioration—of both firms' performance and consumers' welfare (Florio, 2004; 2013).

These policy outcomes are explained as deriving from the difficulties in incentivising market competition in the gas sector, which has specific features as compared to other sectors, both in its productive structure and political implications. For example, the existence of high fixed costs and the large economies of scale and scope make it difficult to enhance efficiency by increasing the number of market players (Helm, 2007). In addition, private management of energy firms does not ensure energy security, geographical access and consumers' price affordability (Chang, 2007). This is commonly explained by the 'public good' nature of energy, especially in certain market segments, and by the private sector's unwillingness to make investments that generate positive externalities.

While these results are relevant to understand some effects of liberalisation, both the current literature and policy debate have largely ignored the implications of liberalisation for the *external dimension* of gas markets, which instead is the focus of this thesis. This reflects the attempt by policy-makers to extend the logic of the EU Single Market policy to the gas sector, concentrating financial and political resources mainly for harmonising regulation among Member States, rather than for promoting the commercial relations with producing countries.

Moreover, the gas sector in the EU shows several differences as compared to other sectors where the EU Single Market policy has shown successful results. In fact, whilst the EU is largely self-sufficient for, and often indeed a net exporter of, most of the goods and services it produces domestically, with an intra-trade amounting to more than 80%, the level of interdependence with non-EU countries in the gas sector is much higher. This suggests that, in addition to domestic regulation, the commercial relations with producing countries are also relevant and influence the functioning of domestic gas markets.

Gas is a key energy source for Europe, accounting for around one fourth of the energy mix in EU-28. It is widely considered to be the transition source to renewables, because it can easily replace the more polluting sources of coal and oil whilst being affordable and ensuring stable supplies. These technical features, and the institutional backing received in the recent years, had the effect of attracting important investments into the gas sector, contributing to its current importance among other energy sources.

However, two third of the gas consumed in the EU is imported from abroad. This represents an element of vulnerability, as EU supplies are likely to be affected by commercial and geopolitical factors that are not fully under EU control. More generally, gas dependence from abroad conditions the dynamics of the domestic energy markets, as final prices of gas are mainly determined by the import price. The fact that most of the gas supply chain is not under

the EU jurisdiction suggests that the EU will not achieve its energy policy objectives through domestic regulation alone, as the Single Market policy approach envisages. Therefore, the effectiveness of EU domestic regulation largely depends on the EU's ability to support it through an effective foreign energy policy that is compatible with the internal rules and reconciles the interests among Member States and with producing countries.

Exploring the transnational dimension of the energy supply chain, from production abroad (upstream) to international transport (midstream) and domestic distribution (downstream), is necessary for the pursuit of various important objectives of EU energy policy. For example, doing so makes it possible to develop strategies of import diversification, which is in turn necessary for energy security and to increase competition among non-EU suppliers. Understanding the structure and trends in the market for gas import makes it possible to assess the dynamics of gas price formation along the supply chain, as the costs of production and transport from abroad account for most of the final price. This aspect is also relevant to the pursuit of price affordability for consumers.

To address the effects of liberalisation on the European gas markets, this thesis adopts the theoretical lens of Transaction Costs Economics (TCE) (Coase, 1937; see Williamson, 1981 for a comprehensive exposition; see also Williamson, 2013; Tadelis and Williamson, 2013; Zhang et al., 2014). TCE is particularly powerful for this purpose and in providing policy suggestions that improve the current regulatory framework. In fact, the theory studies how different forms of supply chain organisation and contractual arrangements can be efficiency-enhancing, depending on specific sectoral features. Such perspective is relevant for analysing the EU market of gas import because of the presence of only few EU importing firms and the systemic relevance—for the energy sector and the economy—of their contractual relations with firms from producing countries.

TCE argues that the governance of firms is mainly driven by the nature of the asset traded, particularly by its “specificity”. The concept of “asset specificity” indicates the extent to which the value of a certain asset changes when it is used for purposes that are different from those for which it was initially conceived. High asset specificity, which reflects the impossibility of using an asset in alternative ways, generates the inability of counterparties to switch supplier or customer. This situation is likely to bring to high transaction costs, especially if the contractual relation is unbalanced and one of the counterparties benefits from high bargaining power. To reduce transaction costs, TCE suggests either to avoid relying on suppliers or customers, by producing the asset internally (i.e. through vertical integration), or to adopt contractual arrangements that discourage opportunistic behaviour.

Gas in Europe is highly specific, especially in the market for gas import (i.e. in the upstream and midstream). High specificity in Europe can be explained by the availability of gas only in specific geographical areas (site specificity), the need to develop facilities and technologies that suit the specific engineering challenges of each project (physical asset specificity), and by the constraints in the routes for gas provisioning, which entail the construction of transport infrastructure that are able to connect only two (or a few) markets (dedicated assets). From a TCE perspective, this suggests the need to integrate the supply chain; liberalisation, in contrast, has led to unbundling, which has brought to higher transaction costs.

However, for a more accurate understanding of the drivers of transaction costs (and profitability) in the EU market for gas import, the thesis suggests that the economic lens of TCE must be extended to also include political aspects. In particular, the thesis aims to bridge the fields of energy economics and international relations through the TCE framework, showing the intertwining of economic and political aspects in the energy sector.

In particular, the contribution to TCE consists in showing the effect of diplomatic intervention for lowering transaction costs between exporting and importing firms. The

contribution highlights how energy diplomacy is central in aligning the interests between the economic (firms) and political (governments) stakeholders, providing further support to contractual arrangements (e.g. joint ventures or long-term contracts) that are identified by TCE as ideal for interest alignment and to reduce transaction costs when asset specificity is a constraint. As a result, energy diplomacy proves effective in strengthening contractual relations whilst offering solutions when political and market factors undermine the profitability of commercial deals and firms do not possess the adequate tools to address the problem. Government action may be decisive for the success of specific energy deals thanks to its ability to offer exchange deals to the foreign counterparty in other sectors of economic and political cooperation, balancing potential initial disadvantages of the domestic firm.

The thesis approaches the problem through a comparative case study of transnational gas infrastructure, and specifically of two undersea pipelines: “Greenstream”, which connects Libyan gas reserves to the Italian gas grid across the Mediterranean Sea; and “Galsi”, which was supposed to connect Algeria to Italy, but has been in a stalemate since the late 2000s. Greenstream is owned and managed by the former monopolist Eni, which retains extensive assets both domestically and in producing countries, and is partially owned by the Italian government. As a result, Greenstream is vertically integrated and has benefited from the diplomatic support of the Italian government when dealing with the Libyan counterparties. In contrast, Galsi is owned and managed by new entrants in the Italian gas market who, despite their increasing domestic market power, lack extensive operations abroad. This has greatly contributed to the current unbundled structure of Galsi’s supply chain. Furthermore, Galsi did not benefit from an effective approach to energy diplomacy. In fact, new entrants in Galsi are owned by public institutions of different levels and nationality, thus they represent different political interests. In addition, the project itself was penalised by the overlaps between the

Italian government and European Commission (EC)'s initiatives of negotiation with their Algerian counterparts, and by their divergent approaches to energy diplomacy.

The choice of the cases follows the criteria of the comparative case study methodology (Collier, 1993; Dion, 2003; Flick, 2006; Yin, 2009), which suggest the importance of selecting cases that display substantial differences on aspects related to the variables under investigation while showing similarities on aspects related to factors that must be controlled for. In this case, the variables under investigation concern i) the different ways of organising the supply chain, and ii) the different forms of public ownership of energy firms and consequent government support (diplomatic, financial, and regulatory). The case study makes it possible to control for gas demand in Europe, gas supply in the North African market for gas export, and for contractual aspects that characterise the energy relations between European and North African countries.

The case study explores how unbundling and partial privatisation of former SOEs have affected the profitability of Greenstream and Galsi. The analysis is then extended to assess how these aspects of the liberalisation have affected the Italian and French governments' ability to pursue policy objectives and the welfare of consumers. As a result, the case study is structured in three steps which explore the perspective of the three main stakeholders in the energy sector, namely firms, governments and consumers. The different perspectives are addressed respectively in Chapters 4, 5 and 6 of the thesis.

Chapter 4 shows that unbundling and the lack of a coherent strategy of energy diplomacy reduce energy firms' profitability, sometimes jeopardizing the realisation of the energy infrastructure projects that they own and manage. This emerges from the contribution of vertical integration and diplomatic support to Greenstream's profitability, and from the negative effect of unbundling and lack of diplomatic support on Galsi's profitability, which caused its stalemate and subsequent failure.

Based on this evidence, the thesis suggests forms of EU energy diplomacy, based on bilateral trade deals, which could achieve forms of vertical integration for energy firms as well as help EU and non-EU counterparties align their interests. In particular, gas and infrastructure deals should be negotiated within trade agreements that also consider the interests of producing countries, as most of them are unwilling to grant unconditional access to foreign energy firms to exploit domestic resources. A systematic and pragmatic EU approach to energy diplomacy would also help pursue the EU objectives of market competition and energy security. For example, it would help new entrants (i.e. those with the lowest bargaining power vis-à-vis monopolists) to vertically integrate in the foreign upstream and create alternative routes from those managed by former monopolists, which usually retain full control over gas imports. This could increase competition in EU domestic markets. Furthermore, vertical integration and recourse to energy diplomacy would help decrease contractual frictions and thus increase infrastructure profitability, which is key for energy security.

In Chapter 5, the main finding is that unbundling, together with changes in ownership structure, reduces the governments' ability to pursue some, though not all, policy objectives. The findings are based on the comparison between the Italian and French governments' role in Greenstream and Galsi and particularly in the energy firms that own and manage such projects. In fact, these energy firms are partially owned by their respective governments through minority or majority shares. Starting from their role in the projects, the analysis is extended to explore their respective strategies of energy policy in a broader perspective, highlighting similarities and differences in their approaches to intervention. On this basis, the chapter suggests that governments may still be able to positively contribute to energy security through State-Invested Enterprises (SIEs), although governments cannot pursue large-scale investments in the energy sector and ensure consumers' price affordability through SIEs irrespective of market fluctuations.

The thesis suggests ways for the governments to overcome such difficulties and pursue wide-ranging policy objectives, despite the constraints posed by a partially liberalised energy market. For example, governments could develop long-term strategies of energy security and consumer price affordability by actively engaging in the management of partially privatised energy firms, in which they retain major shares. However, such strategies should also be able to reconcile the interests of private shareholders. This requires representatives of governments and private shareholders in firms' boards to cooperate on strategies for both the international markets, where their interests are easier to reconcile, and the domestic market, where their interests are more difficult to reconcile.

Chapter 6 shows the implications of liberalisation for European energy consumers. An initial comparison between the three main world gas consumption areas, namely Europe, US and East Asia, helps understand why gas prices in Europe are still high despite the policy reforms. The comparison shows that energy dependence from abroad is the key determinant of high prices, while the historic reliance on vertically integrated models has positively contributed to containing their excessive rise and to securing energy supplies. In a subsequent comparison between the Italian and French gas markets, the chapter shows that prices for consumers are mainly shaped by the contractual relations with producing countries and by the availability of import infrastructure, rather than by domestic market regulation. This is shown by the fact that the two markets have been liberalised to different extents, while relying on the same market for gas import, and recorded very similar trends on gas prices. These findings suggest that i) the external dimension of the gas market is the critical sphere of intervention to reduce price for consumers, and that ii) this is likely to be achieved through vertical integration and political cooperation with producing countries. In contrast, unbundling and decreased government intervention will reduce European firms' market power domestically, decreasing their bargaining power with exporting firms, which will impose higher costs of imports.

An initial step to counteract this trend would be to modify the existing EU law that prevents national or cross-country mergers whose firms' combined turnover in the EU exceeds €250m. Another EU provision that should be reassessed concerns the ban on all typologies of State aid towards domestic firms. In this way, European firms could be able to compete globally with firms that are not restricted by such laws, and that are increasingly relying on Mergers & Acquisitions (M&As) and government support (Musacchio and Lazzarini, 2014) to increase their influence on global energy markets. These measures would not hamper competition in the EU domestic market if State aid is allowed to every Member State, or alternatively if it is conceived and negotiated within EU institutions. In fact, such measures would help European firms maintain their global leadership, and hence be able to negotiate low costs of imports and abundant supplies to the advantage of consumers. Finally, the provision on Third Party Access (TPA) should be modified or abolished. TPA provides new entrants in the European gas market with the right to negotiate energy deals with producing countries that already supply the domestic market, by using existing gas import infrastructure that is managed by former monopolists. This thesis argues that TPA increases the bargaining power of exporting countries, because they benefit from competition between former monopolists and new entrants. This is likely to increase the import price without providing advantages in terms of additional quantity supplied. In contrast, new entrants should be encouraged to develop new energy relations with countries that are not among current suppliers. This solution would increase geographic diversification, which is key for energy security, while preventing foreign suppliers from taking advantage of competition in European domestic markets.

In recent years the EU has made substantial changes to its initial vision of a EU Single Market, which envisioned a separation between the economic and political spheres and progressive limitations to political intervention in the energy sector. For example, it has recently undertaken some steps towards the creation of a EU energy diplomacy, granting

exceptions to unbundling when this represents a clear disincentive for infrastructure investments. In addition, the EU has put forward a wide range of incentives to European energy firms when they take part in energy projects that are of strategic interest for the EU<sup>3</sup>.

However, the analysis undertaken by this thesis suggests that these recent initiatives are not sufficient to face the ongoing transformations of global energy markets, which are extensive and are witnessing the rise of energy players from developing countries and new dynamics of global competition. The analysis shows that several problems in the EU energy governance occur as a result of divergences between EU domestic regulation and each Member State's foreign energy policy. In particular, more efforts are needed to harmonise the different visions and interests within the EU, and to develop a common EU strategy of external action that will allow the EU to be a key global player in the future and a leader in tackling climate change.

The thesis is structured as follows. Chapter 2 reviews the main strands of literature on EU policy reforms in the gas sector. Chapter 3 explains the rationale for adopting the comparative case study methodology and discusses the choice of cases. Chapter 4 analyses liberalisation from the viewpoint of energy firms, and especially those involved in Greenstream and Galsi. The chapter shows how partial liberalisation has led to the emergence of new approaches to energy diplomacy and new ways to organise the supply chain, and how old and new elements of energy governance can be reconciled to ensure the profitability of transnational energy projects. Chapter 5 explores liberalisation from the viewpoint of governments. It focusses on the Italian and French governments, which are involved to different extents in Greenstream and Galsi, showing their different approaches to intervention in their respective energy SIEs. Chapter 6 addresses the long-term implications of liberalisation

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<sup>3</sup> This is only likely to become more urgent in view of the Intergovernmental Panel on Climate Change's (IPCC) call to decarbonise energy and transport (IPCC, 2018)

for European consumers. This is done by analysing the three main world gas consumption areas, namely Europe, US and East Asia, and then focussing on Europe, particularly Italy and France. The comparisons shed light on the links between level of domestic production, extent and effectiveness of liberalisation reforms, and trends in gas prices. Chapter 7 brings the thesis to a close. It sums up the implications of liberalisation for energy firms, governments and consumers, highlights the theoretical contribution of the thesis to TCE, and suggests policy measures to reconcile the main EU policy objectives, namely market competition, energy security and price affordability for consumers.

## **2. Literature review**

To address the political-economic implications of the transition from the national to the EU model of energy governance, I review four main bodies of literature. The contributions are organised according to the relevance for each of the main chapters of the thesis, which explore the impact of liberalisation for energy firms, States and consumers, respectively. Section 2.1. reviews the contributions related to the organisation of transnational energy supply chains, and the implications for gas infrastructure profitability. Section 2.2. focusses on the strands of literature that study the various forms of State intervention in the energy sector, particularly through State ownership of energy firms. Section 2.3. shows the current debate about how structural and regulatory reforms of energy markets influence the welfare of energy consumers. Section 2.4. reviews the key contributions of the main theoretical perspective adopted in the thesis, i.e. Transaction Cost Economics.

### **2.1. Literature on the profitability of transnational energy infrastructure**

Chapter 4 of the thesis studies how transnational gas infrastructure profitability is affected by i) different ways to organize the energy supply chain, and ii) different forms of political support to energy firms. Two bodies of literature are relevant for this topic: one analyses alternative models of supply chain, and another one focuses on cross-country cooperation for the development of transnational energy infrastructure. I review them in turn.

The first stream of literature explores different ways to organize the energy supply chain and the implications for the profitability of the energy sector (see Joskow, 2010 for a review). These studies suggest that different degrees of vertical integration may be more or less appropriate in different contexts, depending on the extent to which energy firms are locked into binding contractual relations in different phases of the supply chain (Joskow, 1985; 1990;

DeCanio and Frech, 1993; Dahl and Matson, 1998; Saussier, 2000; Hirschhausen and Neumann, 2008; Hauteclocque and Glachant, 2009; Glachant and Hallack, 2009; Signorini et al., 2015).

This strand argues that contractual relations are shaped by specific characteristics of the markets and ‘specificity’ (see Williamson 1981) of the asset traded. For example, Joskow (2008; 2013) shows that the discovery and subsequent large-scale commercialisation of shale gas in the US has contributed to decrease asset specificity of gas and has played a crucial role in the transition from vertically integrated to unbundled supply chains, as well as from long-term contracts to spot markets. He shows that despite the increasing number of market players and transactions, costs of transaction are kept low. This is explained mainly by the recent transition from a condition of scarcity to one of abundance and subsequent achievement of energy independence from abroad. Domestic abundance of gas, in turn, makes it possible for energy firms to easily switch suppliers or customers without incurring in price and supply risks. This reflects a substantial decrease of specificity in the US gas market. However, Joskow (2010) points out that regulation is still needed to avoid lack of coordination among the different phases of the supply chain, which often occurs as a result of the transition towards more competitive forms of market structure.

Other empirical studies show that vertical integration and long-term contracts occur in response to ‘asset specificity’ (see Williamson, 1981), particularly site specificity (Joskow, 1985; Stuke, 1983), physical asset specificity (Klein, Crawford and Alchian, 1978), and human asset specificity (Monteverde and Teece, 1982). In particular, Russo (1992), Fan (2000), and Dahlstrom and Nygaard (1993), among others, focus on specificity in the energy sector. Hirschhausen and Neumann (2008) focus on the gas sector, particularly on how the rise of the Liquefied Natural Gas (LNG) industry is contributing to decrease asset specificity in global energy markets and to adopt more flexible contractual arrangements. Interesting insights

on asset specificity and vertical integration have been found also with reference to other manufacturing sectors, such as car components (Klein, 2000; Walker and Weber, 1984), coal (Kirkvliet, 1991), aerospace systems (Masten, 1984), and chemicals (Lieberman, 1991).

Important developments within this strand emphasize the role of Joint Ventures and other vertical contractual arrangements such as long-term contracts (Joskow, 1985; 1987; Hirschhausen and Neumann, 2008; Hautesclocque and Glachant, 2009). The contributions show how different contractual forms decrease uncertainty among the different counterparties along the energy supply chain. In particular, joint ventures help overcome potential opportunistic behaviour of the counterparty with lower exposure to risk (Kogut, 1988; Hennart, 1991; Chang, Chung and Moon, 2013). In a similar way, long-term contracts help hedging the risk against market fluctuations and secure financial returns to infrastructure investments (Joskow, 1985; 1987). In the energy sector, the returns from infrastructure investments are guaranteed by the importer's commitment to buy certain amounts of gas annually at a fixed price for a long period (Hirschhausen and Neumann, 2008; Hautesclocque and Glachant, 2009).

A different viewpoint is that vertical integration is the result of firms' attempt to gain market power, e.g. monopolistic positions, rather than to decrease transaction costs. For example, Perry (1978) argues that vertical integration represents an effective strategy for firms aiming to block resale and to engage in third-degree price discrimination. According to the author, this is likely to happen in markets with a monopoly in the upstream and market competition in the downstream, which is often the case in gas markets. Perry (1978) argues that in such circumstances, the upstream monopolist is likely to merge with the downstream firm with the highest demand elasticity, achieving an effective advantage on competitors also in the downstream market. In the same line of research, Riordan (1998) analyses the potential effects of vertical and horizontal mergers on input prices, whilst Kuhn and Vives (1999) analyse the implications for efficiency in a market characterized by a monopolistic input

supplier and monopolistic competition downstream. In a similar vein, Mathewson and Winter (1984) study efficiency and distributional effects of vertical integration and monopolistic market structure. Beard, Kasserman and Mayo (2001) observe that firms controlling essential facilities (e.g. energy infrastructure) can adopt different strategies to increase their market power in different phases of the supply chain. In particular, these firms can use their bargaining power to extract rents (in case of unregulated monopoly) or to restrict access (under price regulation) to markets on which the owner of the facility is also involved as a supplier.

Other important contributions on supply chain and infrastructure profitability touch upon the different forms of financing, such as Special Purpose Vehicles (SPVs), and different ways to structure Public-Private Partnerships (PPPs) for megaprojects (Gatti, 2013; Finnerty, 2013). The literature on SPVs emphasizes the pros and cons of relying on off-balance sheet subsidiaries, particularly in terms of their ability to isolate the risk deriving from the parent company and on the implications for the cost of financing. The literature on PPPs stresses that a key aspect for the success of projects is the risk allocation among different stakeholders (Hakintoye and Hardcastle, 2003; Zhang et al., 2015). In other words, each stakeholder should bear the type of risk that it can best manage. Typically, the public sector bears the political and regulatory risks, while the private sector deals with risks related to the delivery of the project and its management. The commercial risk may be borne by either the public or the private sector, depending on the typology of PPP in place and specific sectoral features (Yescombe, 2002).

Despite the important insights on the energy supply chain, this literature has not yet addressed the contribution of political cooperation and energy diplomacy to the profitability of transnational energy infrastructure. This is done mainly in another strand of literature. Contributions in this strand concur that reconciliation of interests between producing and consuming countries is a key element for success (Pandian, 2005; Victor et al., 2006; Ericsson,

2009; Bilgin, 2009; Kardas, 2011; Boussena and Locatelli, 2013; Omonbude, 2013; Van de Graaf and Sovacool, 2014; Yorucu and Mehmet, 2018). Chapter 4 of the thesis aims to bridge both strands, as understanding the profitability of European transnational gas infrastructure requires integrating insights on the supply chain and on the reconciliation of political interests among countries.

The contributions that have direct relevance for this research within this strand focus on gas market liberalisation in the EU. They touch upon different relevant issues for my research, ranging from the analysis of institutional, market and contractual aspects of the EU energy governance (Stern, 1998; Spanjer, 2007; Clastres and Locatelli, 2012; Maltby, 2013; Austvik, 2016), EU energy diplomacy and the implication for the successful realization of transnational energy infrastructure, as well as security of energy supplies from abroad (Herranz-Surrallés, 2016; Yorucu and Mehmet, 2018; Talus, 2019).

Stern (1998) explores how different institutional contexts influence the development of different models of energy markets. In particular, he argues that the different political priorities and institutional traditions of the EU with respect to other world regions will have a great influence on the creation of a unique model of competitive gas market. Clastres and Locatelli (2012), however, express concerns over the EU's potential failure to ensure energy security after the transition to the new, liberalized model of energy governance. To overcome this potential failure, they suggest to coordinate investment strategies among Member States and with non-EU energy exporters.

An emerging strand argues that the EU should adopt a more proactive approach in the energy sector, particularly in the relation with producing countries. Some contributions within this strand suggests to adopt a EU strategy of energy diplomacy that is able to reconcile the interests of Member States within the EU and to elaborate a common stance vis-à-vis non-EU counterparties (Herranz-Surrallés, 2016). The different interests and views within the EU are

one of the main obstacles to the elaboration of an effective EU foreign energy policy. This problem is directly addressed by Austvik (2016). He shows the deep differences in the energy policy approaches between Eastern and Western EU countries, and how energy security may be negatively affected as a result of such differences. He stresses that Eastern European countries' necessity to diversify gas imports away from Russia is not a main concern for Western European countries, because they already benefit from greater diversification. In the same way, Eastern European countries do not perceive the transition to a more environmentally sustainable energy system as a priority as much as Western European countries do, mainly because traditional energy sources are cheaper and are thus perceived as more conducive to economic growth.

Other contributions focus on additional important aspects of the EU external strategy of energy policy. For example, Maltby (2013) shows how the European Commission (EC)'s attempt to gain legitimacy on foreign energy policy is driving substantial changes in the governance of the European energy sector. However, Talus (2019) argues that EC foreign energy policy is still under the jurisdiction of Member States, and the EC autonomous initiatives on this field in some cases contrast with existing national and EU laws. For example, he shows that the recent ad-hoc provisions adopted for Nord Stream 2 do not comply with the EU law, and are likely to create uncertainty among investors.

Other important contributions focus on the implications for energy security of the recent EU energy policy provisions and approaches to negotiation with producing countries. For example, Kardas (2018) shows some limitations of the emerging EC approach to energy diplomacy. In particular, he analyses the negotiations between EC and the Turkish government in relation to the Nabucco gas pipeline, which was supposed to bring Azeri gas to Europe via Turkey. He finds that the Turkish government has leveraged on the issue of the Turkish membership in the EU to bargain more favourable energy deals. In particular, the lack of

concessions by the EC officials with that respect has brought the negotiations for Nabucco to a stalemate. This shows that countries outside the EU tend to relate energy deals with other political issues, potentially bringing to large-scale success or failure of sector-wide negotiations. This aspect suggests that the UE foreign energy policy should take into account this factor, and update its approach to energy diplomacy accordingly. Spanjer (2007) focusses on similar issues, although from the viewpoint of the EU-Russia energy relations. He argues that the EU and Russia models of energy market, based respectively on market competition and on State-owned monopolies, can be difficultly reconciled. He suggests that the EU attempts to negotiate the Russian adoption of the EU regulatory standards are unlikely to succeed, potentially jeopardizing energy security.

Important insights derive also from contributions that focus on the global perspective of gas markets and infrastructure investments, as well as on world regions other than Europe. A key theme is the contribution of political institutions in creating the conditions to overcome a set of political, financial and regulatory obstacles that usually impede global energy trade and the development of transnational energy infrastructure. For instance, Victor et al. (2006) emphasize the importance of government guarantees for attracting external financing when transnational energy infrastructure crosses areas with high geopolitical risk, or when the energy companies involved in the construction and operation of projects are have low credit rating. In partial contrast with this view, Makhholm (2012) argues that deregulation is the key element to attract private investors and boost the growth of the energy sector. This is especially important in markets on which (quasi) natural monopolies occur, to erode market power of incumbents and increase market competition. In particular, he shows how deregulation in the US has increased competition both in the intra and inter-State gas pipeline grids, which have been historically dominated by monopolies.

In contraposition to much of this literature, which tends to focus on regulation of energy markets, the perspective provided by Ericsson (2009) and Pandian (2005), with respect to the Russian Federation and India respectively, highlights the government's active intervention for the pursuit of political economy goals. They both argue that the convergence of cross-country political and economic interests is a fundamental condition for transnational infrastructure to be supported ex-ante, and to be profitable ex-post. In particular, Ericsson (2009) investigates how energy interdependence between Russia and Europe has pushed towards the construction of an extended network of gas pipelines connecting the two areas. In the author's view, however, this has happened in the framework of unbalanced relations, in which Europe is highly dependent on Russian gas, with the result that Russia is able to exercise significant political leverage on Europe. In contrast, Pandian (2005) shows that the divergence of political and strategic objectives among India, Iran and Pakistan threatens their convergent economic and commercial interests, and in particular Indian energy security. The implications for India's energy security are also highlighted by Vaid (2014), who argues that India should dedicate more diplomatic effort to facilitating agreements with energy-producing countries to build transnational energy corridors, in order to overcome the current lack of energy infrastructure as well as the uncertainty surrounding energy security. He also agrees that the conciliation of political and strategic interests among governments constitutes a crucial element for the commercial viability of infrastructure projects.

An important part of this literature concerns the Multinational Enterprises' (MNEs) investments in developing economies. This strand is relevant for this thesis because energy and infrastructure deals in the cases analysed occur between MNEs and developing countries.

Jiang et al. (2015) study the issue by emphasizing the role of bargaining power between MNEs, host governments and local firms, which are usually government-owned. They argue that depending on the balance of power, different ownership structures are more likely to be

conducive to the the success of infrastructure projects. In line with this, Zhang et al. (2014) analyse how the institutional environment of a particular country influences the investment decisions of MNEs, and in particular the opportunity to rely on subsidiaries or joint ventures. They argue that MNEs' willingness to create joint ventures depends on two main elements: the existence of local-specific asset that MNEs need for effectively developing their business, and a regulatory framework granting them advantageous conditions for establishing a joint venture with local firms. This literature is relevant for the purpose of this thesis since MNEs' investments in gas infrastructure under the form of joint ventures with developing countries is a significant trend in the sector of energy infrastructure. The relation between ownership, asset specificity and MNEs is further examined by Anderson and Gatignon (1986), Teece (1986), Delios and Henisz (2000), Brouthers and Brouthers (2000), and Erramilli and Rao (1993).

The body of literature on transnational energy infrastructure affords key insights on the economic and political interests at stake, and provides an important starting point for this thesis's argument concerning the importance of diplomatic support for energy firms. However, it has not yet considered if and how the convergence of economic and political interests across and within countries affects the profitability of transnational energy infrastructure. By studying the effects of different models of supply chains and diplomatic support for the profitability of energy infrastructure, chapter 4 bridges the two main bodies of literature reviewed in this section, contributing to both.

## **2.2. Literature on the government's role in the energy sector**

Chapter 5 of the thesis studies the extent to which governments are able to pursue their traditional policy objectives in the newly emerged model of EU energy governance. Five bodies of literature, which I review below, are relevant for this chapter: those on the profitability and political economy of SOEs (State-Owned Enterprises), those on the

profitability and political economy of of SIEs (State-Invested Enterprises), and that on EU industrial policy, for which SOEs and SIEs could potentially play an important role. However, before reviewing the main strands, it is necessary to define SOEs and classify them according to different typologies.

SOEs are business enterprises on which governments exercise substantial influence through full ownership, or by retaining majority or minority shares. Their main mission is to pursue policy objectives on behalf of the State. However, SOEs show different features compared to government agencies, because they are profit-seeking and retain a higher degree of autonomy from the State. SOEs' nature and objectives differ widely, depending on their mandate and ownership structure. This variety reflects sectoral specificities and the policy relevance of certain sectors; the stage of economic development, which require different levels of coordination with State policy (higher in early stages, lower in late stages); the political culture, whose fundamental principles may be more or less suitable to direct State intervention in the economy (Peng et al., 2016; Cardinale, 2017; 2019b; Florio, 2013).

The mandate is a key element distinguishing different types of SOEs. It is often, but not always, specified in the statute of the enterprise, and can emphasize the pursuit of profitability and public policy objectives to different extent. Another fundamental element is the ownership structure, which is usually an indicator of the mission of the SOE and of the balance of interests between different public and private interests. In fact, the government can have different degrees of influence in SOEs, depending on whether it is the sole owner or if it shares the ownership with other investors. For this reason, the OECD (see Christiensen and Kim, 2014) refers to SOEs when the State holds more than 50% of the voting stock, and to SIEs when the State holds between 10% and 50% of the voting stock.

SOEs and SIEs are fundamental players in the contemporary economy. SOEs alone account for around 10% of global GDP and around 20% of global trade. They have a combined

equity value of \$2 trillion and employ 6 million people around the world (Clò et al., 2017). In 2010, 10% of firms listed in Forbes 2000 were SOEs, and accounted for 11.15% of total sales, 13.51% of total profits, 16.38% of total assets and 13.36% of total market value of the list. From 2005 to 2014, the number of SOEs among the biggest world companies increased from 9.8% to 22.8%.

The literature on SOEs' profitability provides a cross-sectoral comparison of SOEs' and private firms' economic performance for different market structures, such as monopoly, oligopoly, and competition. Reviewing this literature is important for the purpose of Chapter 5, because it makes it possible to understand the profit-driven nature of contemporary SOEs and SIEs, and whether they can reconcile profitability with the pursuit of public policy objectives, which is one of the main research objectives of this chapter.

The empirical findings are often in disagreement, with some studies highlighting that SOEs perform worse than private firms (Boardman and Vining, 1989; Megginson and Netter, 2001), and others not finding substantial differences (Domberger and Piggott, 1994; Newbery, 1999). For instance, in an early review, Boardman and Vining (1989) analyse the empirical literature on SOEs' efficiency and profitability. The results show that generally SOEs' performance is lower than that of private firms, except for certain sectors in which evidence is mixed. De Alessi (1980) supports this stance, whilst Borins and Bootman (1985) show that an expanding body of literature finds no evidence of better performance in the private sector. In addition to the review, Boardman and Vining (1989) carry out an empirical analysis consisting of a regression of the 500 largest companies in the world in 1983, which supports the hypothesis that SOEs and SIEs are characterised by lower performance in terms of profitability and efficiency as compared to private firms.

The above-mentioned empirical contributions are inspired by strands of economic theory that focus on allocative efficiency. For example, property rights theory (see Coase,

1960; Hart and Moore, 1990; Meza and Lockwood, 1998; Hoppe and Schmitz, 2010) argues that public ownership does not provide incentives to improve firms' efficiency and profitability. Nevertheless, several contributions have questioned the nature of these assumptions. For example, Florio (2004) has questioned the claim that SOEs would be "owned by all people" (Jefferson, 1998, p. 428), as SOEs are managed by specific people with clear targets to achieve. Another critique is addressed towards the presupposition that SOEs lack incentives to improve performance. However, the fact that SOEs compete in domestic and global markets with other SOEs or private enterprises show the limitations of this presupposition. Other contributions stress the nature of (quasi) public good of SOEs due to their characteristics of "non-excludability" and "non-diminishability", and how these characteristics are likely to lead to negative externalities that generate social costs. According to Jefferson (1998), privatization or the creation of a regulatory framework that guarantees and specifies clear property rights are the suitable measures to reduce the inefficiencies generated by SOEs.

In contrast with these views, Domberger and Piggott (1994) find no evidence of better performance of private firms as compared to SOEs. In fact, their review of the existing literature offers contradictory results, with some studies showing better performance of private firms (Borcherding et al., 1982) and others showing the lack of causal links between ownership and performance (Millward, 1982). Based on these results, the authors argue that competition, rather than ownership, is the key factor for firms' profitability. Reviews performed several years later are equally divided. On the one hand, Megginson and Netter (2001) conclude that most evidence suggests that SOEs are characterised by lower levels of efficiency, profitability, and financial returns to investors as compared to their private competitors (see also Ehrlich et al., 1994; Majumdar, 1996; La Porta et al., 2000). On the other hand, another review carried

out in the same years (Newbery, 1999) finds that it is quality of regulation that has a clear influence on performance, rather than the nature of ownership.

Recent years have witnessed a return of interest in SOEs, but from the viewpoint of political economy, and specifically to gain a more comprehensive perspective on their role. Important strands of literature have looked at the systemic importance of SOEs for what concerns the pursuit of macroeconomic objectives such as their function to boost economic growth in times of recession (Bance and Bernier, 2011; Bance, 2012; Bance and Obermann, 2015) or their role as providers of services of general interest (Christiansen, 2012; Florio, 2013) and national security (Millward, 2011). These contributions agree that productivity and cost efficiency are indeed suitable variables to evaluate SOEs' economic performance, but they are not sufficient to gain a comprehensive understanding of SOEs' multifaceted nature and their contribution to important policy objectives such as economic development, social welfare and national security.

An important contribution to this strand is made by Toninelli (2011). He reviews the evolution of the public policy role of European SOEs since their rise after WWII and subsequent expansion, until their privatisation and decline in the 1990s and early 2000s. He shows that SOEs can pursue very different policy objectives, whilst acting in accordance with the policy priorities of each State. Christiansen (2012) also studies on SOEs' policy role, although he focusses on contemporary SOEs. He identifies four main aspects of the policy rationale that justifies States' reliance on SOEs: i) the presence of a natural monopoly; ii) the need to ensure high quality in the provisions of public services; iii) the existence of imperfect contracts, which are likely to generate high transaction costs; and iv) the need to promote industrial policies that cannot be pursued by relying on the private sector alone.

In another contribution (Christiansen and Kim, 2014), Christiansen shows the difficulty to reconcile SOEs' industrial policy action with the principles of market competition, as

government ownership provides a financial and political advantage to SOEs vis-à-vis their private competitors. In a different vein, Reinert (1999) emphasizes the effectiveness of SOEs for pursuing objectives of industrial development, which are typically difficult to achieve through private firms alone, due to their risk-aversion and the high risks characterising investments in key sectors such as energy and infrastructure. With specific reference to such sectors, Victor et al. (2012) show that the SOE's model has been effective for the pursuit of energy security, among other objectives. In particular, they emphasize that public ownership has avoided underinvestment in energy import infrastructure.

On similar lines, Florio (2004; 2013) warns against sudden processes of privatization. However, he emphasizes the social implications rather than the purely economic ones. He stresses that privatizing sectors of great political and social importance, i.e. the network industries in which SOEs are generally dominant actors, might come at the expense of consumers. His findings are supported by empirical evidence from both the UK's (Florio, 2004) and the EU's (Florio, 2013) energy and telecom sectors. Chang (1994, 2007) makes it possible to extend this line of reasoning to developing countries. In fact, he notes that SOEs are very effective tools of economic policy for solving market failures that are typically connected with early and intermediate stages of development. In particular, SOEs are suitable in case of natural monopoly (i.e. existence of only one supplier of a certain input), capital market failure (i.e. underdevelopment of private capital markets), externalities (i.e. inability of the private sector to take advantage of the positive spillovers generated for the economic system) and equity issues such as geographical access and regional development. This argument is also supported by Davids and Van Zanden (2000). They highlight SOEs' ability to pursue three main objectives that are typical of the early stages of economic development: the development of strategic industries, the redistribution of excessive profits in key sectors

characterised by natural monopoly, and the provision of services of general interest in a way that is affordable for consumers.

The third body of literature studies SIEs' profitability. Florio (2013) claims that it has not yet been demonstrated that SIEs perform worse than their private competitors, as long as the regulatory framework does not hamper the conditions for equal competition. Others, such as Capobianco and Christiansen (2011), agree with this view but explain SIEs' competitiveness as a consequence of the benefits deriving from structural advantages over private competitors. Such advantages derive from the State financial backing, but also from the market share and asset endowment inherited from SIEs' former role of State's monopoly.

In sharp contrast with these views, a study by the OECD on the effects of regulatory reforms in market economies finds that the presence of Golden Shares in quoted companies has a negative effect on the long-run share price. According to the authors, this is explained by the fundamental uncertainty that characterizes the nature of Golden Shares, and in particular the fact that their political scope often runs against the logic of profitability.

An increasingly important strand focusses on Chinese SIEs. Some contributions suggest that SIEs perform better than SOEs. For example, Xu and Wang (1997) find a positive correlation between mixed ownership with few shareholders and profitability. Li (1997) shows that lower entry barriers and partial privatisation in intermediate stages of development increase total factor productivity. Cao et al. (1999) also highlight the potential benefits of partial privatization of Chinese SOEs, emphasizing budgetary and efficiency aspects.

A question that is still largely unexplored by the literature, and that is addressed by Chapter 5 of the thesis, is whether and to what extent SIEs can act as effective vehicles for governments to pursue industrial policy objectives that were traditionally pursued through SOEs. Few recent contributions have recently explored such issue, although only to a partial extent, as this was not their main research question. For example, Clò et. al (2017) show that

Mergers & Acquisitions (M&As) carried out by SIEs may be driven either by financial and political reasons, depending on whether SIEs are majority or minority-owned by States. They find that most of the M&A are motivated by the objective of increasing financial revenues. However, M&A carried out by SIEs that are majority-owned by States are likely to be driven by motivations that are linked to industrial policy objectives, such as industrial expansion, innovation, and domestic supply of natural resources. Pargendler et al. (2013) focus on the reconciliation of public and private interests in SIEs. In particular, they show that State control of SIEs is motivated by the State necessity to pursue policy objectives, particularly in strategic sectors such as energy. However, this has both costs and benefits for the private (minority) shareholders, whose returns may be negatively affected by political decisions that run counter short-term profitability, but also positively affected by the financial and political backing of the State. In a similar vein, Bass and Chakrabarty (2014) shows that different levels of State ownership reflect different levels of motivation by SIEs to act strategically in global markets to pursue policy objectives. For example, they argue that higher levels of State ownership in energy firms incentivize their activism in the global energy market and their ability to supply the domestic market. In contrast, low levels of State ownership constrain SIEs' ability to act strategically in global energy markets to serve national interests.

To understand the potential industrial policy role for European SIEs, it is important to consider the literature on EU industrial policy, and in particular on its aspects of continuity and change since the 1990s. An early contribution is provided by Bianchi (1998), who highlights that the process of European integration requires an EU industrial policy that is able to unite economic interests across the EU to face international challenges. In this book, he stresses that industrial policy has the objective to generate structural changes that make it possible to face such challenges. However, he warns that structural changes generate winners and losers, and suggests that the EU should compensate the losers and reconcile divergent interests. On similar

lines, Cardinale, Coffman and Scazzieri (2017) show that some of the difficulties encountered in the Eurozone, particularly the macro-effects of monetary policy, originate from the lack of understanding of the complex interdependence among political-economic interests across the EU, and how such interests can be reconciled through suitable policy frameworks<sup>4</sup>. Other contributions focus on how EU industrial policy can i) reduce structural asymmetries across the EU (Botta, 2014), ii) coordinate instruments and interests in the framework of a coherent political vision (Bianchi, 2010), especially in periods of extensive socio-technological transformations (Bianchi, 2018), and iii) conceive of SOEs as industrial policy tools, particularly in public services (Bance and Obermann, 2015).

Chapter 5 bridges the above-mentioned strands of literature. By doing so, it advances the frontier of knowledge on an important yet underexplored issue such as the industrial policy role of contemporary SIEs. In particular, the chapter focusses on the implications of the transition from SOEs to SIEs in the EU, and on SIEs' ability to pursue industrial policy objectives on behalf of their governments both in the partially liberalized European domestic markets and in the increasingly interdependent and competitive global markets.

### **2.3. Literature on gas prices and consumers' welfare**

Chapter 6 of the thesis studies the effects of energy market liberalisation on the welfare of European consumers. Two bodies of literature are relevant for this research. The first studies the effect of policy reforms on energy prices for consumers, whilst the second explores similar issues but with a focus on the European energy market.

The literature on the effects of policy reforms on gas prices is largely based on empirical studies of the US gas market, which show substantial differences with respect to Europe. One of the main differences is the presence of large domestic reserves of gas. According to many

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<sup>4</sup> For a more detailed discussion on liquidity policies, see Cardinale and Scazzieri (2016)

scholars (Joskow, 2008; Makhholm, 2012), gas abundance was made possible thanks to a process of liberalization and deregulation that took place across decades. In particular, deregulation made it possible to overcome the market power of few energy firms in strategic market segments (e.g. in the national grids), and to incentivize large scale investments from new entrants. Only thanks to the convergence of such investments could the US gas market be able to take advantage of the discoveries of new techniques of extraction, i.e. fracking, allowing the US to transition from being a net importer to a net exporter of gas (Joskow, 2013).

Makhholm (2012) describes the process of US gas market liberalization as a process that has taken a long time to come to fruition and that has experienced several difficulties before reaching a successful result. For example, price deregulation at the wellhead and in the distribution of gas to consumers since the late 1970s has increased the bargaining power of pipeline companies in the midstream, who took advantages of the fragmentation of upstream and downstream markets by increasing the transport tariffs (Sutherland, 1993; Watson, 1992). However, when in the 1980s the prices of oil and coal decreased substantially, the pipeline companies lost their bargaining power, as consumers could switch to cheaper sources. The inability of pipeline companies to respect their long-term contractual commitments incentivized the US regulatory bodies to start a gradual transition towards unbundling and short-term contracting. This allowed new entrants to challenge the market power of incumbents when gas became again competitive vis-à-vis other sources, leading to prices for consumers that showed lower mark-ups on production costs (Dahl and Matson, 1998).

Some studies provide empirical evidence of the beneficial effects of gas market deregulation for consumers' price affordability. For example, Arano and Blair (2008) show that the welfare of US consumers has remarkably improved after liberalization by calculating the loss of welfare in the years of the transition to a full deregulated regime (i.e. between 1977 and 2000), which amount to about \$15.47 billion. Gorak and Ray (1995) reached similar

conclusions even before the effects on consumers' welfare could be assessed empirically. However, they stress that higher sectoral efficiency does not automatically lead to consumers' welfare, but such a step ahead requires specific policy measures.

Nevertheless, the policy measures suggested by this literature may not be suitable for the European energy sector, which, as I show in the thesis, cannot rely on domestic production. This fundamental difference implies that EU regulation must also take into account the international segments of the supply chain, where most of gas price formation occurs. This aspect is not considered by the existing literature, which has focused mainly on how prices for consumers have been affected by policy reforms that target the domestic segments of the energy markets.

For example, Fiorio and Florio (2009) study the influence of market structure and ownership structure on prices. They find that market opening leads to lower prices, although on a much smaller scale than expected by EU policy-makers, whilst privatisation leads to higher prices. Brau et al. (2010) undertake an econometric analysis that includes indicators of supply chain fragmentation, although they do not study the latter in detail. They also find that there is limited evidence of beneficial effects on consumer prices. Ceriani and Florio (2011), instead, focus on market structure as a determinant of consumers' surplus, and find that results are highly context-dependent.

Newbery (1999) and Florio (2013) broadly agree that gas prices have increased in Europe after liberalisation because of the failure to redistribute the rents of governments and former monopolists to consumers through market competition. An illustration is provided by Garcia (2006), who argues that the liberalization of the Spanish gas market in the mid-1990s has not led to a lower price for consumers because unbundling (re-gasification, transmission and distribution facilities) has resulted either in the creation of different subsidiaries under a single owner, or in the reshuffling of existing assets across firms with oligopolistic market

power. However, the literature offers divergent policy recommendations. According to Newbery (1999), the resistance of governments and incumbents to give up their rents could be overcome by replacing the current long-term agreements for gas imports with a spot and future market. This would allow emerging competitors to challenge traditional suppliers, so that the competitive mechanism can work for the benefit of consumers.

Along similar lines, Ruester and Neumann (2009) analyse how the expansion of the Liquefied Natural Gas (LNG) industry has affected spot market prices. The authors find that increasing levels of global interdependence in this industry determine convergence among spot prices of different markets. Similar arguments are put forward by Stern and Rogers (2014), who show that the lack of flexibility of long-term contracts has negative implications for the prices of gas import, especially in phases of the energy cycle witnessing oversupply and widening gaps between average prices at the hubs and price negotiated in long-term contracts. On similar lines, Hauteclouque and Glachant (2009) support the European Commission's (EC) stance on long-term contracts and suggest that the demise of long-term contracts is the first step towards market liberalization. However, they argue that further steps are needed to accomplish a transition to a fully liberalized gas market. In particular, the EC should be empowered to also act on the basis of a 'market-design' approach rather than only through a 'antitrust' approach, devoted merely to prevent the abuse of dominant position by former monopolists.

Other contributions provide a different viewpoint over the opportunity to bring policy reforms forward until full market liberalization. For example, Florio (2013) argues that a sudden transition to spot markets could negatively affect energy supplies from abroad, and therefore maintains that the coexistence of the two contractual models would be a preferable way to increase competition without jeopardizing energy security. In line with Florio's stance, Zafirova (2010) envisions the future of the European gas market as being characterized by a

hybrid model in which inflexible short-term and flexible long-term contracts will jointly influence gas prices. In the same vein, Delvaux et al. (2010) emphasize the need to take into account the sharp differences between long-term supply contracts in the upstream and downstream, with particular reference to the Community Competition Law. The authors state that introducing such differentiation in the EU legislation is a necessary step to increase coordination among the upstream and downstream markets as well as the profitability of the energy players involved and price affordability for consumers.

In partial disagreement, Ellis, Bowitz and Roland (2000) argue that the EU directives for gas market liberalization do not necessarily impose a fully liberalized market, but leave space for energy firms to shape the future of the EU gas market through their corporate strategies. As a consequence, the EU gas market could take either an oligopolistic or competitive form, and each scenario will have a different impact on gas prices for consumers. A different perspective, explored by Witteloostuijn, Brakman and Marrewijk (2007), is to consider whether a direct government intervention on gas prices can improve consumers' welfare. In particular, they assess the distributional effects of a 5% decrease in the gas price deliberated by the Dutch government for the benefit of Dutch consumers' welfare. The authors find that the beneficiaries of this measure are not only Dutch consumers, but also the foreign companies that own part of the Dutch infrastructure and facilities for the export of gas to neighbouring countries.

To summarise, although the insights emerging from the US experience are important to understand the key role of domestic gas production for implementing successful liberalization reforms, a similar regulatory framework cannot prove successful in contexts such as Europe which instead rely on foreign supplies. Furthermore, the existing literature on the EU reforms emphasizes the domestic dimension of European gas markets, providing only a partial explanation of market trends and particularly of prices. Chapter 6 aims to overcome

such limitations. This is done by putting forward a discussion that takes into account both the domestic and external dimensions of the European gas markets. In particular, the analysis explores how liberalization changes the market power and global role of European firms that supply domestic gas markets from abroad, and how these changes will result in variations in gas prices for consumers.

In the concluding section, the thesis also discusses how the welfare of European consumers could be affected by a transition to a decarbonized energy system. Although this strand has emerged recently, contributions in this field are extensive and touch upon several aspects. For example, Zheng et al. (2019) study the social costs of carbon emissions in the biggest Chinese cities. Coffman and Lockley (2017), Lockley and Coffman (2018), Lockley et al. (2019), discuss the importance of the stock in different market designs for carbon trading using different financial instruments. Other contributions emphasize the importance of relying on large-scale State intervention to tackle climate change. For example, Mazzucato (2018b) argues that the EU policy would greatly benefit from a Mission-Oriented approach, to realize a full transition to a sustainable energy system and to generate innovation, which are both essential factors for the welfare of consumers and citizens. Important contributions on the transition to sustainable energy systems concern the context of Sub-Saharan Africa. In particular, relevant questions addressed concern how to reconcile sustainability with access to energy (Mulugetta et al., 2019; Sokona et al., 2012), the financial options available for the pursuit of this objective (Gujba et al., 2012), and how to achieve an energy sector-led green growth (Okereke et al., 2019).

#### **2.4. Literature on Transaction Cost Economics**

The theoretical lens of Transaction Cost Economics (TCE) is particularly suitable to address the research question of this thesis. In fact, TCE analyses how different models of

supply chain may improve or worsen firms' efficiency. This issue is central to assess the transition from the national to the EU model of energy governance, considering the extensive changes in the supply chain it has entailed and hence its implications for firms, governments and consumers.

TCE conceives of firms' structure as the result of their advantages from internalizing or outsourcing phases of production. The choice to internalise or outsource is based on the opportunity cost to 'make or buy', i.e. to produce intermediate inputs within the firm or to buy them on the market. Coase (1937) is considered the founder of TCE, because he provided the seminal study on the boundaries between firms and markets, which he saw as a result of the transaction costs deriving from the contractual arrangements associated with internalization or outsourcing. However, it was Williamson's work (1975; 1983; 2002; 2013; see also Tadelis and Williamson, 2013) that extended and systematized TCE, establishing it as a theoretical framework that has stimulated a great amount of theoretical and empirical research. In fact, TCE has provided the grounds for a systematic assessment of the economic implications of the boundaries between firms and market, and particularly the rationale for firms to choose different contractual arrangements and different models of supply chain (e.g. vertical integration or unbundling).

According to Williamson (1981), the fundamental element influencing the relation between transaction costs and governance structure is asset specificity. He argues that asset specificity is given mainly by three elements: "site specificity, as when successive stations are located in cheek-by-bowls relation with each other so as to economize on inventory and transportation expenses; physical asset specificity, as where specialized dies are required to produce a component; and human asset specificity that arises from learning by doing" (Williamson, 1981, p. 555). Other studies extended the determinants of asset specificity to 'dedicated assets' (Joskow, 1985) and 'intangible assets' (Lafontaine and Slade, 2007). The

formers are defined by Joskow (2010, p. 26) as resulting from “[general] investment by a supplier that would not otherwise be made but for the prospect of selling a significant amount of product to a particular customer”. Dedicated assets are specific because “[if] the relationship is terminated prematurely, it would leave the supplier with significant excess capacity and a lower price to support the investment would be realized *ex post* than had been anticipated *ex ante*” (Joskow, 2010, p. 26). The other category of assets, i.e. intangible assets, derives for example from investment in advertisement for creating brand name value (Lafontaine and Slade, 2007). These assets are specific because of the impossibility to employ them in uses other than those for which they were originally conceived.

After discussing the causes of specificity, Williamson (1981) turns to analyzing their potential implications for transaction costs. In this context, the way in which the supply chain is organized becomes crucial: “If assets are nonspecific, markets enjoy advantages in both production cost and governance cost respects: static scale economies can be fully exhausted by buying instead of making; markets can also aggregate uncorrelated demands, thereby realizing risk-pooling benefits; and external procurements avoid many of the hazards to which internal procurement is subject. As assets become more specific, however, the aggregation benefits of markets in the first two respects are reduced and exchange takes in a progressively stronger bilateral character. The governance costs of markets escalate as a result and internal procurement supplants external supply for this reason” (Williamson, 1981, p. 558). Therefore, the lack of alternatives both for the buyer and the seller to exchange the commercial counterparty derives from the specificity of the asset considered (Williamson, 1979; Williamson, 1996; Monteverde and Teece, 1982; Klein, Crawford and Alchian, 1978). Specificity thus involves the impossibility of exploiting the investment in ways that are different from those in which it was initially conceived (Joskow, 1987). Hence, if an asset is

specific, production costs and governance costs associated to a transaction between firms are likely to increase.

TCE has been adopted in a great variety of research areas (see David and Han, 2004, for a comprehensive review). For example, sectoral studies of manufacturing have investigated the relationship between specificity and integration (Klein, 2000; Walker and Weber, 1984; Kirkvliet, 1991; Masten, 1984; Lieberman, 1991; Globerman and Schwindt, 1986). Moreover, studies of supply chain management have made extensive use of TCE for the purpose of decision-making concerning vertical integration and outsourcing (Williamson, 2008; Carter and Rogers, 2008; Grover and Malhotra, 2003; Hobbs, 1996). In studies of organizations, instead, TCE has been used for the purpose of understanding the determinants and relative merits of hierarchy within firms and contractual arrangements in the market (Shelansky and Klein, 1995; Dalton et al., 1998; Buvik and Grønhaug, 2000).

Most importantly for the purposes of this thesis, TCE is also used in studies of the energy sector. For example, the implications of the energy sector's specificity have been investigated empirically by Joskow (1985; 2008; 2010; 2013), Stukey (1983), Riordan (1998), Kuhn and Vives (1999), Russo (1992), Fan (2000), Dahlstrom and Nygaard (1993), and Sander (2016) among others. I have discussed these contributions in detail above, in the context of vertical integration and fragmentation of the energy supply chain. In the thesis, I discuss at length several aspects of how the current literature on the energy sector uses TCE. On the one hand, I aim to extend the range of issues that can be studied through TCE. For example, I show that the current approach can be used to explain not only the profitability of the energy sector in general, but also of energy infrastructure in particular. Moreover, I show that the supply chain matters for the State's ability to pursue policy objectives through the energy sector. Finally, a TCE lens can throw light on why liberalization has not led to lower consumer prices. Furthermore, I show that the TCE framework needs to be enhanced to take into consideration

the impact of political aspects, and especially diplomatic support, in lowering transaction costs. In the thesis, I go on to discuss how this theoretical development can also be relevant beyond studies of the energy sector.

Despite the promise and ambition of TCE to become a key perspective to understand and influence firms' governance, some studies have highlighted potential limitations. The key criticism concerns the assumption that the decision to integrate or outsource is purely based on economic calculus. For example, Ghoshal and Moral (1996) argue that TCE overemphasizes the role of market transactions as determinants for firms' structure, neglecting a range of advantages associated with production within firms as opposed to market transactions. They also emphasize that decisions concerning integration depend to a large extent on behavioural, cultural, and political aspects (see also Slater and Spencer, 2000; Granovetter, 1985). Moreover, the possibility of anti-competitive behaviour can provide a powerful incentive to integrate, quite apart from considerations about transaction costs (Perrow, 1986).

Although the foregoing objections to the TCE framework are certainly well-grounded, they are not directly relevant for the purposes of my thesis, with the exception of the political implications on transaction costs, which I discussed above. In fact, my aim is not to interpret managers' decisions, but to explore the most effective ways to organize the supply chain in the energy sector, given the high specificity of gas in Europe, and the importance of diplomatic support for energy firms in dealing with non-EU counterparties.

### **3. The comparative case study: methodological framework**

The empirical component of the thesis is a comparative case study of undersea gas pipelines connecting North Africa to Europe. The comparative case study methodology is particularly suitable for the purposes of this thesis. In fact, it makes it possible to study the variables under investigation by highlighting the fundamental differences between carefully selected cases, whilst controlling for other variables that are not under investigation (Collier, 1993). After discussing the case study methodology, the chapter explains the choice of the cases, and how these allow for the analysis of the variables under investigation and for the control of external factors. The rationale for the comparative case study is explained by Dion (2003), who states that in order to determine “whether a necessary condition is true, we must compare the hypothesis that the necessary condition is at work to some alternative that the necessary condition is not at work” (Dion, 2003, p. 103).

As the thesis studies the effects of a policy process that started in the 1990s and is still ongoing, the business history methodology is also relevant for this thesis (Verbeke and Kano, 2015; Godfrey et al., 2016). In particular, the strand of business history that focusses on case studies provides insights on how to adopt a diachronic perspective when analysing particular cases in a single or comparative way. More specifically, this methodology emphasizes the need to contextualise the evolution of the cases analysed (e.g. business strategies of specific firms) in the light of major political and economic changes that occurred at both the domestic and international level (Wilkins, 1974; Boddewyn, 2016).

I carry out the comparative case study in three stages, which are devoted to the fourth, fifth and sixth chapters respectively. In the first stage, the case study focusses on the project level. Chapter 4 explores the profitability of energy firms by looking at specific infrastructure projects they own and operate. In particular, the chapter compares two transnational gas pipelines, Greenstream and Galsi. Their differences provide important insights on how EU

liberalisation policy has reshaped European gas markets and the governance of infrastructure projects for the import of gas.

Greenstream connects Libya to Italy, whilst Galsi should connect Algeria to Italy, although its realisation is still in a stalemate. The cases were chosen according to Dion's (2003) criteria, as outlined above. Greenstream was not greatly affected by the liberalization policy, for two main reasons. First, the project started in 1996, when that policy had not yet influenced the energy market. Second, it still preserves the integrated supply chain that it inherited from the fact that Eni was at the time the Italian monopolist in the gas sector, and benefited from the Italian State diplomatic support in dealing with the Libyan counterparty.

The negotiations for Galsi, instead, started in 2002, when the Italian energy market was already open to national and foreign competitors. Therefore, the influence of market liberalization policy in the governance of Galsi is evident in two main aspects, namely the unbundled supply chain, which consists of different energy companies in the upstream, transport and downstream phases, and the lack of constant diplomatic efforts to ease the negotiations among importing and exporting firms.

The comparison makes it possible to control for gas demand, which was increasing between the late 1990s and early 2000s, when the projects were conceived<sup>5</sup>. It also makes it possible to control for technical and logistical factors affecting the costs of production in the upstream of each project<sup>6</sup>. Finally, Libya and Algeria have similar approaches to negotiating energy deals, which stem from common aspects of their political culture and the training of energy managers<sup>7</sup>.

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<sup>5</sup> However, Galsi faced increased competition from other European projects of gas import, as noted above.

<sup>6</sup> The Algerian and Libyan wells and transport routes display several technical and logistical differences that might affect the price at the respective borders. Nonetheless, various estimates (John Gault S.A., 2004; Aissaoui, 2016) suggest that, in the period considered in this chapter, the gas at the Libyan and Algerian borders would be sold at similar prices to the respective pipeline companies (i.e. Greenstream B.V. and Galsi S.p.A.).

<sup>7</sup> Libya and Algeria share elements of their political views, based on anti-colonialism and the use of energy resources for political emancipation; they also structure Exploration and Production Sharing Agreement with International Oil Companies in a similar way. In addition, a former minister of industry and board member at Eni

The second stage of the comparative case study aims to address the research question of chapter 5, i.e. to what extent the government is able to pursue traditional policy objectives, such as energy security and low import prices, in the new context characterized by competition among private and semi-private (SIEs) energy firms. To answer this question, I extend the previous comparative case study to exploring the role of the major institutional shareholders in the firms that own and operate the above-mentioned gas pipelines, namely the Italian and French State.

The Italian government owns 30% of Eni, which in turn owns and manages Greenstream through a joint venture with the Libyan NOC. The French government owns Edison, one of Galsi's main shareholders. Edison is fully owned through EDF, Edison's parent company, in which the French government holds 85% of the shares. Another important shareholder of Galsi is Enel, an Italian SIE owned by the Italian government for 30% of its shares. In addition, the French government owns 30% of the shares of another key energy player in Italy, Engie, which operates in the downstream market and is mainly supplied by Greenstream.

The comparison makes it possible to assess the differences in the approaches to intervention by the Italian and French governments in their respective energy SIEs. This is done by following Dion's (2003) criteria. The fact that the energy firms owned by the Italian and French governments operate in the same market, and even in the same projects in the case of Galsi, makes it possible to control for most of the variables that are not under investigation in this chapter. For example, the energy firms are subjected to the regulation of the Italian National Regulatory Authority (NRA) and to the fluctuations of the Italian gas market.

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and Snam (Personal Interview 1) has stressed that the similarities in the management style between Libyan and Algerian NOCs occur because many among their managers were trained in Eni's school.

Furthermore, when they buy gas from Algeria and Libya, they are subjected to very similar contractual terms, due to the similarities of the two countries for what concerns the financial and technological development of the respective energy industries. In fact, the contractual terms of Algeria's and Libya's Exploration and Production Sharing Agreements (EPSA) both show the necessity to rely extensively on the technological and financial capabilities of International Oil Companies (IOCs). Another key aspect of control is that Libya and Algeria can be considered as part of the same market for gas export, in which prices tend to converge as a result of geological and geographical factors among others, e.g. the distance from the Italian end market. Controlling for these factors makes it possible to assess the differences in the Italian and French governments' approaches to intervention in their respective SIEs in an effective and accurate way.

The third stage of the comparative case study aims to address the research question of chapter 6, which explores the long-term effect of liberalisation on the welfare of European consumers. To answer this question, the case study's emphasis shifts to evaluate the more comprehensive picture of the Italian and French gas market structures and recent trends in gas prices for consumers. In particular, the comparison makes it possible to shed light on the effects of liberalisation on the welfare of consumers because Italy and France liberalised their respective markets to a very different extent.

The comparison makes it possible to control for other important factors such as i) the previous market structure, which was monopolistic in both cases; ii) the main energy suppliers, which retain similar export shares in both the Italian and French end markets; and iii) a similar endowment of import infrastructure, in terms of both LNG and pipelines. The chapter shows that, despite very different ways in which the two countries have liberalised the domestic gas market, with Italy liberalising to a much greater extent than France, prices for consumers have followed the same trend and are almost convergent. This confirms the chapter's hypothesis,

which state that, especially in gas importing countries, liberalisation policies that only address the domestic dimension of gas markets, such as the EU policy, are likely to have low or no impact on prices.

The data used in the analysis derives both from primary and secondary sources, as the literature on case study methodology recommends (Yin, 2009). The primary sources consist of semi-structured interviews to experts, public and private hearings, EU legislation, annual reports, press releases and data extracted from databases. Semi-structured interviews are appropriate for the qualitative method of analysis adopted in this research, as the lack of an overly rigid structure gives space to the interviewee to highlight aspects of the phenomenon that were not considered in the original hypothesis (Yin, 2009; Flick, 2006).

I interviewed current and former managers of the main shareholders and subcontractors of the infrastructure projects analysed in the case study (Chapter 4), as well as with EU and Italian policy-makers: a former Minister and board member of Eni and Snam (Personal Interview 1); a former manager of Enel (Personal Interview 2); a former manager at EDF (Personal Interview 3); a former CEO of Eni and Enel (Personal Interview 4); a manager at Rosetti Marino S.p.A. (Personal Interview 5); a head of division at the European Investment Bank (Personal Interview 6). The interviewees were chosen for their high-ranking roles in energy firms and governments, with a direct involvement in decision-making concerning Greenstream and Galsi.

Interviews for Chapter 5 consist of follow-ups of previous interviews, and additional interviews: the Head of Government and Political Affairs of BP (Personal Interview 7); a former Financial Controller of the UK Central Electricity Generating Board (Personal Interview 8); and a board member of Adriatic LNG (Personal Interview 9). The chapter also relies on data collected at private and public events from speeches of representatives of the Italian and French State industry. The data from the representatives of the French State industry

were collected in occasion of the conference “Governance of Public Organisation in the 21st century”, held in Rouen in June 2017. The information was gathered from the speeches of the Deputy Director-General of the Agence des Participations de l’État (Speech 1), the former Director of SNCF-Réseaux (Speech 2), the President of the supervisory board at Peugeot (Speech 3). The data from the representative of the Italian State industry were collected in occasion of the conference “The landscape in the new era of energy transition: Challenges, investment opportunities and technological innovations”, held in Athens in May 2017. The relevant speech was made by the Head of Relations with International Partners of Snam (Speech 4).

Legislation and press releases from EU institutions are also important primary data. Their analysis has played a crucial role in the reconstruction of the political and economic rationale that have driven the process of liberalization since the early phases. In particular, the European Parliament and Council directives are very important for the purpose of this research because they are official acts of the EU and all the main EU institutions concur to their drafting and promulgation, thus being a synthesis between some of the most important interests and visions within the EU. However, the EU directives express general provisions that must be received and transformed into national laws in ways that suit each national context. This has required analysing national legislation, including official documents on national energy strategies, as well as official documents of the National Regulatory Authorities, which regulate and monitor energy markets on behalf of the State.

In addition to laws and regulatory provisions, a decisive step forward to assess the real impact of the EU directives is the analysis of the actual effect on energy markets. This is done in the thesis by collecting data from different databases. For example, the data and indicators provided by the OECD are a first important step to estimate the extent to which Member States have implemented each single aspect of the EU directives: i) entry regulation, ii) public

ownership, iii) vertical integration, and iv) market structure. The data collected from Eurostat concerns the market response to the EU policy reforms. In particular, the database makes it possible to extract data related to the evolution of gas prices for industrial consumers since the start of the policy process.

Additional primary sources consist of data extracted from databases of national grid companies and ministries (energy and economic development). These provide information over the existing and planned gas import infrastructure, their capacity and actual gas flows. They also provide data on the gas market structure and its evolution in terms of number of operators and market shares in each segment of the gas supply chain, namely upstream/import, midstream and downstream.

Annual reports and press releases of the energy firms involved in the projects provide relevant data on the costs of developing the projects, both in the foreign upstream and international midstream, and for assessing the profitability of the production and transport stages, respectively. Annual reports and press releases provide also evidence on the financial performance of both firms and projects.

The secondary sources consist of academic literature on the historical, political and economic context in which the projects have been developed, as well as reports from public bodies, consultancies and industry journals that provide estimates on costs, gas prices, and other details of the projects.

#### **4. The profitability of transnational energy infrastructure: A comparative analysis of the Greenstream and Galsi gas pipelines**

This chapter explores how the profitability of European transnational gas infrastructure is affected by (i) alternative ways to organize the supply chain of gas production and transport and (ii) different forms of diplomatic support in the negotiation with non-EU producing countries. This is done by analysing the transformations generated by the EU-led gas market liberalization, which started in the 1990s as an attempt to decrease the market power of national monopolists and increase market competition. However, it has been shown that liberalisation and privatisation did not fully succeed in bringing the expected improvements in terms of market efficiency, firms' performances and consumers' welfare (Davies and Waddams, 2007; van Witteloostuijn et al., 2007; Jamasb et al., 2008; Florio, 2013).

The chapter explores the implications of the EU-led liberalisation by focussing on the external dimension of the European energy market. The external dimension is important as Europe currently imports around two thirds of the gas it consumes. In addition, the gas imported in Europe is still largely subjected to binding contractual relations with producing countries, although some studies have shown a slight improvement in this respect thanks to recent technological and regulatory changes (Hirschhausen and Neumann, 2008). Therefore, the context in which European gas procurement occurs still poses challenges in terms of energy security and domestic market competition. The chapter argues that supply chain unbundling and changes to the approach to energy diplomacy<sup>8</sup>, which were brought about by the EU-led liberalisation, may affect traditional mechanisms of interest alignment between EU and non-

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<sup>8</sup> A debate on EU energy diplomacy has recently emerged, following the EU's difficulties in developing a unified and effective strategy of energy procurement from neighbouring countries. The effectiveness of the EU approach has also been questioned because of the stalemates in the negotiations of major infrastructure projects for the import of gas, such as Galsi and Nabucco. The debate on EU energy diplomacy is taking place both at the academic (Herranz-Surrallés, 2016) and policy level, as shown by the adoption of the "EU Energy Diplomacy Action Plan" (2015) by the Foreign Affairs Council.

EU producing countries. This, in turn, can have negative implications for the profitability of transnational gas deals and import infrastructure<sup>9</sup>.

Two strands of literature are particularly relevant to address this issue. One strand studies how the development of transnational gas infrastructure is affected by cross-country relations. Contributions in this strand concur that reconciliation of interests between producing and consuming countries is a key element for success (Pandian, 2005; Victor et al., 2006; Ericsson, 2009; Bilgin, 2009; Kardas, 2011; Boussena and Locatelli, 2013; Omonbude, 2013; Van de Graaf and Sovacool, 2014; Yorucu and Mehmet, 2018). The other strand studies the energy supply chain through the lens of Transaction Cost Economics (TCE) (see Williamson 1981 for a survey of TCE). These studies suggest that different degrees of vertical integration may be more or less appropriate in different contexts, depending on the extent to which energy firms are locked into binding contractual relations in different phases of the supply chain (Joskow, 1985; 1990; DeCanio and Frech, 1993; Dahl and Matson, 1998; Saussier, 2000; Hirschhausen and Neumann, 2008; Hauteclouque and Glachant, 2009; Glachant and Hallack, 2009; Signorini et al., 2015). This chapter aims to bridge both strands, as understanding the profitability of European transnational gas infrastructure requires integrating insights on the supply chain and on the reconciliation of political interests among countries. Bridging those strands may also prove relevant for the broader debate on EU industrial policy (Bianchi, 1998; Trouille, 2007; Botta, 2014).

The chapter approaches the problem through a comparative case study of transnational gas infrastructure, and specifically of two undersea pipelines: “Greenstream”, which connects Libyan gas reserves to the Italian gas network across the Mediterranean Sea; and “Galsi”, which was supposed to connect Algeria to Italy, but has been in a stalemate since the late 2000s.

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<sup>9</sup> This hypothesis is based on the current European context of gas procurement (as described above); it does not consider potential future scenarios of large-scale domestic production (e.g. shale gas) or the emergence of viable alternatives to procurement through pipelines (e.g. Liquefied Natural Gas).

The chapter shows that both projects are potentially profitable in terms of production and transport costs, as well as in terms of other important factors such as gas demand in Europe. It then shows that the profitability of Greenstream and the stalemate of Galsi depend on differences in the supply chain and in the energy diplomacy framework in which they were conceived. In particular, the chapter shows that Greenstream's profitability was enhanced by the diplomatic relations between Italy and Libya, which made it possible for the Italian Eni to secure favourable concessions in the Libyan upstream and to vertically integrate through equal joint ventures with the Libyan NOC; this allowed the two firms to align their interests<sup>10</sup>. Such an interest alignment did not occur in the supply chain of Galsi, due to its unbundled structure<sup>11</sup> and the lack of well-established EU-Algeria relations. In fact, Galsi was penalised by the EU approach to energy diplomacy, which was not systematic and did not suit the Algerian interests. The chapter will show that EU energy diplomacy ultimately prevented European firms from securing licences in the Algerian upstream, which made it impossible for them to vertically integrate. The involvement of Algerian and European firms in different supply chain phases caused prolonged disputes for the price of gas to be imported by the European firms and for the partition of Galsi's financing<sup>12</sup>.

The case study shows that energy diplomacy can play a key role in aligning the interests of European energy firms and NOCs, thus reducing transaction costs. The chapter argues that gas and infrastructure deals should be negotiated within trade agreements that also consider the interests of producing countries. In fact, most producing countries use their energy resources

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<sup>10</sup> The gas flowing through Greenstream is sold to Eni's competitors in the Italian downstream, following the European Commission's provisions on market competition. Despite that, the chapter considers Greenstream as vertically integrated (from Eni's perspective). In fact, internalising the upstream and midstream is much more strategically important than internalising the downstream, at least in the European context, as only upstream and midstream require 'asset-specific investments' (see the TCE analysis in section 6 for a detailed explanation).

<sup>11</sup> Although the European firms involved in Galsi are vertically integrated from midstream to downstream, they lack a production phase in the Algerian upstream. Therefore, following the logic explained in the note above, this chapter considers Galsi as unbundled, as its vertical integration does not include the strategic upstream phase.

<sup>12</sup> Other external factors have also influenced the profitability of the two projects. For instance, Greenstream was conceived in a phase of rising gas demand in Europe. In contrast, whilst Galsi was also conceived when gas price was still high, the project was negatively affected by increased competition from other import infrastructure.

for political leverage and are therefore unwilling to grant unconditional access to foreign energy firms to exploit domestic resources. A systematic and pragmatic EU approach to energy diplomacy would also help pursue the EU objectives of market competition and energy security. For example, it would help new entrants (i.e. those with the lowest bargaining power vis-à-vis NOCs) to vertically integrate in the foreign upstream and create alternative routes from those managed by former monopolists, which usually retain full control over gas imports. This could increase competition in EU domestic markets. Furthermore, vertical integration and recourse to energy diplomacy would help decrease contractual frictions and increase infrastructure profitability, which is key for energy security.

The chapter is structured as follows. Section 4.1. analyses the EU-led gas market liberalisation through the lens of the Advocacy Coalition Framework and the implications for Greenstream and Galsi. Section 4.2. explores Greenstream's potential profitability in terms of production and transport costs, and how profitability was enhanced by the diplomatic relations between Italy and Libya. Section 4.3. shows that, despite Galsi was potentially profitable in terms of production and transport costs, diplomatic relations between the EU and Algeria contributed to make the pipeline unprofitable, and ultimately prevented its realisation. Section 4.4. explores Greenstream and Galsi's (un)profitability through the lens of TCE, and outlines how this case study might lead to an enhanced TCE framework that includes energy diplomacy. Section 4.5. concludes the chapter and provides policy suggestions to reconcile the Single Market framework with the specificities of the European gas sector, including recommendations for EU energy diplomacy.

## **4.1. The transition from the national to the EU model of energy governance**

### *4.1.1. The EU vs State industry dispute in an Advocacy Coalition Framework*

After World War II, the Italian State intervention in the energy sector was comprehensive and pivotal for economic development, and it was implemented through a system of public holdings (Bianchi, 2002; Toninelli, 2011). Their monopolistic nature (horizontal and vertical integration) allowed for investment coordination and fixed cost minimisation. State ownership made it possible to (i) use diplomatic action to reach favourable deals of energy provision with producing countries; and (ii) achieve a form of domestic political accountability over energy provision, because such provision was subject to citizens' pressure in terms of quality and price affordability (Cardinale, 2017). In short, the 'national' model of energy governance just outlined was characterised by public ownership, vertical integration and monopolistic market structure.

Since the 1990s, the 'national model was challenged by the EU-led process of liberalisation, which aimed to create a European Single Market of gas. In the EU vision, opening national gas markets would allow the most efficient European energy firms to increase their scale of production, thus reducing the market power of former monopolists. Unbundling the supply chain, and particularly the national grid of gas transmission, was seen as crucial for market opening as it would grant access to new entrants, thus increasing competition in energy provision from abroad as well as distribution to consumers. Privatization had the function to decrease political interference, avoiding market distortions (Florio, 2013). In short, private ownership of energy firms, supply chain unbundling, and market opening were the pillars of the emerging model of 'EU' energy governance.

However, EU-led liberalisation seems to have encountered the resistance of some State interests (Bianchi, 1998; Baldassarri et al., 2017)<sup>13</sup>, for reasons related to loss of political power or to the presumed ineffectiveness of the EU energy model, or both. To interpret the policy dispute that occurred between the key players in Italian energy policy, namely Italian State industry and the European Commission, I adopt the Advocacy Coalition Framework (ACF), which is designed to interpret policy disputes among rival coalitions of interests and their outcomes (Sabatier, 1998; Jenkins-Smith, et al., 2014). The analysis aims to explore the origins of the ‘national’ and ‘EU’ models (including their hybrid aspects), which in this chapter are represented by Greenstream and Galsi, respectively.

The ACF explains policy processes as a consequence of competing coalitions of interests. The theory conceives of policy change as a long-term process (usually one or two decades), which is shaped by the ability of opposing coalitions to influence decision-making to achieve their own goals (Jenkins-Smith et al., 2014). On this view, the dispute between coalitions does not concern only opposing interests but also opposed values and belief systems (Sabatier, 1998). The theory takes into consideration three levels at which the belief systems are structured, namely the ‘deep core’ beliefs, the ‘policy core’ beliefs and the ‘secondary’ beliefs. The ‘deep core’ beliefs correspond to values shared by all groups in society, such as the desirability of economic development; such beliefs are usually not disputed by the opposing coalitions. The ‘policy core’ beliefs are the normative ground on which the coalitions differ; they often concern the priority of certain issues over others in the policy agenda and the general approach to State intervention (e.g. direct intervention vs. regulation). The ‘secondary’ beliefs concern specific policies and the design of institutional arrangements to deal with the

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<sup>13</sup> This point emerged from personal interviews with a former board member of Eni and Snam (Personal Interview 1), a former manager of Enel (Personal Interview 2), and a former manager of EDF (Personal Interview 3).

normative issues supported by the coalitions (e.g. State-Owned Enterprises vs. independent regulatory authorities).

In relation to the Italian gas market liberalisation, the opposed coalitions can be identified as the European Commission (EC) and the State bodies supporting the Italian State industry, while the regulation of strategic markets and their infrastructure can be seen as the object of the dispute. These markets have been historically monopolized by the State industry, and specifically Eni in the Italian oil and gas sectors, due to the private sector's technological backwardness and shortage of capital. However, when the European economy approached a more mature stage of development in the 1980s, the private sector became able to play a major role (Cardinale, 2019b). This justified the EC's advocacy of State industry privatization and economic liberalization (European Commission, 2001; 2005). However, the State industry coalition rejected such a normative principle, restating the relevance of public assets in sensitive markets such as energy, in which public interests are at stake, and which cannot therefore be managed only through a logic of allocative efficiency. In addition, the State industry coalition claimed that higher competition in capital intensive sectors could entail lower levels of efficiency because of the reduced scale of production and lack of coordination between the different phases of the supply chain<sup>14</sup>. Therefore, despite a shared 'deep core' belief based on economic development, the opposed coalitions contrasted over the 'policy core' beliefs: the EU coalition advocated economic liberalization while the State industry coalition supported retention of public assets. This opposition also entailed substantial differences in the 'secondary beliefs': the EU coalition favoured the establishment of 'Regulatory Authorities' in charge of monitoring against dominant market positions<sup>15</sup>, while the State industry coalition advocated the retention of government assets, either directly through the Ministry of Finance,

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<sup>14</sup> This argument was supported by former managers of Eni and Enel (Personal Interviews 1 and 2). They argued that vertical integration and market power are necessary to compete in global energy markets.

<sup>15</sup> See the first (98/30/EC) and second (2003/55/EC) EU directives, which respectively suggest and require to set up national energy regulators. See also Wallace, Pollack and Young (2010) on this topic.

or indirectly through the Italian Sovereign Wealth Fund (“Cassa Depositi e Prestiti”) (Baldassarri et al., 1997).

#### *4.1.2. The outcome of the dispute: evidence from Greenstream and Galsi*

In the last 30 years the EU coalition seems to have prevailed, as shown by the extent of liberalisation and the establishment of National Regulatory Authorities (NRAs). The specific policy tools through which the EU could put pressure on Member States were introduced since the early 1990s. For example, the Maastricht Treaty envisioned privatisation as the most feasible measure to reduce public debt in a short time (Bortolotti et al., 2004). Of great importance were also specific EU directives of the 1990s and 2000s addressed to market opening and unbundling<sup>16</sup>. However, the opposition of the State industry gave rise to a compromise between the two opposing policy instances (Brutschin, 2016). In the case of the gas sector, the policy outcome was partial privatization of former monopolists, unbundling of the national grid from the upstream and downstream phases, and a gradual market opening to national and European competitors. As a consequence of this compromise, the main players in the Italian gas market are currently characterised by different degrees of state ownership, vertical integration and market power. This led to the emergence of hybrids models also in the governance of transnational supply chains, which reconcile elements of the national and EU models to different extents.

For instance, Greenstream retains a vertically integrated supply chain, but only in the more strategic phases, i.e. upstream and midstream. In addition, it has not received explicit State support as had happened for previous gas projects. However, it benefited from well-established diplomatic relations between Italy and Libya and their cooperation in various

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<sup>16</sup> See also the third (2009/73/EC) EU directive on gas market liberalisation, in addition to the first and second directives cited above.

political and economic sectors. In contrast, Galsi is vertically integrated in the less strategic midstream and downstream phases, as the project is managed by new entrants in the Italian gas market who lack long-term relations with Algeria. Furthermore, Galsi was conceived in the framework of the EU energy policy, which does not envision an active approach to energy diplomacy as much as some Member States do.

To summarise, the dispute between the two coalitions brought to a partial liberalisation of the gas market. This is shown by the key elements of energy governance, namely ownership of energy firms, organisation of the supply chain, and market structure. For what concerns transnational gas projects, partial liberalisation brought to the emergence of two hybrid models. One is represented by Greenstream's supply chain, which retains key elements of the 'national' model such as vertical integration and energy diplomacy, in addition to new elements introduced by the EU model (e.g. Eni's private management). The other is represented by Galsi's supply chain, in which elements of the EU model prevail (i.e., unbundling and lack of energy diplomacy), in addition to elements of the national model such as State shares in energy firms.

#### **4.2. Greenstream's profitability: a successful mix of traditional and innovative elements of governance**

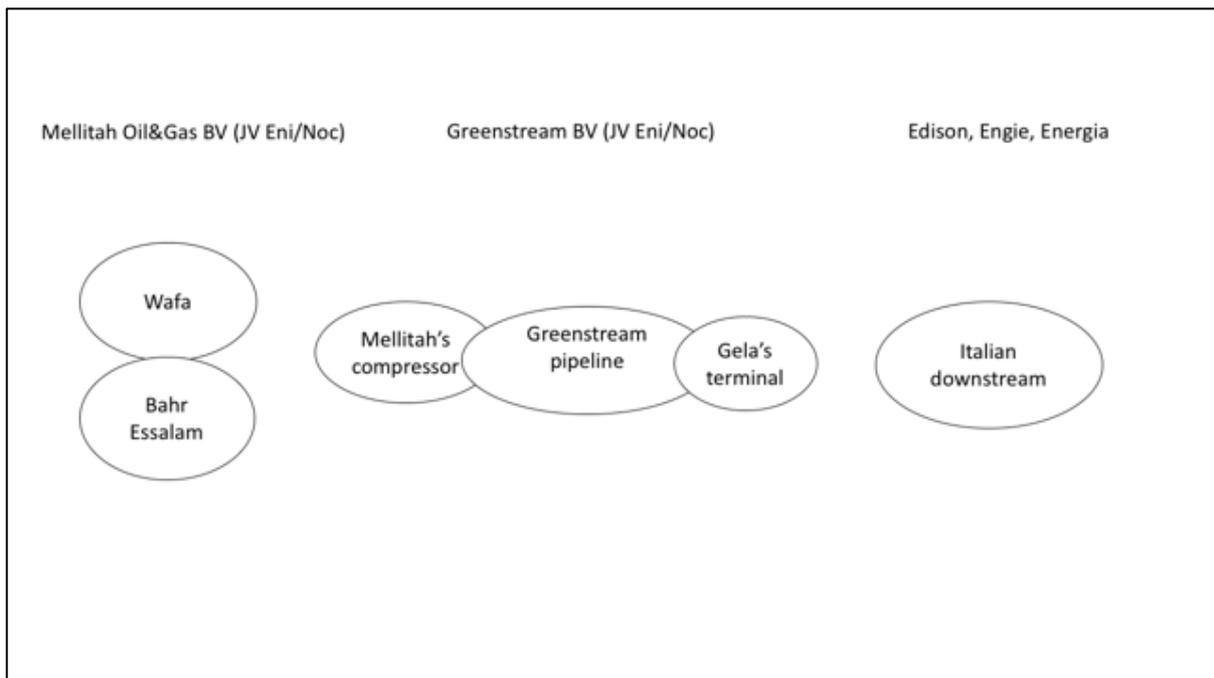
Greenstream B.V. is an equal joint venture between Eni North Africa B.V.<sup>17</sup> and the Libyan NOC. Greenstream strategically contributes to the Italian energy security thanks its capacity to supply 8 bmc per year. The joint venture's main assets include the offshore pipeline Greenstream, Mellitah's compressor in the Libyan coast, and Gela's receiving terminal in Italy (Greenstream BV, 2008). Mellitah's compressor is supplied with natural gas extracted from the Bahr Essalam and Wafa wells in the Libyan upstream. The wells are owned and operated

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<sup>17</sup> Eni North Africa B.V. is a subsidiary of Eni.

by Mellitah Oil & Gas B.V., another equal joint venture between Eni North Africa B.V. and NOC, established with the purpose of managing their common upstream assets. The gas shipped to Gela's terminal is then inserted into the Italian national grid and sold through long-term contracts to Eni's competitors in the downstream, following the EC provision on market liberalisation. Figure 1 provides for an overview of Greenstream's supply chain.

Figure 4.1. Greenstream's supply chain



Source: Own elaboration based on information provided by Greenstream B.V.

Several elements suggest that Greenstream's supply chain<sup>18</sup> is profitable. For example, the financial statements for the years 2008-2017 show Greenstream B.V.'s positive profit margin ranging from 15% to 20% and a solvency ratio ranging from 20% to 36%<sup>19</sup> (see Table 1).

<sup>18</sup> Although Greenstream is the name of the offshore pipeline, in this chapter I refer to Greenstream's supply chain as the whole process of gas production and export to Italy.

<sup>19</sup> Note that in some years, and especially in 2011, some indicators show a negative (or below-average) performance because of particularly intense clashes in the Libyan civil war, which caused disruptions to the main facilities of Greenstream.

Table 4.1. Greenstream's indicators of profitability (2008-2017)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>Net Income</b> (Thousand €)	n.a.	9,053	17,587	-52,065	1,697	-5,229	2,444	13,166	16,246	15,983
<b>Profit Margin</b> (%)	n.a.	16.79	17.15	n.a.	3.32	-3.33	2.17	11.31	15.25	20.46
<b>Solvency ratio</b> (asset based) (%)	36.35	28.87	24.83	23.21	20.15	19.82	18.19	25.39	21.77	19.58

Source: Amadeus database

The proximity to the sizeable Italian market is certainly an important factor for Greenstream's supply chain profitability. However, according to Eni's management<sup>20</sup>, a primary determinant is the low production cost in the upstream. The latter has been as low as \$1 per barrel in the case of oil (equivalent to \$0.2/mmbtu), due to the geological features of Libyan wells (see EIA, 2002). However, considering the greenfield nature of the investment to realise Greenstream, its cost per unit is likely to be higher. In fact, the total investment, which consisted in developing the wells and constructing production and transport facilities, amounted to around €5.6bn (Townsend, 2002). Some reports indicate that, in 2004, the price range at the Libyan border was \$3 - 3.25/mmbtu; the price at the Italian border, which includes the transport costs of the offshore section, was estimated to range between \$3.5 - 3.85/mmbtu

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<sup>20</sup> Based on interviews conducted with a former board member of Eni and Snam (Personal Interview 1) and a former CEO of Eni and Enel (Personal Interview 4).

(John Gault S.A., 2004). By comparing these prices to the estimates of costs, there appears to be a substantial margin of profit<sup>21</sup>.

While geological, geographical and market factors seem to provide favourable conditions, the contractual terms between Eni and NOC played a key role in enhancing profitability. The contractual terms were in turn shaped by political and economic factors, especially the critical situation of Libya's international relations and the Italian interests in Libya's energy resources. In fact, the UN sanctions imposed on Libya in the 1990s posed increasing problems to its economy, which relied on the historical relations with Italy to maintain a sufficient level of energy export as well as to negotiate softer conditions with the international community (Ronzitti, 2009; Varvelli, 2009). The Italian diplomatic activism helped Libya slowly open its economy and slightly overcome international isolation. The intensification of diplomatic commitment since the mid-1990s is evident in the establishment of an Italian-Libyan Commission to increase bilateral cooperation in key political and economic areas. Although official State visits started in 1999, the Italian diplomatic effort had already been intensified since 1996, when Eni and NOC signed the Addendum of Agreement for their cooperation in the Libyan upstream and the realisation of Greenstream. From the Italian State viewpoint, Greenstream was functional to improve Italy's energy security<sup>22</sup>. Cooperation with Libya in a range of political and economic domains such as terrorism, immigration and trade created the conditions for obtaining favourable deals in other sectors of cooperation, especially energy<sup>23</sup>.

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<sup>21</sup> This statement is supported by a personal consideration of a former board member of Eni and Snam (Personal Interview 1). See Table 2 for a more detailed exposition of costs and benefits in different phases of Greenstream's supply chain.

<sup>22</sup> In the same interview, and on the basis of his experience as former minister of industry, Interviewee 1 stressed that the Italian government has historically given primary importance to energy security in its diplomatic action. This was also the case in the mid- and late 1990s, when the negotiations for Greenstream took place. On this issue, see also Coralluzzo (2010).

<sup>23</sup> In Personal interview 1, the interviewee emphasizes the importance of political relations between Italy and Libya for the profitability of their energy deals, although he cannot provide specific details on the deals due to the confidential nature of the information. He adds that although the diplomatic action has been essential to create

In short, Greenstream's deals were shaped by two interconnected political factors: Libyan international isolation and the Italian diplomatic activism to help Libya overcome it. The former brought Libya to award favourable Exploration and Production Sharing Agreements (EPSAs) to International Oil Companies (IOCs). However, only Eni could actually secure contracts at such favourable conditions, and that was due to Italian diplomatic effort. In fact, other IOCs were not allowed to operate in Libya by their respective governments, due to the ongoing sanctions.

The deals envisaged the creation of joint ventures along the supply chain, with the purpose of sharing risks and returns equally. The equal share in the joint ventures allowed Eni to halve the financial burden of the €5.6bn total investment, whilst helping NOC participate in the production process and benefit from the revenues of the export<sup>24</sup>. In addition, the deals envisaged an overall government take of 65%. This greatly helped Eni North Africa BV's profitability, as government take in other producing countries amounted to 89% on average (Johnston, 2005).

In addition to the relations between Italy and Libya, Eni was able to take advantage of its partial privatization by setting a successful mix between public and private interests in the company. In fact, partial privatization helped Eni shift from public to private management, thus maintaining or further increasing performance (Wolf and Pollitt, 2008). This in turn had positive implications for the firms' reputation towards investors as well as Italian citizens, who changed their previous perception of Eni as a political tool for short-sighted policies. In addition, the residual 30% government share allowed Eni to still benefit from the government's

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favourable conditions of context, the deals have been negotiated by the firms without significant interference from the respective governments (especially in the Italian case).

<sup>24</sup> This information is based on an interview with a manager of Rosetti Marino S.p.A (Personal Interview 5). He stressed the importance of creating equal joint ventures between NOCs and IOCs to ensure the success of transnational energy projects. In his view, equal joint ventures ensure a balanced governance and the possibility to align mutual interests and maximize synergies between counterparties.

support in crucial negotiations, as in the case of Greenstream, but without heavy government interference in corporate management<sup>25</sup>.

In short, the nature of diplomatic relations between Italy and Libya in the 1990s, and particularly the Italian approach to energy diplomacy, were crucial for the concessions in the Libyan upstream and to avoid frictions between Eni and NOC. They contributed to the profitability of Greenstream, in addition to other factors such as the relatively low cost of production in Libya, the increasing demand in the Italian gas market, and Eni's private management. Therefore, the coexistence of traditional elements (energy diplomacy) and innovative elements (private management), in such a form and extent, seems to provide particular strength to Eni's governance and therefore to Greenstream.

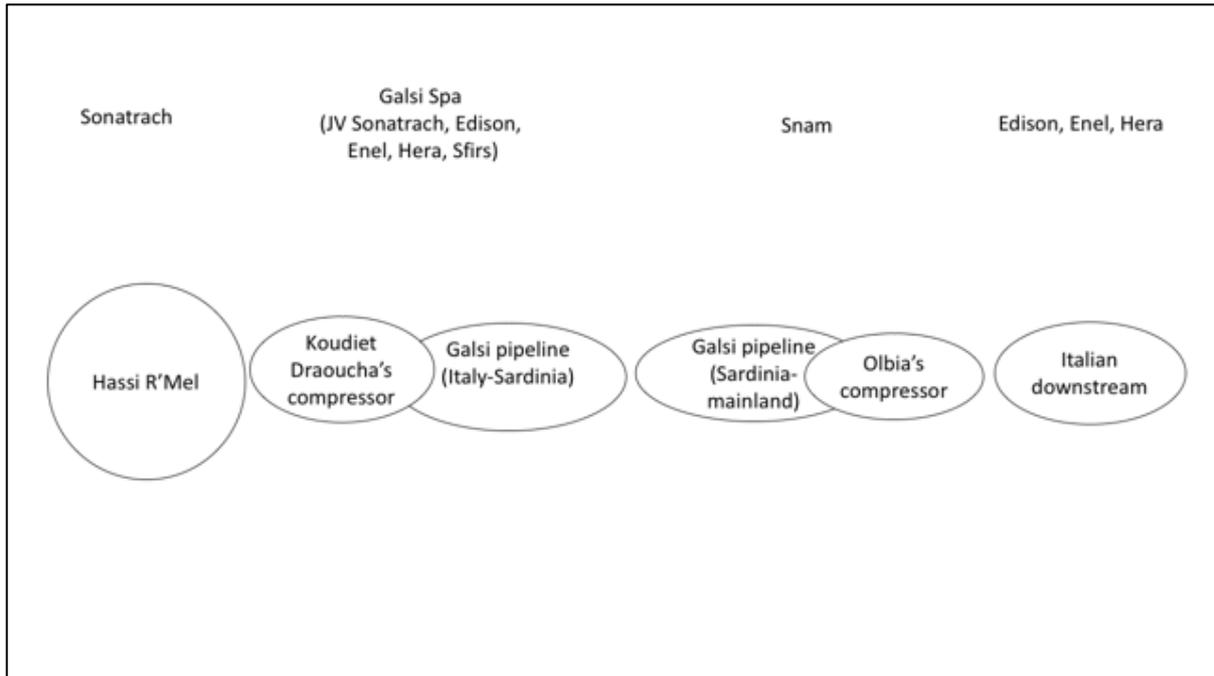
#### **4.3. Galsi's unprofitability: the lack of a diplomatic strategy**

Galsi is a planned but not yet realized gas pipeline which should connect the Algerian gas wells in Hassi R'mel to Sardinia (Italy) and provide 8 bcm of natural gas per year. The pipeline would cross the Sardinian island, supplying the gas needed to the region, and reach the Italian mainland by crossing the Tyrrhenian Sea through another offshore segment. Whereas Hassi R'Mel production in the upstream is fully owned and operated by the Algerian State-Owned Sonatrach, the ownership of the international section of the pipeline is shared by Sonatrach (41.6%), Edison (20.8%), Enel (15.6%), Sifis (11.6%), and Hera Trading (10.4%), most of which operate in the Italian downstream (Galsi, 2009a). Unlike the Algeria-Sardinia offshore segment, the onshore and offshore segments in the Italian territory will be financed, owned and operated by the national grid company Snam (Galsi and Snam Rete Gas, 2008). See figure 2 for an overview of firms involved in Galsi's supply chain.

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<sup>25</sup> This was stressed by both a former board member of Eni and Snam (Personal Interview 1) and a former CEO of Eni and Enel (Personal Interview 4). Interviewee 1 added that the lack of government interference in Eni's management is also important to ensure Eni's credibility towards investors and Italian citizens.

Figure 4.2. Galsi's supply chain



Source: Own elaboration based on publicly available information provided by Galsi S.p.A.

Galsi has been in a stalemate since 2003, and is now likely to be abandoned (Coats, 2013). And yet, several elements suggest that Galsi could potentially be profitable. A key element is the low wellhead production cost at Hassi R'Mel, which is estimated to be \$0.5 mmbtu (Aissaoui, 2016)<sup>26</sup>. Moreover, extraction and production facilities are already in operation in Hassi R'Mel, and this suggests that this price is unlikely to increase considerably, although the field's maturity has recently required increasing investment for maintenance. As a result, Galsi would require investments mainly for the onshore and offshore transport phases, which are estimated to reach a total amount of €2bn. Table 2 compares the main indicators of cost and potential profitability in Greenstream's and Galsi's supply chains.

<sup>26</sup> For comparison, estimated production cost for Russian gas, which is considered to be among the cheapest sources for Europe, is almost \$2/mmbtu at wellhead and almost \$4/mmbtu when domestic and transnational transport costs are included (Rogers, 2015).

Table 4.2. Greenstream and Galsi's supply chains (own estimates are indicated in brackets)

	Greenstream		Galsi	
	Upstream	Midstream	Upstream	Midstream
<b>Ownership</b>	Mellitah Oil&Gas B.V. (Eni/NOC)	Greenstream B.V. (Eni/NOC)	Sonatrach	Galsi S.p.A. (Sonatrach, Edison, Enel, Hera, Sfisr)
<b>Est. production/transport cost (\$/mmbtu)<sup>27</sup></b>	0.2	0.5 - 0.6	0.5	(0.5)
<b>Sale price (\$) <sup>28</sup></b>	3 - 3.25	3.5 - 3.85	3 - 3.5	3.5 - 4
<b>Mark-up (\$/mmbtu)<sup>29</sup></b>	(2.8 – 3.05)	n.a.	(2.5 – 3)	n.a.
<b>Capex (€bn)<sup>30</sup></b>	4.6	1	(Very low)	(0.8)
<b>Rate of return (%)<sup>31</sup></b>	n.a.	7.5	n.a.	(7.5)
<b>Capacity (bcm/year)<sup>32</sup></b>	10	8	76	8

<sup>27</sup> Upstream production costs in Libya and Algeria are estimated by EIA (2002) and Aissaoui (2016), respectively. The cost for Lybia does not include Greenstream's upstream capex. In fact, the data is reported by EIA (2002) with reference to the production cost of oil in Libya. This cost can be used as a proxy for the production cost of gas, as capital expenditure for exploration and production of oil and gas does not differ substantially. The low cost to produce gas in Libya was also confirmed by a former board member of Eni and Snam (Personal Interview 1), and by Abd al-Hafiz Zleitni, NOC's former chairman, as reported by Townsend (2002). Transport cost for Greenstream was estimated by John Gault S.A. (2004). Transport cost for Galsi's international section was estimated to be similar to the transport cost for Transmed (see John Gault S.A., 2004), an existing gas pipeline connecting Algeria to Italy via a similar route as Galsi.

<sup>28</sup> Estimates are made by John Gault S.A. (2004) and refer to 2004.

<sup>29</sup> Estimates for the upstream are based on production costs and sale prices as reported above. Estimates for the midstream cannot be calculated because the operating cost is not known. In any case, they are not crucial for the decision to build the pipeline, as such decision depends on the profitability of the whole supply chain.

<sup>30</sup> See Townsend (2002) for Greenstream's capex. Galsi's capex refers to the international (offshore) section connecting Algeria to Sardinia, which corresponds to about 1/3 (285km) of the total route (865km). As a result, the €0.8bn cost corresponds to slightly more than 1/3 of the €2bn total cost, considering the higher cost of offshore pipe laying. The capex of Galsi's upstream is indicated as "very low" because it does not require substantial investments (at least not as much as for greenfield investments), as Hassi R'Mel wells are already in operation to fill other pipelines.

<sup>31</sup> Greenstream B.V.'s rate of return is based on assessments made by John Gault S.A. (2004). Galsi S.p.A.'s rate of return is estimated to range on similar values as those of Greenstream, considering the similar sale prices assumed and the similar capital expenditure on the pipeline, and assuming that it would work at the same capacity as Greenstream. Note that rate of return of the pipelines, which are estimated to be similar, obviously do not depend on the production cost and capital expenditure of the upstream, which differ substantially across the two supply chains.

<sup>32</sup> The remaining 2bcm/year produced in the wells that fill Greenstream (Wafa and Bahr Essalam) are used for Libyan domestic consumption, whilst the Algerian supergiant well Hassi R'Mel, which should fill Galsi, already supplies most of the country's export infrastructure with the remaining 68bcm/year.

Despite these conditions for profitability, Galsi's commercial value is undermined by important factors, most of which have political roots. A primary factor is the Algerian depletion risk<sup>33</sup>, evident in the decline of gas production and exports of 10 and 25 bcm respectively, in the period between the mid-2000s and the mid-2010s (Aussaoui, 2016). The main cause of this risk is the lack of significant discoveries in the Algerian upstream during the early 2000s' rounds (Darbouche, 2011). In turn, this was generated by the unattractive contractual terms offered to IOCs, which followed from Sonatrach's attempt to increase fiscal revenues and further assert its control over gas resources.

However, it can be argued that the failure of European firms to secure contracts in the Algerian upstream also stems from the approach to energy diplomacy adopted by the EC in negotiations with the Algerian counterparties. In particular, two main aspects of the EC's energy diplomacy are central for understanding such an outcome. The first aspect is related to the conventional wisdom within the EC that the political and economic spheres should be kept separate to avoid market distortions and resources misallocation<sup>34</sup>. This brought to a lack of diplomatic activism in the negotiations with the Algerian authorities, which is shown by the fact that only two official meetings between EC and Algerian officials for the discussion of energy issues took place in the 2000s (Weber, 2014). The other aspect concerns the content of the negotiations, and particularly the nature of the agreement proposed by the EC. In fact, rather than negotiating specific energy deals, EC officials have mainly advocated for Algeria to adopt a liberalised energy model<sup>35</sup> (Weber, 2014). This was an ambitious diplomatic target, which would have allowed European firms to increase market power in the Algerian energy sector.

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<sup>33</sup> This was stressed by a former CEO of Eni and Enel (Personal Interview 4).

<sup>34</sup> A Head of Division of the European Investment Bank (Personal Interview 6) suggests that the EC approach contemplates the need to reconcile i) principles of market competition and limited interference in the market, and ii) objectives such as energy security, which require greater policy action due to market failures.

<sup>35</sup> On this issue see the *Mémoire d'entente sur l'établissement d'un Partenariat Stratégique entre l'Union européenne et la République algérienne démocratique et populaire dans le domaine de l'énergie*, signed in Algiers on 7<sup>th</sup> July 2013 by the EC President Manuel Barroso and the Algerian Prime Minister Abdelmalek Sellal.

However, the liberalisation of the Algerian energy sector would have neutralised the Algerian ruling elites' main lever of economic policy<sup>36</sup>. This suggests that EC requests were not politically feasible. The widely different stances of Algeria and the EU left no room for negotiating traditional yet important aspects such as concessions for Exploration & Production (E&P), thus jeopardising the European energy firms' interests in the Algerian upstream.

The lack of an upstream phase for the European firms has not only contributed to the depletion risk, which negatively affects the interests in Galsi of both the Algerian and European stakeholders; it is also a major factor for European firms' unprofitability, because of the mark-up in price associated with Sonatrach's monopoly in the upstream. More generally, the involvement of Algerian and European stakeholders in separate phases of the supply chain – i.e. the lack of vertical integration – has made it impossible for them to align their interests. This has emerged in several occasions, causing prolonged contractual disputes.

The disputes concerned mainly the prices for the gas imports<sup>37</sup>, as well as the partition of the financing of the different sections of Galsi. The price dispute was exacerbated by the deep fluctuations of the European hub gas prices, which ranged from \$10 to \$7.5mmbtu in 2008-2010, reaching \$14 in 2013 and falling to \$5 or less a couple of years later.

The dispute over Galsi's financing emerged as a consequence of Sonatrach's demand to only be committed to the international offshore section and just for its 41.6% share, with the rest of the routes towards the Italian mainland to be financed by Snam<sup>38</sup>. As a result of changing circumstances in the gas market (fluctuating gas prices and increasing competition from other infrastructure), the bargaining power of the Algerian and European counterparties changed

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<sup>36</sup> This point is emphasized by a former manager of Enel (Personal Interview 2). Interviewee 2 stresses that the energy sector is extremely important in Algerian domestic politics, and hence that European political and corporate stakeholders must consider this aspect in the negotiations.

<sup>37</sup> This information on the disputes, provided by the trade journal *Hydrocarbons Technology*, is available at <https://www.hydrocarbons-technology.com/projects/algeria-sardinia-italy-gas-pipeline-galsi/>.

<sup>38</sup> A former CEO of Eni and Enel (Personal Interview 4) identified the dispute over the financing of Galsi's different sections as one of the key elements for Galsi's stalemate. The dispute was eventually solved through an agreement between Galsi S.p.A. and Snam.

accordingly over time. This made it difficult to reconcile their different stances and align their interests.

Strictly political factors have also had a negative influence on the realisation of Galsi. The Italian government has initially stated its support to the project for several reasons. First, to prevent potential supply shortages from critical areas such as Libya and Ukraine. Second, to further contribute to make Italy the European hub for gas (Galsi, 2009b). Third, to comply with the EC's pressure to break Eni's monopoly over the Italian gas import infrastructure (Sartori, 2013). However, the merger of Edison with the French government-owned EDF in 2008 contributed to turn the attention of the Italian government towards other projects, Eni-Gazprom's South Stream above all<sup>39</sup> (Prontera, 2018).

The EC initially included Galsi among the Projects of Common Interest (PCI), allocating €120m (European Commission, 2009). The pipeline contributes to two EU energy policy objectives, namely to break Eni's monopoly over the Italian gas import infrastructure and to improve European energy security<sup>40</sup>. However, the project would contribute to the EC's priority of decreasing the European dependence on Russian gas only to a limited extent (Sartori, 2013). Furthermore, Galsi does not contribute to diversify the existing energy supply, because Algeria is already among the main suppliers.

As a result of commercial and political disputes, the initial conditions of profitability, which made Galsi an attractive investment and a PCI for the EC, ceased to exist. By June 2017, Galsi was considered not profitable from the viewpoint of capital expenditure by the Italian National Regulatory Authority (NRA), although it was still seen as socially desirable (ACER, 2017). For this reason, NRA recommended to discard Galsi from the list of PCIs. The

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<sup>39</sup> However, a former manager of EDF (Personal Interview 3) states that EDF's merger with Edison cannot be fully ascribed to a political dispute between Italy and France, as the merger with Edison was launched by EDF management without a formal consultation with the French government and concerned a privately owned firm.

<sup>40</sup> On this point, a Head of Division of the European Investment Bank (Personal Interview 6) notes that projects that enhance market competition and energy security at the same time receive particular attention from the EC, as these two objectives are not always easy to reconcile in a single project.

prolonged disputes and subsequent delays in the project schedule played a major role in raising costs. This made the project unfeasible when, in the 2010s, market conditions worsened because of a fall in demand and an increase in supply from competing projects.

To conclude, unbundling and lack of energy diplomacy were primary causes of Galsi's disputes and its subsequent stalemate. This suggests that the EU model of energy governance must be rethought to some extent, in order to ensure interest alignment between commercial and political stakeholders in European and exporting countries.

#### **4.4. National vs EU energy governance from a Transaction Costs Economics perspective**

The Transaction Costs Economics (TCE) approach provides a powerful lens to interpret the case studies' findings, and to draw policy implications. TCE conceives of firms' structure as the result of their advantages to internalize or outsource the different production phases (Coase, 1937; Williamson, 1981; Joskow, 2013). The internalization or outsourcing is based on the opportunity cost to 'buy or make', depending on whether the cost of a certain input is lower or higher in the market than if produced internally.

A fundamental aspect influencing the relation between transaction costs and governance structure is asset specificity. According to Williamson (1981), asset specificity is given mainly by (i) site specificity, which occurs when an asset cannot be moved and used in other geographic areas (e.g. gas pipelines); (ii) physical asset specificity, which arises when certain assets are project-tailored (e.g. offshore gas platforms); (iii) human asset specificity, which derives from investments in human skills that cannot be used in other production phases; and (iv) dedicated assets, which are conceived for supplying a specific customer.

Because it is impossible to exploit the asset differently from how it was initially conceived, there are limited options both for the buyer and the seller to change commercial

counterparties. This encourages the emergence of binding contractual relations, in which counterparties are locked-in with different bargaining power (Joskow, 2010). In a context of high specificity, the opportunity to internalise production (i.e. vertically integrate) stems from both the need to reduce the ‘production cost’ of a certain input by overcoming the counterparty’s market power, and from the potential ‘governance costs’ (e.g. negotiating disputes) arising in long-term contractual relations.

Gas in Europe can be considered as a specific asset in the sense described above. In fact, gas procurement in Europe is constrained by the availability of gas in foreign countries and by the economic and technical difficulties in importing. Investments in E&P and transnational infrastructure are high and risky. Even more importantly, they are devoted to specific geographic areas (site specificity), project-tailored (physical asset specificity), and conceived to serve one or few specific customers; therefore, they cannot be employed for alternative uses (they are dedicated assets). As a result, the counterparties are locked-in once the investments are launched; this is especially true for the counterparty that is more exposed financially. This implies that the internalisation of upstream and midstream (i.e. vertical integration) is often<sup>41</sup> advantageous for European energy firms who have the financial and technical capability to afford it. Furthermore, vertical integration decreases the costs of being locked in with upstream producers and avoids the cost of frictions arising throughout the time of the contractual relation<sup>42</sup>.

However, full vertical integration is not always possible. In such cases, certain contractual arrangements might act as a partial substitute of vertical integration and help reduce

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<sup>41</sup> The assumption is that gas prices are high, which is a structural feature of European gas markets. Therefore, the reasoning does not consider scenarios such as (i) extreme fluctuations in energy prices; or (ii) hypothetical future structural changes, such as large-scale domestic production of renewable energy or a significant fall in the price of gas imported through Liquefied Natural Gas, which would reduce the advantage of participating in the upstream.

<sup>42</sup> Although frictions may also occur between the different parts of a firm (Cyert and March, 1963), in situations of asset specificity these frictions are likely to be much less important than those arising in the market (Joskow, 2010).

both production and governance costs. For instance, joint ventures make it possible to ensure shared production in all phases of the supply chain, thus potentially mitigating the effects of the producing country's market power<sup>43</sup>. Joint ventures also contribute to decrease contractual uncertainty and potential opportunistic behaviour of the counterparty with lower exposure to risk (Kogut, 1988; Hennart, 1991; Chang, Chung and Moon, 2013).

In the case of Greenstream, full vertical integration was not possible for Eni because the upstream is located in Libya, which, as every sovereign State, has full control over its natural resources. In contrast, the Libyan NOC could not vertically integrate from its upstream to the Italian downstream for financial and technical reasons. As a consequence, the creation of joint ventures between Eni and NOC, both in the upstream and midstream, ensured the internalisation of upstream production to Eni, lowering production costs<sup>44</sup>. In addition, the joint venture made it possible to reduce potential opportunistic behaviour of the NOC, which was initially less exposed in terms of upfront costs (e.g. investments in E&P). NOC's commitment to the project stems from its direct interest as a major shareholder, which entails access to Eni's technology and revenues deriving from exports.

In the case of Galsi, the lack of joint ventures in the upstream has prevented European firms from vertically integrating. This would result in greater production costs for European firms, as gas is supplied by Sonatrach at a higher cost than if produced internally. Furthermore, it caused price disputes among stakeholders, which were not mitigated by the adoption of long-term contracts, despite the fact that the latter are often seen as a partial substitute of vertical integration, though to more a limited extent than joint ventures (Joskow, 1985). In fact, long-term contracts are effective in hedging risk against gas market fluctuations and ensure returns

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<sup>43</sup> However, profitability also depends on the firm's ability to negotiate favourable terms with the producing country (e.g. overall government take and taxation).

<sup>44</sup> In the aforementioned interviews, a former board member of Eni and Snam (Personal Interview 1) and a former manager of Enel (Personal Interview 2) emphasized the importance of vertical integration to lower production costs, whilst a manager of Rosetti Marino S.p.A. (Personal Interview 5) stressed the positive role of joint ventures to align interests and therefore to minimise governance costs.

to infrastructure investments (Joskow, 1985; 1987; Hirschhausen and Neumann, 2008; Hauteclouque and Glachant, 2009). In fact, the returns from infrastructure investments are guaranteed by the importer's commitment to buy certain amounts of gas annually at a fixed price for a long period. However, as the case of Galsi shows, in certain cases long-term contracts cannot reduce transaction costs, as the interests of counterparties (exporters and importers) tend to diverge as a result of their involvement in different phases of the supply chain. In this context, changes in external variables such as gas price would shift the bargaining power, potentially exposing either counterparty to opportunistic behaviour<sup>45</sup>. As a result, the case of Galsi shows that the EC stance on unbundling, particularly in the context of trans-European supply chains, runs counter to the insights provided by TCE.

In addition, this chapter shows that the adoption of TCE's contractual perspective helps shed light on another relevant factor affecting the profitability of energy deals: the role of energy diplomacy. In fact, the chapter argues that energy diplomacy plays a decisive role in reducing energy firms' production costs as it helps them negotiate favourable deals to access the foreign upstream, making it possible to vertically integrate. A systematic diplomatic effort also helps reduce governance costs, by establishing long-term governance mechanisms among political and economic actors, thus increasing trust and mutual benefits. This was evident in the extremely advantageous EPSA granted to Eni thanks to the Italian cooperation in other political-economic sectors, which in turn have contributed to the profitability of Greenstream. Diplomatic activism, in addition to pre-existent strong diplomatic ties, ensured smooth negotiations between Eni and NOC both during project realisation and after completion, namely when the project was in the operational phase.

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<sup>45</sup> When Galsi was conceived in the early 2000s, Sonatrach had great bargaining power, as the gas price was relatively high and global supply was relatively low. Subsequently, Sonatrach's bargaining power decreased for different reasons: a decrease in global gas prices, Sonatrach's major investments in Galsi's domestic sections, Algerian gas wells' depletion risk and, to a certain extent, the EU diversification strategy.

In this sense, Galsi's unprofitability too shows the importance of reliance on energy diplomacy. From a 'production cost' perspective, the lack of well-established diplomatic relations has prevented European firms from operating in the Algerian upstream with favourable terms. In fact, EU diplomacy did not offer attractive compensations to the Algerian counterparties (see section 5). From a 'governance cost' perspective, the lack of such political-economic mechanisms has opened the way for enduring disputes and frictions among the stakeholders, which have brought the project to the current stalemate.

In conclusion, the chapter suggests that reliance on energy diplomacy, whether at national or supranational level, is a powerful factor that can help shape both 'production' and 'governance' costs, not only because the commercial deals involve different political entities, but also because the diplomatic element acts as a powerful tool to reduce transaction costs in binding contractual relations. The effectiveness of energy diplomacy stems from the possibility to offer attractive deals in a wide range of economic and political domains in return for energy deals, thus aligning interests between importing and exporting energy firms. In particular, it incentivizes vertical integration and helps reduce potential frictions in both the *ex-ante* (negotiation and construction phases) and *ex-post* (operation phases) relations. Seen in this light, energy diplomacy represents a partial substitute to vertical integration when the latter is not possible, for instance because specific production phases (i.e. upstream) are located abroad and their exploitation is subjected to foreign political authorities. The contribution of energy diplomacy to mitigate transaction costs can work in combination with contractual arrangements, such as joint ventures, which are usually adopted for this purpose. This combination would arguably reach results close to those which can be achieved by full vertical integration when asset specificity acts as a constraint. The foregoing considerations, based on empirical evidence of Greenstream's and Galsi's (un)profitability, leads to envision the importance of enhancing the theoretical apparatus of TCE to include diplomatic aspects.

#### **4.5. Conclusions and policy suggestions**

The policy dispute over the gas sector between the Italian State industry and the European Commission has led to two hybrid models of transnational gas governance: a national model characterised by a vertically integrated public monopolist, but with some innovations, represented by Greenstream; and a EU-inspired model characterised by unbundled private firms in competition with each other, but with some traditional aspects, represented by Galsi. The innovations in the respective models, namely Eni's partial privatisation (Greenstream) and the persistence of State shares in the European firms (Galsi), seem to be the result of a compromise between the EU's push towards privatization and the Italian state industry's effort to retain strategic public assets. However, the mix of public and private assets has generated different outcomes in the governance of two projects: whereas Greenstream has benefited from the efficiency deriving from Eni's private management, Galsi has suffered from the coexistence of public assets of different countries with different political objectives. This shows that projects' profitability depends not only on factors such as production costs, but also on how interests are reconciled in the supply chain. Galsi, for example, despite needing a substantially lower capital expenditure than Greenstream, has suffered from prolonged disputes that contributed to its commercial unviability.

The chapter argues that vertical integration is an essential element for interest alignment, and has played an important role for the (un)profitability of Greenstream and Galsi. This was shown by adopting the lens of TCE, which suggests that, in case of asset specificity, vertical integration is desirable to reduce transaction costs. The specificity of gas in Europe is evident in European firms' binding contractual relations with non-EU producers, as assets dedicated to production and provision of gas in the foreign upstream and international midstream are 'transaction-specific' and cannot be used for alternative purposes. This explains

why European firms tend to internalise production, both to avoid high costs of import and to minimise frictions in the relation with producing countries.

Eni's joint ventures with the NOC in the production and transport phases allowed Eni to vertically integrate, thus contributing to Greenstream's profitability. In contrast, the lack of vertical integration in the Algerian upstream raised concerns over the profitability of the energy deals, hence on the opportunity to finance Galsi. The failure to internalise production entailed higher costs of imports and frequent price disputes with the Algerian upstream producer Sonatrach. The decision to stipulate long-term contracts between European firms and Sonatrach, which are usually effective in hedging the risk of infrastructure investments, did not prevent governance frictions. Joint ventures can be more effective for this purpose, as they make it possible for the European and North African counterparties to share the same interests in all supply chain phases when market conditions change (e.g. gas price or supply from competing infrastructure).

The analysis suggests that energy diplomacy is another key element for profitability in transnational energy deals. In the case of Greenstream, Italy's diplomatic effort secured very advantageous concessions for Eni in the Libyan upstream and smooth contractual relations. By contrast, the fragmented framework of European political interests in Galsi, the lack of systematic diplomatic commitment, and the nature of deals proposed by the European Commission have produced disadvantageous contractual conditions for the European energy firms. It is true that in the case of Galsi the EU diplomacy could not leverage factors such as international isolation, as had been the case for Italian diplomacy vis-à-vis Libya. However, it could have arguably taken advantage of several strengths characterising the EU, such as its economic power and its appealing position as a trade partner.

The analysis above suggests the need to extend the TCE theoretical framework to include diplomatic aspects. In particular, in the same way as the internalization of production

stages requiring asset-specific investments decreases transaction costs, the internalization of energy diplomacy might lead to a similar outcome. In particular, energy diplomacy helps domestic firms secure favourable energy deals; it also contributes to reduce potential frictions in both *ex-ante* and *ex-post* contractual relations. The reduction of transaction costs stems from the potential to align mutual interests by offering deals in other sectors of the economy and fields of political cooperation. As a result, the internalisation of energy diplomacy can act as a partial substitute to vertical integration, in addition to contractual arrangements (e.g. joint ventures) that are usually adopted for this purpose, thus minimising transaction costs as much as full vertical integration would do.

The internalisation of energy diplomacy was evident in the ‘national’ model, as State ownership of energy firms entailed the involvement of State officials and diplomats at different managerial levels. This implied also a smoother coordination with diplomatic bodies external to the firm, maximising the synergies between corporate and State diplomacy. In contrast, the ‘EU’ model does not (in principle) contemplate the internalization of energy diplomacy in the strict sense (i.e. state ownership). However, it could envision the adoption of an approach to energy diplomacy that is externalised from the firm but generates similar effects. For example, it could work on the creation of diplomatic platforms for the negotiation of energy deals between EU and non-EU firms.

Negotiating energy deals on the basis of trade agreements could be crucial for reconciling the diverging approaches to negotiation of EU and non-EU producing countries. In fact, whereas the EU’s approach focuses on mutual liberalisation of energy markets and trade, producing countries tend to maintain political control on the energy sector. So far, the EU energy diplomacy has instead ranged from the absence of intervention to overly ambitious targets such as the request of energy market liberalisation to non-EU counterparties (beside Galsi, see the case of the Nabucco pipeline). The latter approach, although being probably the

most suitable for European interests, was often rejected by non-EU counterparties as it deprives them of their bargaining power. The stalemate of Galsi and other projects (e.g. Nabucco) shows that obtaining direct access to non-EU energy resources requires a major commitment to political-economic cooperation, as was the case in the ‘national’ energy model.

In conclusion, the negotiation of energy deals within EU trade agreements, and the creation of a EU energy diplomacy that also suits the interests of non-EU producing countries, can greatly contribute to reconcile energy security and domestic market competition in the energy sector, in line with the EU Single Market policy. In fact, this approach would help new entrants vertically integrate by acquiring shares of production in the foreign upstream. This would be crucial for increasing their competitiveness vis-à-vis the vertically integrated domestic incumbents (i.e., the former monopolists), as it would grant them direct access to foreign gas resources without depending on incumbents’ imports. Therefore, the existence of competing vertically integrated supply chains could represent the starting point to increase market competition in Europe, but also to diversify the sources of gas procurement through profitable transnational infrastructure, which is essential for energy security.

## **5. The Italian and French governments' ability to pursue policy objectives under partially liberalised energy markets: Insights from Greenstream and Galsi gas pipelines**

The partial transition from the national to the EU model of energy governance has had wide-ranging implications of political-economic nature. In particular, one of the most important stakeholders in the energy sector, namely the government, has witnessed substantial changes in the forms of intervention and objectives pursued. This chapter explores the nature and extent of such changes. In particular, it analyses how the current EU energy governance makes it possible for the government to pursue energy security, growth and global competitiveness of the energy industry, and public service obligations. Whilst the transition from vertically integrated to unbundled supply chains has had implications especially for firms, as shown in the previous chapter, the governments' ability to influence the energy sector has been affected above all by variations in the ownership structure of energy firms. In particular, the full or partial privatization of former State-Owned Enterprises (SOEs), and the subsequent transition to State-Invested Enterprises (SIEs) and Private Enterprises (PEs), has led to the reduction of governments' influence in energy firms, and hence to the prioritization of profitability over the pursuit of policy objectives.

The large-scale privatization of European SOEs that started in the 1990s was not the result of specific EU provisions, but was undertaken voluntarily by Member States. In that phase, the EU merely recommended to privatize in view of the upcoming Monetary Union, which required Member States aspiring to join it to reduce their annual deficit and public debt. However, in recent years the European Commission has started to actively sanction Member States that use public ownership as a way to obstruct market competition. For example, governments' provision of additional equity funds is often interpreted as State aid, which is

forbidden by EU law<sup>46</sup>. Furthermore, in some cases public ownership makes it possible for the government to veto potential takeovers from private investors, which violates the EU principle of free movement of capital (Adolff, 2002). Overall, government's powers and rights attached to a control share in a SIE are indicated with the term Golden Share. This has been recently banned by EU law, because it grants extensive government interference in the management of State-Invested Enterprises, and thus it represents an obstacle to market competition.

To reconcile the EU principles of market competition and governments' ability to safeguard strategic interests, the EU has introduced the Golden Power. This provision allows governments to veto certain decisions taken by the board of strategic firms, even in absence of government ownership. However, such veto can be exercised only when the board's decision concerns divestments from infrastructure that are strategic for national interests (e.g. energy security, economic system connectivity and defence). This chapter questions the effectiveness of the Golden Power in addressing strategic objectives such as energy security. In fact, it shows that energy security requires direct and long-term government intervention in key firms, while Golden Power is only effective to veto specific decisions but does not have an impact on the overall energy strategy.

The governments' ability to pursue policy objectives under SIEs has not been addressed extensively in the literature, probably because partial privatisation of SOEs in the European gas sector is still relatively recent. In fact, the literature on SOEs and SIEs has been dominated by the themes of performance and profitability, especially before and during the process of privatisation (De Alessi, 1980; Millward, 1982; Borins and Bootman, 1985; Boardman and Vining, 1989; Donberger and Piggott, 1994; Meggison and Netter, 2001; Newberry, 2000;

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<sup>46</sup> For more detailed information on the EU provisions on State aid, see "Consolidated version of the Treaty on the Functioning of the European Union – Part three: Union policies and internal actions - Title VII: common rules on competition, taxation and approximation of laws - Chapter 1: Rules on competition - Section 2: Aids granted by States - Article 107 (formerly Article 87 TEC)", *Official Journal* 115, 09/05/2008 P. 0091 – 0092.

Florio, 2004). Fewer contributions focus on SOEs as a tool of economic policy (Chang, 2007; Toninelli, 2011; Victor et al., 2012; Christiansen, 2012) and even less so in the context of SIEs (Pargendler et al., 2013; Bass and Chakrabarty, 2014; Clò et al., 2017). SIEs are particularly important for the purpose of this research, because they are currently key players in European gas markets.

This chapter addresses these gaps by exploring the extent to which objectives of public and private nature coexist and are reconciled in the corporate governance of contemporary SIEs. It builds on the assumption that private shareholders are profit-seekers whilst the government is mainly oriented by objectives of public policy. On this basis, it argues that the presence of private shareholders will most likely orient management to prioritise profitability over public policy objectives, or at best to pursue both. In contrast, if public policy objectives are pursued at the expense of profitability, private shareholders would lose the incentive to hold their shares. Based on these assumptions, this chapter shows that the governance of SIEs makes it possible for European governments to pursue only some of the traditional objectives of public policy they could previously pursue in the context of full public ownership, namely through traditional SOEs.

These hypotheses are investigated in the context of the Greenstream and Galsi gas pipelines. The cases shed light on the Italian and French governments' ability to pursue policy objectives both in the context of SIEs and contemporary SOEs. In fact, Greenstream is owned and managed by Eni, a SIE in which around 30% of shares are held by the Italian government. Galsi, in addition to other Italian firms, is owned and managed by Edison, a subsidiary of EDF, a SOE in which around 84% of shares are held by the French government. Another important shareholder of Galsi is Enel, an Italian SIE owned by the Italian government for around 24% of its shares. The chapter finds that the Italian government's minority share in Eni (Greenstream) and Enel (Galsi), although providing a *de facto* control, reflects a general

principle of non-interference in corporate management. However, the chapter shows that exceptions to this principle occur to prevent hostile takeovers and to support negotiations that are critical for Italian energy security. Somewhat different conclusions are drawn with respect to the French case, where the energy sector is characterised by the presence of both SIEs and SOEs. Although the French government's majority shares on SOEs certainly reflect a greater potential for pursuing policy objectives, this is ultimately constrained by elements of the domestic and global governance that entail a degree of autonomy of SOEs from government policy.

Finally, the comparison between the Italian and French cases also sheds light on common aspects of contemporary European SIEs operating in the energy and other strategic sectors. The fact that SIEs are both profit-seeking and (potentially) politically driven indicates that they have the potential to overcome both market and political challenges deriving from the rise of emerging economies. For example, SIEs can help European governments face their relative decline vis-à-vis emerging economies. In fact, as SIEs operate in sectors that produce intermediate goods, their global market power allows them to reduce the cost and increase the supply of key inputs for domestic final producers. This makes it possible for final producers to prevail in international markets at the expense of foreign competitors, increasing the competitiveness of the overall economy. This suggests that contemporary SIEs can potentially pursue industrial policy objectives that are highly relevant to reverse the relative decline of European economies in the current historical phase.

The chapter is structured as follows. Section 5.1 reconstructs the traditional objectives of public policy pursued through full public ownership of SOEs before privatisation. Section 5.2 analyses the extent to which European governments can pursue traditional objectives of public policy through SIEs. Section 5.3 shows the nature and extent of the Italian and French governments' influence in their respective SIEs, which own and manage Greenstream and

Galsi. Section 5.4 explores SIEs' business in other strategic sectors and provides insights on how to leverage their global leadership to serve industrial policy objectives. Section 5.5 brings the chapter to a close, reflecting on how full and partial privatisation of SOEs entail both shortcomings and opportunities for European governments.

### **5.1. The economic, social and political objectives of SOEs**

SOEs have proven to be able to address a wide range of public policy objectives such as economic growth, reduction of unemployment, and public service obligations to improve the quality and affordability of services of general interest (Chang, 1994; Florio, 2004; Millward, 2005; Capobianco and Christiansen, 2011; Christiansen, 2012). SOEs were also used as a tool of foreign policy by governments to enhance political-economic cooperation with other countries, contributing to increase commercial surpluses and to import raw materials and other inputs that were scarce domestically. In Europe, the foreign policy of SOEs was pivotal for energy security, due to the insufficient levels of domestic production of energy and the need to rely on import from abroad (Victor et al., 2012). Overall, SOEs' business was relevant for different policy domains and had economic, social and political implications.

With respect to the economic objectives, SOEs' role in Europe has been pivotal after World War II for solving market failures connected with stagnation and underdevelopment of the gas industry (Cronshaw et al., 2008), which hampered economic growth. Stagnation and underdevelopment derived from the lack of adequately developed financial markets, but also from the risk-aversion of private energy firms and their reluctance to invest in industrial upgrade. However, SOEs were created mainly because of the systemic importance of gas: since gas is a key input for both industrial and household consumers, the gas sector is highly interdependent with other sectors and has major implications for production costs and industrial upgrade.

The creation of SOEs in the gas sector, and particularly the financial and political backing provided by the government, was essential to take advantage of the systemic role of gas (Victor et al., 2006), especially in a context of technological underdevelopment and political-economic weakness. The public investments for the adaptation and development of new technologies generated new industrial capabilities for the production and import of gas, reducing production costs and contributing to the spread of technological innovations in sectors of the economy in which such innovations could be applied. The reduction of gas prices improved industrial competitiveness by means of an increase in industrial value added; consumers' welfare also rose.

SOEs proved to be effective for pursuing *social* objectives also in a direct way, for example by ensuring consumers' price affordability (Capobianco and Christiansen, 2011; Florio, 2013) and geographical access (Chang, 2007). In this case, SOEs were needed to overcome the market power of private firms in businesses with social implications, and their reluctance to provide essential services to citizens irrespective of the viability of investments. In fact, in the absence of specific regulatory measures, a private monopolist would tend to produce lower levels of output with respect to the socially desirable level, which would result in higher prices. A public monopoly, instead, could afford to produce higher quantities and prioritise consumers' price affordability over profitability. Geographical access represented a further objective of social relevance that justified public monopoly. The market failure in this case consisted in the fact that, in remote areas, the marginal cost of gas supply is higher than the price that consumers are willing or able to pay, so that gas provision in those areas is not profitable for private energy firms.

SOEs also contributed to the pursuit of *political* objectives. For example, SOEs' contribution to economic growth, and the subsequent rise of employment and income levels, often proved essential for legitimising political leadership. The increase in the employment

rates occurred indirectly through economic growth but also directly, through specific policies of large-scale hiring by SOEs' subsidiaries (Capobianco and Christiansen, 2011). This policy in some cases occurred at the expense of profitability.

SOEs' business in international markets also favoured the pursuit of other *political* objectives such as energy security and political-economic cooperation with foreign countries. Despite the long-term domestic implications, these objectives belong to the sphere of foreign policy and were pursued through collaborations between SOEs and diplomatic bodies. In particular, energy security benefited from the diplomatic platforms already set in the frameworks of political-economic cooperation with producing countries, but also from ad-hoc political support for specific deals of energy imports, or for the joint development of energy projects, i.e. production of gas fields, development of transnational infrastructure, and other relevant projects (Victor et al., 2006; Dannreuther, 2015). In this context, SOEs often acted as a government branch for foreign energy affairs (Davis et al., 2014), in charge of both the negotiations and the technical development of gas fields in joint ventures with the foreign counterparties.

In some cases, SOEs even played a key role in opening new diplomatic and economic relations with foreign countries. SOEs' effectiveness as a tool of foreign policy made it possible for governments to pursue both economic and political objectives. Concerning economic objectives, the stipulation of energy deals often induced the mobilization of satellite activities as well as a chain reaction in other sectors, contributing to increase exports in a wide range of sectors. For what concerns political objectives, energy cooperation often represented the starting point for exploring broader strategic alliances to enhance national defence and energy security.

In conclusion, SOEs proved suitable for the pursuit of multiple objectives of economic, social and political nature. In particular, the pursuit of economic objectives greatly benefited

from the use of political tools, because of the particular constraints deriving from the stage of development, as well as the economic and political specificities of the gas sector. Furthermore, political objectives, such as energy security and political-economic cooperation with foreign countries, also benefited from the growth of the gas industry and SOEs' ability to penetrate foreign markets. Lastly, the economic and political synergies helped achieve social objectives, not only through SOEs' commitment to public services obligations, but more broadly for the contribution of SOEs to economic development.

## 5.2. The economic, social and political objectives of SIEs

Starting from the 1980s and speeding up in the 1990s, European SOEs underwent an extensive process of privatization in a wide range of key sectors, including gas (Florio, 2013). However, in several cases, the privatization of SOEs was not fully accomplished: governments retained a major share, which led to the emergence of the hybrid (public-private) model that characterizes SIEs. On the basis of the OECD ETCR (Energy, Transport and Communication Regulation) indicators, Table 1 shows the extent to which privatisation of the gas sector occurred in EU-15 countries (where in a range from six to zero, six indicates full public ownership whilst zero indicates full private ownership). Table 2 lists the main vertically integrated former SOEs currently operating in Europe and the public share held on them.

*Table 5.1. ETCR reform indicators of public ownership in the gas sector, EU 15, 1975 – 2013*

	1975	2013
<b>Austria</b>	4.53	2.76
<b>Belgium</b>	5.34	2.22
<b>Denmark</b>	6	4.5
<b>Finland</b>	5.88	1.44
<b>France</b>	6	2.4
<b>Germany</b>	0	0

Greece	6	3.88
Ireland	6	5.82
Italy	6	1.8
Luxembourg	4.26	2.75
Netherlands	3.75	3.49
Portugal	-	0.48
Spain	6	0.08
Sweden	-	0
UK	6	0

Source: own elaboration of OECD data

Table 5.2. State shares held in the main vertically integrated European gas companies (EU-15)

	Public Share (%)	Country of origin
British Petroleum	0	UK
British Gas	0	UK
Dong Energy	50.1	Denmark
EDF	85.6	France
Engie	32.76	France
Total	0	France
Enel	23.6	Italy
Eni	30.1	Italy
Galp	7	Portugal
Gasunie	100	Netherlands
Hellenic Petroleum	35.5	Greece
OMV	31.5	Austria
Gas Natural Fenosa	0	Spain
Repsol	0	Spain

Source: own elaboration of Privatization Barometer data

Privatization of former SOEs had two main causes. One was connected to the objective of increasing competition in European markets. In fact, privatised firms were deemed more suitable than SOEs to operate in competitive markets, due to their profit-oriented nature and the absence of political interference in corporate strategies. Competition was expected to increase the profitability of the most efficient energy firms as well as to lower gas prices for

consumers, enhancing overall economic welfare (Brau et al., 2010). Another factor that justified privatization was related to the successful transition from an intermediate to an advanced stage of development between the 1970s and the 1980s. This transition has led to the emergence of a competitive private industry that was potentially able to provide socially desirable levels of investment (Cardinale, 2017). However, privatisation occurred only partially, probably because of the strategic relevance of key sectors such as gas, and the uncertainties connected to full privatisation. The newly emerged public-private governance of former SOEs raises questions over the government's ability to pursue policy objectives.

Concerning *economic* objectives, economic growth and technological innovation have lost their priority in the management of SIEs, at least to some extent. In fact, the existence of private shareholders, some of which pursue short-term investment strategies, implies that short-term financial returns assume greater importance<sup>47</sup>. Therefore, one might argue that the increasing emphasis on short-term profitability could penalise long-term strategies for innovation, and indirectly also economic competitiveness, given the relevance of gas as an input for the rest of the economy (see section 5.1 for a more detailed explanation).

However, SIEs could balance short-term with long-term investments to reconcile profit and innovation. This strategy could be suitable for advanced economies, in which European SIEs operate. In fact, despite the systemic importance of gas has not diminished in the transition from SOEs to SIEs, the transition to an advanced stage of development has made it possible to partially shift the emphasis from economic growth to short-term profitability, due to the lower rates of growth that can be pursued in the current phase (Cardinale, 2019b).

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<sup>47</sup> On this point, a former financial controller of the UK Central Electricity Generating Board (Personal Interview 8) explains that the profit-oriented nature of private shareholders in some cases impeded a full privatisation of SOEs, as certain subsidiaries operated businesses characterised by high risks or low returns. This was the case of the subsidiary Nuclear Electric, which remained government-owned for many more years than other subsidiaries (i.e. PowerGen, National Power and National Grid Company). Nuclear Electric could be privatised only after the government undertook the considerable investment required to dismantle the old nuclear facilities.

The transition to SIEs also has potential *social* implications, for instance in terms of price affordability for consumers and geographical access. In these cases, the problem is directly connected with the private management of SIEs. The public shareholder, in fact, would face non-negligible opposition from private shareholders if it attempted to alleviate critical conditions for consumers at the expense of financial returns, as routinely happened in the context of SOEs. For example, a cut of fuel price for consumers, or investments in gas infrastructure to supply remote areas that would not be viable from a narrow economic cost-benefit perspective, would reduce the financial returns of SIEs' private shareholders. This suggests that social objectives are unlikely to be pursued by SIEs, and would require government agencies to provide incentives, such as subsidies, to SIEs or PEs.

However, the government can still pursue *political* objectives through SIEs' business abroad, namely energy security and foreign economic policy, as these objectives can reconcile the interests of government and SIEs' private shareholders and maximise mutual synergies. For example, the government-appointed managers in the board of SIEs might advocate for the adoption of investment strategies that reconcile energy security with profitability, for instance by prioritising profitable investments in producing countries that are geographically closer and politically compatible with the country of origin. Energy security and SIEs' profitability can be enhanced through government diplomatic support in the negotiations with producing countries as well as from military protection along transport routes. Diplomatic support increases SIEs' profitability thanks to concessions in other sectors of political-economic cooperation, in exchange for a reduction of the import price from the producing country.

The government can also take advantage from SIEs' business abroad by orienting some of their strategies, provided that such strategies prove to be profitable. In fact, energy SIEs own and manage extensive assets in the production and transport of gas in international markets, and they have accumulated a great amount of knowledge and trusted relations with the

producing countries. The government can leverage on SIEs' market power and technological leadership to obtain favourable deals from foreign countries in other sectors of political-economic cooperation. This helps expand economic cooperation between countries and provide trade opportunities for other sectors.

However, after the European Commission's ban of the Golden Share, many governments have decided to fully privatise their SIEs or to avoid exercising their influence in the board by only keeping a "Golden Power" (Bassan, 2014). The latter only allows governments to veto divestments from assets that are critical for energy security. This entails that the government can no longer adopt a more active approach for the pursuit of long-term strategies of energy security through SIEs, and for the pursuit of broader strategic objectives such as economic cooperation with producing countries and foreign policy objectives. The European Member States' ability to pursue these objectives will probably decrease further in the light of the forthcoming EU provisions for the oil & gas sector (European Commission, 2016), which envisage the EU Commission's supervision and approval of each Intergovernmental Agreement stipulated by Member States with non-EU countries.

### **5.3. SIEs' international business and foreign policy implications for Italy and France: Insights from Greenstream and Galsi**

As shown in Chapter 4, Greenstream is vertically integrated through different joint ventures between the Italian Eni and the Libyan NOC. Vertical integration emerges as a crucial aspect for the pursuit of energy security and foreign economic policy, especially if the government retains an important stake in the energy firm. With respect to energy security, one might argue that Italian government's influence in Eni is not essential for its pursuit. On this view, the government could sell its 30% share in Eni to private investors and eventually veto potential divestments from Greenstream by using its Golden Power (see section above for

details on Golden Power). However, the government can only oppose a veto to divestments related to assets within its territorial jurisdiction, but not to divestments in gas production in the Libyan upstream. This hinders the effectiveness of Golden Power and jeopardises energy security. In contrast, government control over a firm that owns strategic assets throughout the supply chain is a much more reliable tool for energy security. In fact, in that case control is not limited to the infrastructure but to the overall production processes. Moreover, that makes it possible to envisage a long-term strategy for energy security from within the company, avoiding to rely on emergency measures, such as the Golden Power, which can prove insufficient to safeguard energy security.

In the previous chapter, it was shown that a long-term strategy of energy procurement is essential for energy security because it contributes to the profitability of transnational energy infrastructure and therefore it makes its realisation possible. This chapter shows that government ownership of strategic firms is an even greater guarantee for energy security and other strategic objectives, as it enables the adoption of additional strategies of active and passive nature for its pursuit<sup>48</sup>.

Since Eni's partial privatisation, the Italian government has adopted both active and passive intervention strategies, although passive strategies have prevailed to avoid private investors to fear excessive interference by the government<sup>49</sup> (Amato, 2005). However, the adoption of a passive strategy does not necessarily imply the government's inability to pursue any policy objective. For example, only the government's retention of a major share makes it possible to veto hostile takeovers from financial investors with short-term profitability goals,

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<sup>48</sup> The chapter refers to active strategies when the government is a key player in the management of SIEs through its representatives in the board, and exercises its influence to pursue policy objectives. In contrast, the chapter refers to passive strategies when the government retains a substantial share in a SIE, but does not aim to influence the corporate strategies.

<sup>49</sup> This point emerged from personal interviews with a former board member of Eni and Snam (Personal Interview 1).

and from foreign SOEs or Sovereign Wealth Funds (SWFs) whose political strategies could be in contrast with Italian energy security.

With respect to financial investors, Eni's CEO Claudio De Scalzi<sup>50</sup> expressed his concerns in relation to hedge funds, because of their short investment horizon. He stated that when extensive shares are held by this type of investors, energy firms such as Eni suffer from financial instability, which undermines the firm's long-term growth. The issue assumes even higher relevance when such dynamics occur in firms that have a high impact on national interests, as in the case of Eni. This suggests the need to manage a transition in the capital structure of strategic SIEs, away from shareholders with short-term investment horizons.

The retention of major stakes by foreign SOEs or SWFs in domestic firms could jeopardise national interests in an even more direct manner, as foreign SOEs can be politically driven (Cardinale, forthcoming). In fact, as energy sources are scarce and countries compete globally to ensure abundant and affordable provisions to their economies, foreign SOEs' takeovers of national energy firms might cause the diversion of energy imports towards foreign markets. For example, if Eni would become a subsidiary of a foreign SOE, current energy resources and infrastructure owned and managed by Eni as well as future investments could be subjected to a new strategic vision that prioritises the supply of foreign markets at the expense of the Italian market.

Nevertheless, the Italian government has also adopted more active approaches, making use of its influence on Eni's board to promote political-economic initiatives of cooperation with strategic partners. The diplomatic efforts to decrease Libya's international isolation was a basic condition that allowed Eni to go ahead in the negotiations with the Libyan NOC and to be awarded very favourable gas deals. Securing favourable gas deals has systemic importance for the Italian economy, as gas is an essential input for Italian industry and hence it has a

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<sup>50</sup> Stated in occasion of a press conference in London, 18 March 2016.

substantial influence on industrial performance and competitiveness vis-à-vis international competitors. The strategic relevance of government intervention in energy deals stems from gas scarcity, its nature as input for all sectors in the economy, and the consequent global competition for its procurement. Government intervention, in turn, makes it possible to overcome such competition and serve national interests.

The successful cooperation between Italy and Libya in the energy sector, thanks to the synergies between the Italian government and Eni, led the government to expand trade deals to other sectors. This made it possible for Italian large firms to be awarded important tenders in key infrastructure sectors, high-tech and defence (Ronzitti, 2009; Varvelli, 2009). Italian Small and Medium Enterprises (SMEs) were also involved as sub-contractors, contributing to SMEs' internationalisation and technological upgrade. The increasing economic cooperation culminated in the 2008 Treaty of Friendship, Partnership and Cooperation, which aimed to turn good economic relations into a political alliance.

Similar considerations can be made in relation to Galsi, which shows that energy SOEs play an important role in French foreign economic policy. This hypothesis seems to be supported by EDF's recent takeover of one of the main shareholders of Galsi, Edison, and the subsequent plan to build a new pipeline from Sardinia to the French mainland via Corsica, diverting Edison's gas from the Italian to the French market. The diversion of Algerian gas to Corsica could in principle affect energy security in Italy, although the relatively low quantity of gas that would be diverted (2 bcm) and the current situation of oversupply in the Italian market suggest the irrelevance of such concerns in this specific case. However, Edison's takeover is part of a broader strategy carried out by the French government to protect its energy industry against the European and international competition (Bauby and Varone, 2007). The strategy consists in the internationalisation of French SIEs by means of Mergers & Acquisitions (M&As) of European and international competitors in the energy sector. The

internationalisation of SIEs aims to increase the French influence in international strategic markets and at retaining considerable market power domestically.

The transformation of SIEs' role from providers of public services into profit-seeking global corporations seems to reflect structural changes occurred in domestic and international markets as well as the French government's necessity to readdress its strategic objectives accordingly. In particular, SIEs' internationalisation reflects a strategy that aims to overcome competition over scarce energy resources in global markets and ensure energy security and price affordability for consumers in French markets. In fact, France, as other countries, face increasing competition from advanced and emerging economies to secure energy supplies for the domestic market.

Nevertheless, a closer look into the dynamics between government bodies and the management of SIEs is needed in order to explore their mutual relations, and hence the extent to which the French government is still able to pursue policy objectives through SIEs. The main difference emerging from the comparison with the Italian case is the extensive activism and willingness of the French government to intervene in the management of SOEs. This is evident in the majority shares retained in the two main energy firms, EDF and GDF. Until 2008, the French government held around 80% of their ownership, while the Italian government owned around 30% of shares in the main energy firms. The merger of GDF with Suez decreased the government share to 25%, due to the private ownership of Suez. However, despite the minority share held, the French government *de facto* controls an energy firm, now called Engie, which thanks to the merger has become one of the world's largest utilities. Thanks to the important stakes in EDF and Engie, and the possibility to appoint managers in the board, the French government could in principle exercise great influence in corporate strategies and, more broadly, in the French energy market.

However, the public shares held in SIEs do not allow the French government to easily achieve policy objectives. This is the case for several reasons. Firstly, because of lack of expertise by government officials and hence information asymmetries<sup>51</sup>. Secondly, because of an incoherent government policy for the management of SIEs<sup>52</sup>. In particular, the government lacks a consistent strategy of industrial policy<sup>53</sup>. For example, SIEs are asked to be profitable whilst providing affordable services for consumers and being environmentally sustainable. In fact, profitability benefits the French government as a shareholder, alleviating financial burdens in the government budget. Price affordability for consumers and environmental sustainability are objectives with direct impact on citizens, and thus of great political relevance. However, SIEs' profitability is difficult to reconcile with affordability for consumers, as consumers are customers of SIEs. Therefore, an increase in price by SIE corresponds to a deterioration of consumers' welfare, and vice versa.

This hypothesis has been confirmed by a manager at EDF<sup>54</sup>, who argues that the French government has encountered several difficulties in influencing the corporate strategies, despite its control share. However, the manager notes that this inability did not only derive from liberalization, but has deeper roots in the rise of an elite of SIEs' technocrats that has been exploiting its technical and managerial knowledge to pursue a corporate strategy that is independent from the government. This trend started in the 1970s, when EDF took key decisions on the nuclear programme without official consultations with the government. It continues in the current phase, as shown by Edison's takeover, which was carried out without the consent of the French government.

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<sup>51</sup> This point was stressed by a former manager of EDF (Personal Interview 3).

<sup>52</sup> On this point, the representatives of the French State industry agreed. These are the Deputy Director-General of the Agence des Participations de l'Etat (Speech 1), a former Director of SNCF-Réseaux (Speech 2), and the President of supervisory board at Peugeot (Speech 3).

<sup>53</sup> This was stressed by the President of the supervisory board at Peugeot (Speech 3).

<sup>54</sup> See Personal Interview 3.

The limited influence of the French government in the energy sector is also evident in the internal composition of *Commission de Régulation de l'Énergie* (CRE), the regulatory authority in charge of monitoring market competition and consumers' welfare. CRE's board is mainly composed by former managers of energy SIEs (Van den Hoven and Froschauer, 2004; Thatcher, 2007; Bauby and Varone, 2007). Members appointed by the government are in the minority and have limited influence in the authority's decisions. Beside the composition of the board, SIEs' influence on CRE is evident from the extent to which key liberalization measures have not been implemented in the French market, despite CRE's mandate to monitor market competition and consumers' welfare. For example, the unbundling of the national grid from Engie has not occurred. This makes it possible for Engie to grant favourable conditions of transport to its subsidiaries in the upstream and downstream at the expense of new entrants, which are likely to be negatively affected by the saturation of the transport capacity in the grid and by higher tariffs.

In conclusion, the French government's ability to influence SIEs' strategy is limited, despite the control share held. The main influence in SIEs' management is exercised by an elite of technocrats internal to SIEs, which gained increasing autonomy before the liberalization and strengthened its power thanks to the strategy of internationalization. However, it can be argued that the limited government influence on SIEs' management does not necessarily entail the lack of a strategy of industrial and energy policy. In fact, it seems that SIEs' management itself has assumed a sort of political responsibility towards French society. This is evident from some of French SIEs' strategies in domestic and international markets. In domestic markets, despite partial privatization and the pressure from public and private shareholders to increase profits, SIEs' management has attempted to maintain close ties with trade unions as well as to continue to pursue the traditional role of public service by setting affordable prices for consumers. In

international markets, SIEs act as geoeconomic actors<sup>55</sup>, trying to increase their influence to ensure the domestic supply of key inputs such as energy. This international strategy resembles those that are usually carried out by governments to serve national interests, but in this case SIEs' pursuit of geoeconomic objectives seems to be carried out by managers independently of government's directives. However, in the long-term, the lack of a coordination with government policy and among national SIEs could negatively affect the government's ability to pursue a coherent strategy of industrial policy that serves national interests.

#### **5.4. The potential industrial policy role of European energy SIEs in the 21<sup>st</sup> century: insights from recent trends in global strategic markets**

This section expands the foregoing analysis of the role of energy SIEs to include other sectors of strategic interest. The analysis aims to look beyond the specificities of the energy sector, to understand a general trend among industries that produce or outsource from abroad inputs for most sectors of the economy, and are therefore strategic for economic competitiveness. The adoption of a cross-sectoral perspective makes it possible to understand the broader interfaces between the political choices of direct government intervention in the economy, the changes in the balance of power among world economies, and the role played by sectors of strategic relevance for national economies. This perspective provides insights on how to reshape the relation between governments and SIEs in the 21<sup>st</sup> century.

The issue is important in view of the extent of ongoing global changes, particularly increasing globalisation and the rise of new technologies and production patterns that are leading to a new industrial revolution (Bianchi, 2018). These trends in the world economy have coincided with major changes in international relations, such as the rise of previously marginal

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<sup>55</sup> Geoeconomics is an emerging field of study that analyses how governments can increase their political influence worldwide by means of control of strategic global markets (e.g. through SOEs or investments by Sovereign Wealth Funds). For further details, see Lorot (2001), Luttwak (1990), and Quadrio Curzio and Miceli (2010).

countries (e.g. China) and the relative decline of previously hegemonic countries (e.g. in Europe). These economic and political changes pose relevant challenges for Europe and require rethinking industrial strategies accordingly (Bianchi and Labory, 2010).

The recent setback in the privatisation of European SOEs is an important signal of changes in domestic and global markets, and of how governments are readdressing their policy strategies. The 2008-2009 financial crisis was certainly a major factor for this countertrend. Beside other countercyclical measures, some European governments have even re-nationalised certain sectors of the economy – particularly the banking sector (Bance and Bernier, 2011; Bance, 2012; Bance and Obermann, 2015).

However, the financial crisis may not be the only cause of the privatization setback. Another cause may be the increasing perception of the inability of privatized firms to meet expectations in terms of performance and quality of services provided to citizens (Florio, 2013). Moreover, governments may have been reluctant to fully privatise firms that operate globally and supply key inputs to domestic markets.

This section argues that, no matter the concurring reasons that have halted privatisation and slightly increased government ownership in recent years, the major shares held by European governments in firms that operate globally are powerful industrial policy tools to face the rise of emerging economies. However, 21<sup>st</sup>-century SIEs should be different from 20<sup>th</sup>-century SOEs, as important changes have occurred in domestic and global markets (Cardinale, forthcoming).

Domestically, the objectives of economic policy have radically changed from industrialisation, fast economic growth and structural changes to market competition and market-led innovation. This has affected SOEs' traditional industrial policy role. In fact, the policy pursued by contemporary SOEs are mainly related to the provision of public services or the management of natural monopolies. For example, the public ownership of downstream

utilities in countries such as Germany, France and Italy, is still justified by the necessity to maintain high quality and price affordability in services of general interests and grant basic rights to citizens such as access to water and energy. In contrast, government ownership of natural monopolies occurs due to the presence of market failures. In fact, many European governments still own the national networks in several sectors, from energy to transport and telecommunications, with the aim to avoid transaction costs associated with the regulation and monitoring of a private monopolist in strategic assets for the economy.

As a result, beside the cases of natural monopoly and provision of public services, liberalisation required SOEs to compete equally with other firms and to start being managed as private firms. This was usually done through a process of corporatisation, which entailed both the options of full or partial privatisation. The need to give up SOEs' contribution to domestic expansion of key sectors can be attributed to several factors. First, the transition to an advanced stage of development implied that large-scale public investments were not needed, at least not to the same extent as in previous phases. Second, privatisation made it possible to decrease political influence in key domestic firms, contributing to the EU vision of preventing governments aid to specific firms. Third, privatisation was functional to various political objectives that ranged from reducing public debt to gaining electoral support in a period in which SOEs were perceived by citizens as a source of excessive public expenditure.

Internationally, several factors have changed the landscape in which European firms operate. For example, the relative size of European economies and their competitiveness has declined in relation to emerging economies. Table 3 shows this trend in the last 40 years.

*Table 5.3. World largest economies by PPP GDP*

<b>Rank</b>	<b>1980</b>	<b>2000</b>	<b>2020</b>
<b>1</b>	United States	United States	China

<b>2</b>	Soviet Union	China	United States
<b>3</b>	Japan	Japan	India
<b>4</b>	Italy	Germany	Japan
<b>5</b>	West Germany	India	Germany
<b>6</b>	France	Russia	Russia
<b>7</b>	Brazil	France	Indonesia
<b>8</b>	United Kingdom	Italy	Brazil
<b>9</b>	Mexico	Brazil	United Kingdom
<b>10</b>	India	United Kingdom	France

Source: IMF and CIA World Factbook

The rise of emerging economies has also been accompanied by their increasing competitiveness in strategic sectors such as natural resources, engineering and infrastructure, and other network industries. This trend is certainly the consequence of their attempt to upgrade their economy and to increase the share of capital and technology-intensive production vis-à-vis labour-intensive productions, in which they historically retained a comparative advantage. Table 4 shows that, although Western firms are still dominant, firms from developing economies in the BRICs, particularly China, rank among the top positions in many critical sectors. A primary reason explaining the extensive presence of government ownership in firms from emerging economies is connected with the governments' aim to reduce the gap of competitiveness with western incumbents.

*Table 5.4. World largest companies by revenue*

<b>Rank</b>	<b>Oil &amp; Gas</b>	<b>Mining</b>	<b>Engineering</b>	<b>Aerospace</b>	<b>Chemical</b>	<b>IT</b>
<b>1</b>	Saudi Aramco	Glencore (Switzerland)	GE Power (USA)	Boeing (USA)	BASF (Germany)	Apple Inc (USA)

<b>2</b>	Sinopec (China)	BHP Billiton (Australia)	Siemens (Germany)	Airbus (Europe)	Dow Chemical (USA)	Samsung Electronics (SK)
<b>3</b>	CNPC (China)	Rio Tinto (UK-Australia)	CSCEC (China)	United Technologies (USA)	Sinopec (China)	Amazon (USA)
<b>4</b>	Exxon Mobil (USA)	Vale (Brazil)	Bosch Corporation (Germany)	Lockheed Martin (USA)	SABIC (Saudi Arabia)	Foxconn (Taiwan)
<b>5</b>	Shell (UK-Netherlands)	Anglo American (UK)	Hitachi Ltd (Japan)	General Dynamics (USA)	Exxon Mobil (USA)	Alphabet (USA)
<b>6</b>	Kuwait Petroleum Co (Kuwait)	China Shenhua	China Railway Group Ltd	GE Aviation (USA)	Formosa Plastics (Taiwan)	Microsoft (USA)
<b>7</b>	BP (UK)	Freeport McMoran Copper & Gold (US)	China Railway Construction Corp	Northrop Grumman (USA)	LiondellBasell Industries (USA)	Huawei (China)
<b>8</b>	Total (France)	Barrick Gold (Canada)	CRRC (China)	Raytheon (USA)	DuPont (USA)	Hitachi (Japan)
<b>9</b>	Lukoil (Russia)	Coal India Limited (India)	Honeywell (USA)	BAE Systems (UK)	Ineos (UK)	IBM (USA)
<b>10</b>	Eni (Italy)	Fortescue Metals Group (Australia)	ABB Group (Switzerland)	Rolls Royce (UK)	Bayer (Germany)	Dell Technologies (USA)

Source: Fortune 500

The table shows that global markets of strategic inputs have witnessed substantial changes in the last years. In particular, Chinese corporations are now dominating in many sectors, whilst corporations from other BRICs (i.e. India, Brazil and Russia) are also starting to rank in top positions. Nevertheless, the relative decline of Western economies concerns mainly European countries, although Germany and the UK still hold important positions. In contrast, the US is still able to avoid being overtaken by competitors thanks to its leadership in high-tech sectors.

From the viewpoint of emerging economies, the effort to pursue leadership in capital- and technology-intensive sectors may respond to different logics of industrial policy. One is related to the contribution of these sectors to industrial upgrade, thanks to the transfer of technology across sectors. Another, which is emphasized by this chapter, is related to two fundamental and interconnected features of these sectors: i) they produce fundamental inputs for the economy, and ii) such inputs are scarce and rival in nature. The latter feature entails a zero-sum game with international competitors, either for their provision from abroad in case of scarce natural resources, or for their domestic production in case of high-tech. In the case of natural resources, the zero-sum game emerges for their limited availability, but also for the excludability of production sites and transport infrastructure, which are conceived to connect specific countries. In the case of capital and technology-intensive inputs, the zero-sum game is inherent in the dynamics of international trade and in the difficulty for new entrants to defy their comparative advantages and compete with incumbents in technology-intensive sectors. Although protective measures may provide a time-lag for the nascent domestic industry to expand and develop, its competitiveness in the long-term is to an important extent determined by the ability to conquer significant shares in global markets at the expense of incumbents. In fact, the control of high-tech markets has not only a positive effect on the domestic economy,

but also generates a position of advantage vis-à-vis foreign economies that need to buy high-tech inputs.

The possibility for developing economies to avoid relying on foreign suppliers for the provisions of critical inputs is a determinant factor to increase industrial competitiveness. As contributions in the structural theories argue (Furtado, 1964), pursuing this strategy of industrial policy in an initial stage of development is functional to end the dependence on advanced economies and develop domestic industrial capabilities.

In more advanced stages of development, when the need to expand domestic industry becomes less relevant, the control of inputs that are globally scarce is still strategic. In fact, on the one hand, inputs are still important to maintain the competitive advantages of domestic industries in the global markets. This aspect is strategic as industrial competitiveness is a major factor for the rise and decline of world economies. On the other hand, the control over inputs is decisive to exercise a political bargaining power towards competitors, due to the importance of such inputs for economic resilience and national security. This consideration, which is inspired by the contributions to geoeconomics (Lutwack 1990; Lorot, 2001), sheds light on the potential implications for European governments of retaining control shares in firms that produce strategic inputs domestically or supply them from abroad, and the importance of government ownership in advanced stages of development.

Other additional, interconnected elements are relevant for global strategic markets and show the emergence of fundamental changes as compared to previous historical phases: globalisation and financialisation. Globalisation consists in greater interdependence among economies. It has political roots in the process of economic liberalisation promoted by Western economies in previous decades, and was accelerated by technological improvements, primarily in the information and communications technology (ICT) and transport sectors (Bordo, Taylor & Williamson, 2003). Financialisation is shown by the global increase of the financial sector's

value added vis-à-vis primary and secondary sectors, and it partially derives from decreased rates of industrial growth. It has determined a radical change in the nature of investment and business strategies of MNCs companies (including SOEs), which consists on the demise of greenfield investments and the reliance on Mergers & Acquisitions (M&As) of existing businesses (Clò et al., 2015). Both globalisation and financialisation imply potential threats and opportunities for national interests, and particularly for the control of strategic markets.

The increasing degree of economic globalisation may jeopardise the pursuit of policy objectives if the internationalisation of domestic firms entails large-scale divestments from domestic markets and a substantial reduction in the trade flows with the country of origin. Financialisation of global markets can also pose a threat to national interests. In fact, domestic companies providing critical inputs to national markets are increasingly exposed to takeovers from foreign firms, whose business strategies could contrast with the public interest of the host countries, especially when their main objective is to maximise profitability for the shareholders rather than invest in the local economy.

Nevertheless, globalisation and financialisation can be turned from potential threats to favourable opportunities if governments and domestic firms cooperate. In fact, whereas the government's support to domestic firms helps overcome the competition deriving from foreign firms, globalisation makes it possible to penetrate foreign market with greater ease. Furthermore, financialisation makes it possible to acquire existing businesses and benefit from existing resources, avoiding the risks related to greenfield investments. In this context, the cooperation between governments and domestic firms may be functional for governments to increase their influence on strategic global markets, and for firms to increase profitability.

The aforementioned cooperation can provide fruitful outcomes under different forms of ownership structure, as shown by the polarised examples of US and China. In the case of the US, domestic firms have benefited extensively from US diplomacy, whose bargaining

power and ability to create privileged bilateral relations have eased their access to foreign markets and favoured contractual terms. Furthermore, as Mazzucato (2015; 2018a) notes, the strength and competitiveness of US firms in global markets is largely generated by government support in the form of large-scale investments in R&D, whose successful outcomes are then internalised by US firms. The US government also takes advantage of the global leadership of US firms, for example in the ICT sector, as is evident in their ongoing collaborations to develop cutting-edge technologies and services for national security purposes.

In the case of China, government support is more evident due to extensive government ownership in the largest Chinese firms. Not surprisingly, Chinese SOEs benefit from wide-ranging support from State institutions, such as privileged access to credit from government-owned banks. In particular, the role of Exim Bank of China has proven crucial for Chinese SOEs operating abroad to face competition from other global players. In fact, Exim's extremely favourable terms of financing have made it possible to finance major infrastructure projects in developing countries, particularly Africa, strengthening the Chinese global leadership in key sectors (Brautigam, 2009; Huang and Chen, 2016). This suggests that the Chinese government's control over the largest firms has not been instrumental only to domestic political affairs, but also to China's international relations. As a result, government ownership may serve as a binding force for economic and political interests, or may reflect a certain political culture, but ultimately the government's and firms' economic interests may be reconciled under different forms.

With respect to Europe, a revival of government ownership in global firms may help overcome relative economic decline and decreased global influence, as the successful experience of catching up in previous historical phases shows. Table 5 shows the main European SIEs operating in global strategic markets.

Table 5.5. Main European SIEs by sector

<b>Energy</b>	<b>Transport &amp; Infrastructure</b>	<b>Banking</b>	<b>Aerospace &amp; defence</b>	<b>Telecom</b>
Verbund (Austria)	Naval Group (France)	Dexia (France)	Patria (Finland)	Telekom Austria AG
OMV (Austria)	Fincantieri (Italy)	Belfius (Belgium)	Leonardo (Italy)	Orange (France)
Ørsted (Denmark)	SNCF (France)	Commerzbank (Germany)	Safran (France)	Deutsche Telekom (Germany)
EDF (France)	Ferrovie dello Stato (Italy)	KfW (Germany)	Thales (France)	STMicroelectronics (Italy-France)
Engie (France)	Deutsche Bahn (Germany)	Cassa Depositi e Prestiti (Italy)	Nexter Systems (France)	Telia Company (Sweden)
Eni (Italy)	Hapag-Lloyd (Germany)	Caisse des Dépôts (France)	Airbus (Germany, France, Spain)	Swisscom (Switzerland)
Enel (Italy)	Navantia (Spain)	SACE (Italy)	Empordef (Portugal)	BBC (UK)
Hellenic Petroleum (Greece)	SAS Group (Sweden, Denmark)	Banque et Caisse d'épargne de l'État (Luxemburg)	Indra Sistemas (Spain)	Proximus Group (Belgium)

Source: Fortune 2000

In the current phase, European SIEs show weak links with the government, and their investment strategies are seldom coordinated with industrial policy (see e.g. Bass and Chakrabarty, 2014; Clò et al., 2017). For example, after analysing the investment strategies of SIEs, Clò et al. (2017) found no correlation with the pursuit of policy strategies. In contrast, SOEs tend to be driven by policy objectives. Bass and Chakrabarty (2014) find similar results with particular reference to the energy sector, although they show some exceptions to this trend.

These studies, in addition to the opinions provided by managers of SIEs<sup>56</sup>, suggest that the investment strategies of contemporary European SIEs are not driven by industrial policy objectives. In contrast, the government stakes in European SIEs seem to be the result of an unaccomplished process of privatisation rather than a specific strategy to maximize public-private synergies. The lack of a political vision for SIEs may be caused by the retention of minority shares only, which in some cases entail a difficulty for the government to be in a leading position vis-à-vis other shareholders; but it may also result from the deliberate intention of governments not to interfere in the management of SIEs.

However, the lack of a direct government influence in European SIEs does not imply a complete lack of contribution to national interests. In fact, despite partial privatisation and liberalisation of domestic markets, SIEs' assets, international positioning in strategic markets, and relationships with foreign countries are still largely imprinted by their original public policy missions. Therefore, even in the absence of direct government influence, firms' business may still serve national interests. For example, the management of former SOEs may deem it more profitable to use existing transnational infrastructure for energy imports rather than investing in new infrastructure that would divert such supplies to other countries. Ultimately, cooperation between governments and SIEs can occur in the same way as between governments and private firms and provide fruitful results, although it deprives the government of the possibility to directly intervene in strategic markets.

Nevertheless, the extensive use of political tools by governments around the world to support their domestic firms requires enhancing the strategic potential of European SIEs and thinking of new ways to reconcile public and private objectives within SIEs to serve national interests. This is important for improving the performance and market power of European firms

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<sup>56</sup> Based on interviews conducted with a former board member of Eni and Snam (Personal Interview 1), a former CEO of Eni and Enel (Personal Interview 4), a former manager of EDF (Personal Interview 3), a former manager of Enel (Personal Interview 2), a manager of Rosetti Marino S.p.A. (Personal Interview 5), and the head of government and political affairs at BP (Personal Interview 7).

in global strategic markets, and for European governments to maintain their economic and political leadership in the long term. The industrial policy role played by SOEs in the phase 1950s-1970s can provide insights on how to maximise synergies between State institutions and domestic firms operating globally. In particular, it sheds light on the importance of SOEs' role to supply critical inputs to the domestic industry, which remains strategic to address wide-ranging policy objectives of defence, energy security and innovation. This requires the elaboration of an industrial policy that enhances and coordinates SIEs' global action and that takes into account SIEs' private interests.

This chapter suggests that the reconciliation of interests between governments and SIEs is possible particularly in global energy markets, where they tend to collaborate to overcome the competition of foreign (political and economic) actors in the production and procurement of energy from abroad. In a future perspective, the strategy may prove even more effective if coordinated at the EU level. The extent to which a EU strategy of foreign energy policy may be successful will depend on the EU Member States' ability to identify common interests in their global action and common plans to interact with other global players.

## **5.5. Concluding remarks**

The analysis of the Italian and French gas import infrastructure shows that the EU-led partial liberalisation has affected the governments' ability to pursue policy objectives. This was caused primarily by the rise of SIEs, following the partial privatisation of former SOEs. More specifically, the introduction of private shareholders in former SOEs has limited the government's ability to pursue economic and social objectives. In fact, private shareholders' risk-aversion entails that SIEs have a narrower investment horizon, which negatively affects their long-term growth and innovative potential. This has large-scale implications for economic growth, considering the systemic role played by SIEs in the domestic economy. The transition

from SOEs to SIEs has also implications for citizens, who are penalised in the short-term by the government's inability to control energy prices and increase employment. Moreover, in the long-term citizens are negatively affected by the lower potential of economic growth and innovation brought about by SIEs' lower propensity to invest. Nevertheless, governments can still pursue strategic objectives such as energy security and economic cooperation, mainly by exploiting SIEs' external sphere of action. This is possible because in international markets the interests of governments and private shareholders are aligned against those of foreign counterparties, because rents can be extracted abroad and shared domestically. With respect to the gas sector, exploiting such synergies between governments and SIEs is important for long-term economic competitiveness, as gas is a fundamental input for industry and households.

The cases of Italy and France show interesting differences in the way each European country faces the challenges posed by partially liberalised energy markets. Although both the Italian and French governments have partially privatised their energy firms, they have done so to a different extent and have adopted different approaches to government intervention in the energy sector.

In Italy, the government retains minority shares in SIEs (usually around 30%) and shows willingness not to interfere heavily in the board's decisions. The lack of government interference in the daily management of the firm has proven to be important to maintain credibility towards private investors. However, the adoption of a passive approach does not imply the government's inability to pursue any policy objective. In fact, government shares make it possible to prevent hostile takeovers from financial investors with short-term profitability objectives and from foreign SOEs with conflicting political objectives, whose influence in the national SIEs could jeopardise the long-term strategies of energy supply. The presence of control shares in key energy firms has allowed the Italian government to also pursue more active approaches, for example by intervening diplomatically in key negotiations

with foreign energy suppliers. Ultimately, control shares in firms that own and manage the overall production process from the foreign upstream to the domestic downstream is a key element for energy security, as it makes it possible to intervene across the whole supply chain and to implement a long-term investment strategy of energy procurement, avoiding to rely on emergency measures such as Golden Power that can only target domestic assets.

In France, the government retains both majority and minority shares and shows an interest in intervening in the development of corporate strategies. Furthermore, the French government has frequently adopted a policy of mergers between national SIEs to make them larger and more competitive internationally. This reflects the willingness to use SIEs as a tool of industrial policy. However, the French government's ability to influence SIEs' strategy is not extensive, despite the control shares held. The main influence on SIEs' management is exercised by an elite of technocrats internal to SIEs, who in many occasions have been able to take key decisions of energy policy without direct consultation with the government. However, the power shift to the technocrats has not in itself transformed SIEs from policy tools to purely market-driven actors. In fact, this chapter finds that SIEs' management itself is subjected to a sort of political responsibility towards the French economy and society. This is evident in the French SIEs' strategy in domestic and global markets. Domestically, they have maintained close ties with the trade unions whilst trying to maintain low prices for consumers. Globally, they have increased the control of strategic markets that ensure abundant and affordable supplies of energy to the French economy.

Nevertheless, as the Italian and French cases show, the strategic role of SIEs does not necessarily reflect a direct influence from the government. In fact, in France the government influence on SIEs is hampered by the power of SIEs' managers, whereas in Italy by the government's inability or unwillingness to interfere. Despite these general trends, the chapter argues that SIEs still contribute to the pursuit of public policy objectives (economic, social and

strategic) regardless of their relations with the public shareholder. This might be the result of their historical positioning in markets of goods that have high impact on national interests. SIEs' current policy role may also reflect the development of a political responsibility towards society and the domestic economy after the retreat of the government, because of the systemic role they play. The fact that their corporate strategies show both links and divergences from government policies suggests a certain degree of autonomy from political power, but also the need to converge on issues of national interest.

The need to coordinate government's and SIEs' strategies stems from SIEs' systemic importance for domestic economies. In fact, as SIEs operate in sectors that produce intermediate goods, their global market power allows them to reduce the cost and increase the supply of key inputs for the domestic economy. This, in turn, has positive effects on economic competitiveness and on the European governments' efforts to maintain their competitive positions vis-à-vis emerging economies.

Currently, the coordination between European governments and SIEs is rather weak in most strategic sectors, probably because of the absence of government strategies of industrial policy. However, an overly prolonged absence of government strategies of industrial and energy policy may jeopardise the government's ability to pursue long-term policy objectives of energy security, consumers' price affordability and economic growth. Governments should take advantage of European SIEs' leaderships in global strategic markets, particularly in the energy sector. This may be done by more actively using their major shares in ways that reconcile public and private interests within SIEs, or through the development of a strategy at the EU level. A strategy of foreign energy policy is important in the current phase of rising multipolarity, in which each emergent centre of power attempts to gain influence and leverage over competitors by means of control of vital resources. Contemporary European SIEs are

suitable for this purpose, as their action is able to reconcile economic and strategic objectives and overcome high levels of competition in economic and political spheres.

## **6. The transition from the national to the EU model of energy governance: long-term implications for European consumers**

The transition from the national to the EU model of energy governance coincided with raising prices of gas for consumers. For example, in Italy and France, the price of gas for industrial consumers has more than tripled since the mid-1990s, when the early liberalisation reforms were launched. Although the increase in gas prices is mainly attributable to factors that are external to the EU policy reforms, namely the increase in oil prices, privatisation has had a role in the increase because it has made it difficult for European governments to rely on price ceilings to protect consumers from price fluctuations (Fiorio and Florio, 2009; Brau et al., 2010; Ceriani and Florio, 2011).

In addition to privatisation, the literature has focussed on the effects of unbundling and market opening on consumers' welfare. The prevailing stance within this strand is that liberalisation reforms have not succeeded to decrease prices for consumers because they have only been implemented to a partial extent. This has led to a transition in national markets from a monopoly to an oligopoly, in which few players retain high market power and therefore are able to apply a high price mark-up to retailers or directly to consumers (Davies and Waddams, 2007; van Witteloostuijn et al., 2007; Jamasb et al., 2008).

However, the above-mentioned strands of literature provide only a partial view of the effects of liberalisation on the welfare of European consumers. These views overemphasize the importance of the domestic market, while they largely neglect that prices paid by final consumers reflect primarily the cost of import. In contrast, this chapter argues that the fact that privatisation is only been partial has prevented an even more deeper deterioration of the welfare of European consumers. More specifically, the fact that dominant firms still hold substantial market power allows them to exercise a certain bargaining power vis-à-vis foreign exporters and to negotiate low import prices, which is a precondition to bring about low prices for final

consumers. In contrast, a higher number of firms with low domestic market power would have a lower bargaining power vis-à-vis foreign exporters. This would result in higher import prices, generating *long-term* negative repercussions on the welfare of European consumers. So far, the deterioration of consumers' welfare has concerned only a rent redistribution to financial shareholders. If European firms have low bargaining power and current rents are transferred to non-EU firms, the conditions for redistributing the rents back from financial stakeholders to consumers will cease to exist altogether.

This argument is developed by using the lens of Transaction Cost Economics (TCE) (see Coase, 1937; Williamson, 1981; Joskow, 2010), which provides insights on how to best organise the supply chain, depending on specific characteristics of markets and goods. The TCE lens helps understand why a full transition to a liberalised market in the EU is unlikely to lower gas prices for final consumers, and why such transition has instead succeeded in other contexts, such as in the US. The chapter will show that the key difference is the (un)availability of domestic resources, which are abundant in the US whilst being in short supply in Europe.

In the US, gas abundance makes transactions less constraining, as every firm has a wide range of options in terms of suppliers and customers (Joskow, 2010; Makhholm, 2012). This prevents energy firms from being locked into binding contractual relations and to incur high transaction costs when contractual terms become inconvenient or they decide to change commercial counterparties. Domestic abundance of gas allows for the proliferation of firms and their possibility to rely on short-term contractual arrangements, increasing market competition and potentially lowering prices for consumers.

In contrast, the European necessity to rely on imports from abroad entails a certain degree of difficulty in switching suppliers. This implies that the bargaining power of producers is high and that transaction costs are likely to rise as a result of producers' opportunistic behaviour, jeopardising import price affordability and the security of supplies. This explains

the traditional recourse by the European energy industry to market and contractual arrangements that increase the bargaining power of domestic firms, i.e. vertically integrated monopolies, and the reluctance shown by some Member States to pursue a full liberalisation.

The chapter is divided in two main parts. The first part outlines the main characteristics and differences among the three main areas of gas consumption, namely US, East Asia and Europe. The comparison, carried out in Section 6.1, makes it possible to explore the relation between levels of domestic production and degree of market liberalisation. As expected, East Asia and Europe show reluctance to fully liberalise, due to insufficient domestic production, with East Asian countries still relying on vertically integrated government-owned monopolies due to greater distance, and thus greater supply risk, from producing countries. In contrast, the US has recently adopted a liberalised model, thanks to the size of its gas market and the transition from being a net importer to a net exporter since the shale gas revolution.

Section 6.2 focusses on Europe by comparing the cases of Italy and France. The comparison is interesting because the two markets have been liberalised to different extents, and yet they have recorded very similar trends of gas prices. This shows that in gas deprived markets prices are mainly shaped by contractual relations with producing countries and availability of import infrastructure, rather than by domestic market regulation.

Section 6.3 discusses the empirical findings through the lenses of Neoclassical Economics and TCE, and provides a contribution to the theoretical and policy debates on the energy sector's liberalisation. It shows that Neoclassical Economics and TCE, when analysed in a comparative manner, provide powerful lenses to understand the criticalities of the EU gas market. In fact, unsuccessful policy results in the EU may have been generated by a partial understanding of these criticalities or by the inability to contextualise that understanding in the light of European specificities. For example, one of the main elements of failure is the excessive emphasis on the domestic dimension of the EU market, which pervades the debates of both

academic and policy circles. In contrast, an adequate understanding of the external dimension is crucial, especially in deprived markets such as Europe, as its functioning depends on the relations with energy producers. Section 6.4 brings the chapter to a close and suggests potential ways to safeguard the *long-term* welfare of European consumers.

### **6.1. World gas markets compared: Insights from the US and East Asia**

Unlike the oil market, the gas market is not globally interdependent, because of technical and commercial constraints in long-distance transportation and limited global infrastructure due to the relatively recent large-scale commercialisation of gas. However, in recent times the degree of interdependence between the European, US and East Asian markets has increased considerably. This is due to developments in the Liquefied Natural Gas' (LNG) technology, which has led to lower costs of long-distance transportation, but also to the increasing willingness of governments to diversify the supply sources and increasingly rely on spot markets.

Despite this trend, it is possible to consider Europe, the US and East Asia as the three main macro areas of gas consumption, which differ significantly from one another whilst displaying an important degree of internal homogeneity and domestic interdependence. The main differences are the level of domestic production and imports, the geographical proximity to producers, the political and commercial relations with them, and the prevailing regulatory framework currently in place. The next subsections provide an overview of the differences between US, East Asian and European gas markets, which are key to understand their different structural conditions and the challenges they face at the market and regulatory level.

### *6.1.1. The US gas market*

Natural gas represents 33% of the US energy mix, with the other most important sources being oil and coal. Since 2015, gas has become the largest source of electricity generation, mainly for the recent large-scale increase in production and decrease in prices. As a result, US domestic production has recently reached 30 trillion cubic feet (tcf), almost doubling the values of the early 2000s (EIA, 2019). Such production volume was the result of the exploitation of shale gas, which was made possible by the development of new technologies for the extraction of gas from rocks. The extensive increase in production turned the US from a net importer to a net exporter of natural gas. As a consequence, total imports declined from 5 to 3 tcf, whereas total exports increased from 0.2 to 3.4 tcf, the highest level in US history. As a result, since 2009 US has surpassed the Russian Federation becoming the world largest gas producer (Middleton et al., 2017). These trends show the US' recent achievement of two objectives of historical significance: energy independence and extensive reduction in the costs of gas production, which have led to a reduction of prices for consumers.

Nevertheless, another element is pointed out in the literature as critical for the achievement of energy independence and reduction of production costs and consumers' prices: the US' competitive market structure, which was brought about by liberalization and full deregulation of the early 1990s.

In the upstream, the top 10 producers in the US represent only 30% of domestic production, with the rest spread among large, mid- and small-size companies. Such degree of market fragmentation is unusual in other world regions as the upstream is intensive in capital and technology, so that only few firms are able to afford the technical and financial risks connected to it. Nevertheless, the onshore nature of most of the gas wells and the large size of the US gas market has left space for a large number of firms of all sizes to enter the gas market.

In the midstream, the extension of the interstate grids between the 1990s and 2000s played an important role in incentivizing increasing investments in gas production, which is a precondition for gas abundance and market competition. The US pipeline network is owned by different private companies. The interstate network is operated by around 150 companies, whilst the intrastate network accounts for around 900 companies (Smith, 2013). Since 1992, pipeline companies are unbundled from other segments of the supply chain and are prevented by law from operating in the production, import, wholesale and retail markets. Ownership unbundling as well as their legal commitment to grant indiscriminate access to the grid to new entrants has so far contributed extensively to market competition. Market fragmentation in the downstream is also substantial. Furthermore, downstream operators benefit from a certain bargaining power with upstream producers thanks to the relative fragmentation of the upstream market and their possibility to switch suppliers.

The US gas market has not always been characterized by high levels of competition. Although in the first half of the 20<sup>th</sup> century prices at wellhead were deregulated, after World War II the Federal Power Commission (FPC) imposed ceilings in order to protect consumers from the market power of upstream producers. According to Joskow (2006) and Makhholm (2012), these ceilings discouraged investments in gas exploration and production, thus being a primary cause of gas shortages in different historical phases. The limitations of such a model emerged with the oil shocks of the 1970s, when the increase in oil prices caused the growth of natural gas demand. This was not met by actual supply, raising concerns among industrial and household consumers. To increase the potential supply, the Federal Energy Regulatory Committee (FERC) deregulated prices at the wellhead. Nevertheless, this measure increased the market power of pipeline companies, which at that time were monopolists in their respective markets. In fact, pipeline companies took advantage of the increasing market fragmentation in the upstream, brought about by wellhead price deregulation, and of gas

shortage in end markets. This made it possible for them to negotiate favourable prices with upstream producers in the framework of long-term contracts, to benefit from the competition among them, and to resell gas at higher prices to downstream operators or directly to customers (Sutherland, 1993; Watson, 1992).

However, as the oil prices dropped by the mid-1980s, energy production switched from gas to cheaper resources such as oil and coal, leaving pipeline companies with large unsold quantities of gas to which they were committed in their long-term contracts. The difficulties experienced by pipeline companies, brought about by fluctuations in energy markets, induced further changes at the regulatory level. In 1992, FERC approved a provision that imposed a ban for pipeline companies to operate in potentially competitive commercial activities in the upstream and downstream. More specifically, pipeline companies were prevented from buying and selling gas. Their business was limited to infrastructure investment and the application of transport tariffs to upstream operators. In this situation, downstream companies could directly negotiate gas supplies with upstream companies, bypassing the market power of midstream (pipeline) companies. This regulatory framework incentivised competition among pipeline companies, whose tariffs reflected more closely prices at the wellhead, increasing the benefits for downstream companies and consumers (Dahl and Matson, 1998).

Nevertheless, gas prices for consumers did not decrease following the liberalisation reforms. Prices decreased only by the late 2000s, falling to around \$3 per Mmbtu, which correspond to about half the price paid by European consumers. The timespan between the full accomplishment of liberalisation reforms and price decrease was quite long, namely more than 15 years. This was explained by Makhholm (2012) and Arano and Blair (2010) as the result of existing players' market power and their ability to prevent new entries, but also by the difficulty to bring about a change in the industry's culture and the time needed for competitive mechanisms to work effectively.

Despite that, there is no clear evidence on the contribution of liberalisation reforms to price reduction. In fact, the fall in gas prices occurred only after the discovery of the shale gas and its extensive commercialization in the late 2000s. Therefore, it is likely that the shale revolution was the precondition for lowering gas prices, while liberalisation was only a complementary factor that helped achieve this outcome.

This argument is supported by the fact that in the 15 years between the accomplishment of full liberalization and the advent of gas abundance, market structure and contractual arrangements adopted by the industry underwent several changes. These ranged from market fragmentation in the late 1980s and simultaneous increase of the share of spot markets from 4% in 1983 to 70% in 1988, to a decline of the share of spot market to 40% in 1995 and the return to long-term contracts and increasing vertical integration between production and commercialisation phases (Dahl and Matson, 1998). These trends show that the industry is very responsive to changes in the levels of supply, and more so than changes in regulation. The shale revolution, which represents a fundamental element in the stabilisation of supply, explains the permanent transition to low prices and short-term models of transaction in recent years.

This argument suggests that liberalization reforms can successfully incentivise market competition only if structural conditions allow for it. Although liberalisation in the US may be a key element that supported the transition from shortage to abundance, as it created the conditions for large-scale investments in R&D and subsequent discovery of fracking techniques (Joskow, 2006), this might not be the case in other contexts such as Europe, because of several reasons. For example, laws on environmental protection in Europe discourage the exploitation of hydrocarbons, whilst banning the use of fracking techniques for the production of shale gas. Furthermore, deregulation and removal of ceilings do not always bring to the discovery of new technologies, as innovation is characterized by highly uncertain dynamics

that might not bring to the expected results despite the favourable conditions at the regulatory and market level.

#### *6.1.2. The East Asian gas markets*

The main gas-consuming countries in East Asia are Japan, South Korea and Taiwan, with China and India playing an increasing role. As these countries mainly lack domestic resources, they have historically relied on imports from South-East Asian countries such as Indonesia and Malaysia, as well as from Middle Eastern countries and more recently also Australia and the US. Liquefied Natural Gas (LNG) has played a dominant role because of geographic reasons, namely the distance from producing countries. Although reliance on LNG markets and infrastructure may provide the potential for avoiding the creation of binding contractual relations with producers, thanks to the possibility to switch suppliers in a short period of time, East Asian countries still heavily rely on long-term contracts. This choice is justified by the mutual convenience of East Asian countries and their suppliers to rely on a contractual model that provides adequate guarantees in terms of energy security for the former, while ensuring certain levels of revenues over the years for the latter.

The monopolistic structure of the East Asian domestic markets also reflects a lack of domestic resources. In fact, the need to create strong national players was necessary to counterbalance the bargaining power of producing countries. This has always been a priority over the creation of competitive markets, which could make fragmented operators weak vis-à-vis producing countries, who could take advantage of such fragmentation.

In the case of Japan, although market structure is characterised by regional monopolies, the government has adopted mechanisms of coordination for the negotiation of prices and quantities with foreign producers, for the management of energy disruptions, and for the redistribution of gas towards regions affected by such disruptions (as happened recently

following the Fukushima disaster). Although such market structure has proven efficient to ensure energy security and the resilience of the gas sector, the Japanese government aims to create a gas hub for the trade of gas on a spot basis. The gas hub would be operated in addition to the existing long-term contracts. This choice should not bring to a situation of oversupply, considering the progressive reduction in the production of nuclear energy and the increasing concerns for energy security (IEA, 2016).

South Korea is characterised by a monopolistic market structure in all phases of the supply chain. In particular, gas imports as well as transmission and distribution are managed by the SOE KOGAS. The latter is in charge of stipulating long-term contracts with foreign suppliers and of distributing the gas to local firms, which are in turn monopolists in their respective local markets. As for the Japanese case, the South Korean government's decision to rely on a single firm was also supported by considerations related to energy security and bargaining power with foreign suppliers. In recent times, proposals to separate KOGAS into several companies in order to increase competition have been rejected amid concerns over energy security and the difficulty to trigger competition mechanisms in a gas-deprived country. Nevertheless, KOGAS has recently reduced the duration of the contracts of gas import from over 20 years to about 10-15 years. This reflects KOGAS's attempt to take advantage of the increased global gas supply, rather than to liberalise the domestic market. In fact, full deregulation and extensive reliance on spot markets could generate serious gas shortages when global gas supply decreases again (IEA, 2006).

Another relevant player in the East Asian gas market is China. Although the share of gas in the energy mix is still lower than 10%, this percentage is destined to increase substantially. A report of China National Petroleum Corporation (CNPC) estimates that gas consumption in 2020 will reach 400bcm, whilst in 2030 will reach 600bcm (Duan, 2017). From 2000 to 2015, domestic gas production has increased from 27bcm to 132bcm, although China

is still dependent on imports for 37% of its consumption. This percentage is expected to grow in view of the Chinese government's plan to reduce CO<sub>2</sub> emissions through a large-scale switch from coal to gas. The increasing reliance on gas will expose the Chinese economy to a greater dependence from foreign import, which so far could be contained by the domestic availability of coal. The speed in the growth of Chinese gas imports is evident in the shift from being the 5<sup>th</sup> largest world importer in 2013 to being the 1<sup>st</sup> in 2018, which has increased the influence of China in the global gas governance.

The Chinese domestic market remains mainly oligopolistic, with three government-owned vertically integrated firms dominating the production, import and distribution markets. The main players are China National Petroleum Corporation (CNPC), Sinopec and China National Offshore Oil Corporation (CNOOC). CNPC owns 80% of the national grid, while Sinopec owns the remaining 20%. CNOOC owns and operates most of the LNG import infrastructure (Kang, 2014). However, the Chinese government is planning to introduce reforms to partially liberalise the gas market. The first step will be to spinoff the national grid and create an independent grid company. The latter would grant indiscriminate access to the grid to new entrants, which is a precondition to increase market competition. Nevertheless, concerns related to a full liberalisation remain, because of the increasing exposure to foreign imports and the negative implications for energy security deriving from it.

## **6.2. The European gas markets: The cases of Italy and France**

The European gas market displays several structural differences vis-à-vis the US and East Asia. In particular, Europe seems to be worse positioned than the US in terms of domestic production, but better positioned than East Asia in terms of proximity to gas producers and potential for diversification of supplies. These aspects entail the possibility for Europe to negotiate lower import prices as compared to East Asia. Firstly, this is because of the possibility

to transport gas through pipelines rather than LNG; secondly because geographic diversification entails greater bargaining power. Lastly, another advantage of Europe is given by the privileged diplomatic relations with producing countries. Such privileged energy relations are the result of Europe's long-lasting industrialisation and the need to rely on foreign resources, as well as of Europe's technological advantage, which has incentivised producing countries in investing in such relations. The next section focusses on Italy and France, two countries that have extensively relied on government intervention in the gas market. The cases show that changes in regulation, in this case through partial liberalisation, have limited effects on prices for consumers.

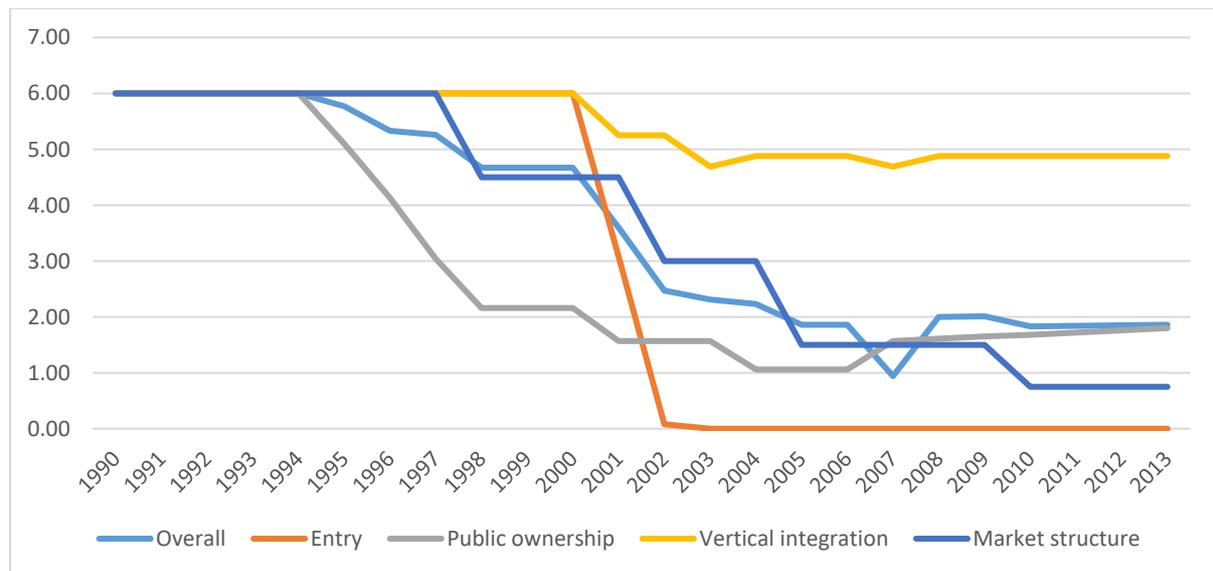
#### *6.2.1. The Italian market of gas import: the partial transition from the national to the EU governance*

Italy is the third largest natural gas market in Europe. Natural gas is the primary energy source, accounting for 36.7% of the Italian energy mix and 38.3% of electricity generation. Italy imports 90% of its domestic gas supply. The main suppliers are Russia (43.1%), Algeria (12.2%), Libya (11.7%), the Netherlands (11.7%), and Qatar (7.9%) (BP, 2018).

Different segments of the supply chain display different market structures. Whilst capital- and technology-intensive phases such as the upstream and midstream are characterised by an oligopolistic market structure, the downstream market is more fragmented. Overall, the current structure of the Italian gas market is the result of the attempt to liberalise it as much as possible, although high concentration in the upstream and midstream reflects their high barriers to entry. Liberalisation was justified by the need to comply with the European Commission's directives, but also by the emerging belief among political elites that breaking the monopolistic model and favouring a transition to a liberalised model would increase industrial competitiveness and consumers' welfare. On the basis of the OECD indicators of regulation in

energy, transport and communications (ETCR), Figure 1 shows the extent of liberalisation reforms in Italy. The indicators of liberalisation are legal barriers to entry, public ownership, vertical integration and market structure, where in a range from 6 to 0, 6 indicates absence of liberalisation whilst 0 indicates full liberalisation (i.e. no barriers to entry, private ownership of energy firms, unbundled supply chains, competitive market structure).

Figure 6.1. ETCR reform indicators for the Italian gas sector, 1990 – 2013



Source: OECD

As the graph shows, the Italian gas sector is only partially liberalised. However, the shift from 6 to 1.86 in the “overall” indicator shows that liberalization reforms have been extensive and that, in the current hybrid model of energy governance, aspects of the EU model prevail over those of the national model.

For example, the shift from 6 to 0 in the indicator “entry” shows that there are no legal barriers to entry. In fact, Third Party Access (TPA) to the gas transmission is granted without restrictions to any potential supplier (upstream/import operator) or buyer (downstream operator) who is eligible to operate in the Italian gas market. The requirements for eligibility

are set by the Italian Regulatory Authority for Energy (ARERA), whose aim is to set regulatory standards that avoid discrimination between firms and that are consistent with the EU principles of market competition. In contrast, in other European countries, the government selects the potential new entrants in the domestic market on ad-hoc basis.

In terms of public ownership, the shift from 6 to 1.80 shows an effort to privatize former SOEs whilst at the same time to retain government shares in a few strategic firms. Under EU legislation, public ownership of firms is permitted unless this undermines market competition either by providing special support (financial or regulatory) to State-Invested Enterprises (SIEs) or by vetoing the entrance of potential (public or private) investors into SIEs. In 2012, the Italian government transposed this EU provision into national law, giving up most of the powers attached to its minority shares in former SOEs.

Another important indicator is vertical integration. The shift from 6 to 4.88 shows that the Italian gas supply chain is still relatively integrated. This can be explained by the presence of the largest companies in almost all phases of the supply chain. Nevertheless, the recent spinoff of the Italian national grid company Snam from Eni has allowed new entrants to receive an equal treatment vis-à-vis Eni in terms of access to the national grid and tariffs applied.

In terms of market structure, the indicator decreases from 6 to 0.75. This shows that entry regulation has been effective in breaking the former monopoly; it allows several hundred new entrants to operate in the Italian gas market, particularly in the downstream phase.

However, a closer look at the specificities of the Italian gas market reveals that a significant number of new entries does not necessarily entail an increase in market competition. In contrast, the crucial element for market competition is the balance of bargaining power between firms operating in different phases of the supply chain, particularly between upstream and downstream firms, and the regulation of their contractual relations with midstream firms. As Italy imports 90% of gas, the import market structure is key for the overall market dynamics.

However, the import market is oligopolistic, as 80% of the Italian imports are managed by three firms, which are the only ones with the financial and technological capabilities to dominate in this segment. This entails that efforts to liberalise the downstream market, which is accessible to a greater range of firms, are likely to have no effects on prices for consumers. In fact, downstream operators are mere price takers, especially when they face high bargaining power from the upstream and high competition in their market segment.

In the market of gas import, the former monopolist Eni is still dominant and supplies around 51% of the total imports. Eni's main competitors in this market are Edison and Enel, whose shares of gas imports amount respectively to around 22% and 11%. The remaining importers are domestic and foreign firms whose market share does not exceed 2%. Table 1 shows the 12 top importers.

*Table 6.1. Largest gas importers in the Italian market*

	Gross imports M(m3)	Market share (%)
<b>Eni</b>	33.434	51.2
<b>Edison</b>	14.666	22,5
<b>Enel Trade</b>	7.228	11,1
<b>DufEnergy Trading SA</b>	1.004	1,5
<b>Enoi</b>	772	1,2
<b>Axpo Italia</b>	715	1,1
<b>Worldenergy SA</b>	483	0,7
<b>Shell Energy Europe Ltd</b>	477	0,7
<b>PremiumGas</b>	458	0,7
<b>Iren Mercato</b>	392	0,6
<b>Met International AG</b>	377	0,6

<b>Hera Trading</b>	341	0,5
<b>Total</b>	65.284	100

Source: ARERA (Italian Regulatory Authority for Energy, Networks and Environment)

Despite the relatively high number of gas importers, market concentration is still high. The market power of the main importers is accentuated further as they also control critical import infrastructure. For example, Eni owns three pipelines, whereas Snam owns one pipeline and two LNG facilities. The main competitors Edison and Enel are trying to build their own import infrastructure to avoid the dependence from the incumbent. Smaller players have either no financial or technological capacity to own and manage infrastructure projects. Table 2 lists the Italian gas import infrastructure and related ownership structure.

Table 6.2. Italian gas import infrastructure

	Gas origin	Ownership	Entry point	Capacity (bcm/y)	Flow
<b>TENP/Transitgas</b>	Netherlands Norway	Fluxys; Open Grid Europe; Swissgas	Passo Gries	21.5	9
<b>TAG</b>	Russia	Eni; OMV	Tarvisio/ Gorizia	39,7	13,1
<b>Transmed</b>	Algeria	Eni; Sonatrach	Mazara del Vallo	36.1	20,6
<b>Greenstream</b>	Libya	Eni; Libyan Noc	Gela	11.5	6,5

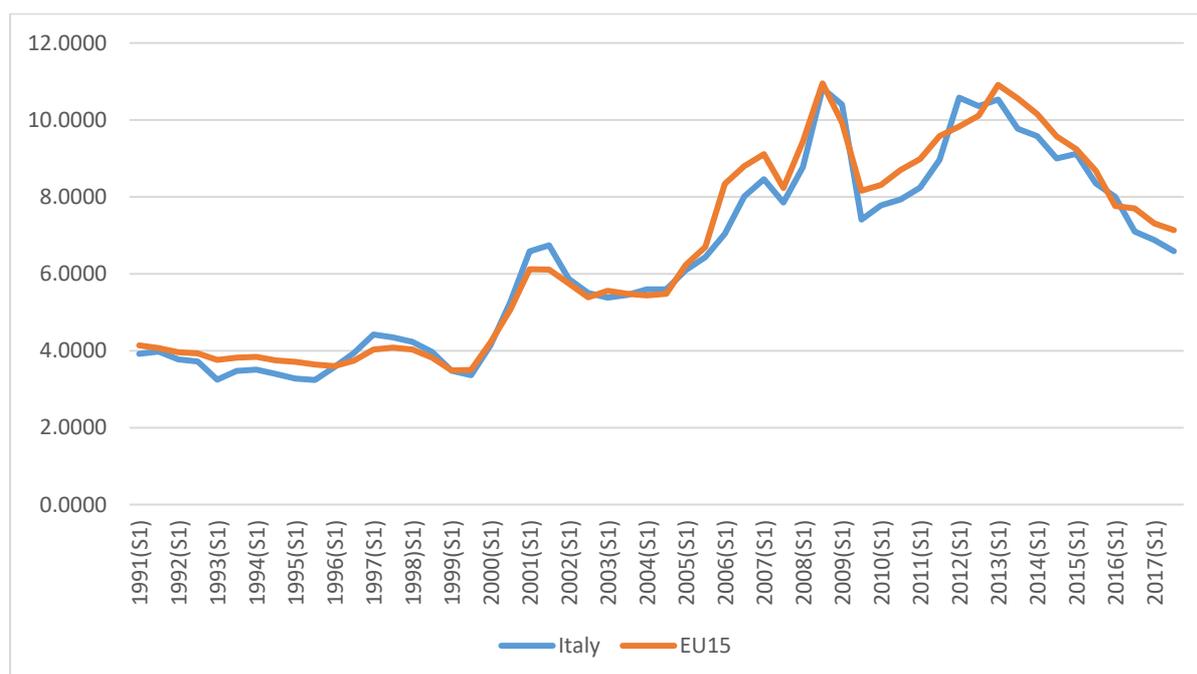
<b>TAP (2020)</b>	Azerbaijan	BP; Socar; Snam, Fluxys, Enagas	Lecce	10	0
<b>Panigaglia LNG</b>	Various	Snam	Panigaglia	3.3	1.1
<b>Rovigo LNG</b>	Various	Exxon Mobil; Qatar Petroleum; Snam	Rovigo	8.4	6.2
<b>Livorno LNG</b>	Various	Iren; E.ON	Livorno	3.7	0

Source: Snam S.p.A.

The table shows that in 2020 Italy will have 8 entry points from at least 8 different countries. These data reveal an increased effort to diversify gas sources, in accordance with the EU strategy of energy policy. In fact, before liberalisation, Italy relied on 5 entry points. According to the EU policy and the Italian National Energy Strategy (SEN), increasing the diversification of supply is the key step to increase market competition among foreign suppliers and domestic importers, and to decrease the price for final consumers.

However, the data shows that the diversification strategy conducted so far in addition to the liberalization policy has had negligible effects on gas prices paid by consumers. Figure 2 shows the evolution of prices since the 1990s when the initial steps towards liberalisation have been undertaken.

Figure 6.2. Gas prices for industrial consumers, 1991-2017 (euro/gigajoules)



Source: Own elaboration from Eurostat

The graph shows that gas price in Italy has always been in line with the EU average price. The upward trend since the mid-2000s shows the strong correlation with oil prices, due to oil-indexation of long-term contracts. According to the dominant view in the literature (Cavaliere, 2007; Honoré, 2013), the increase in prices derives from the inability of the current regulatory framework to get rid of long-term contracts and to decrease the market power of the current oligopolists. Alternative views (Florio, 2013; Helm, 2007) argue that long-term contracts are important for energy security, especially in phases of gas scarcity<sup>57</sup>. This chapter, in contrast, argues that long-term contracts and the market power of current oligopolists are necessary to contain the bargaining power of non-EU exporters and to avoid further increases of gas prices.

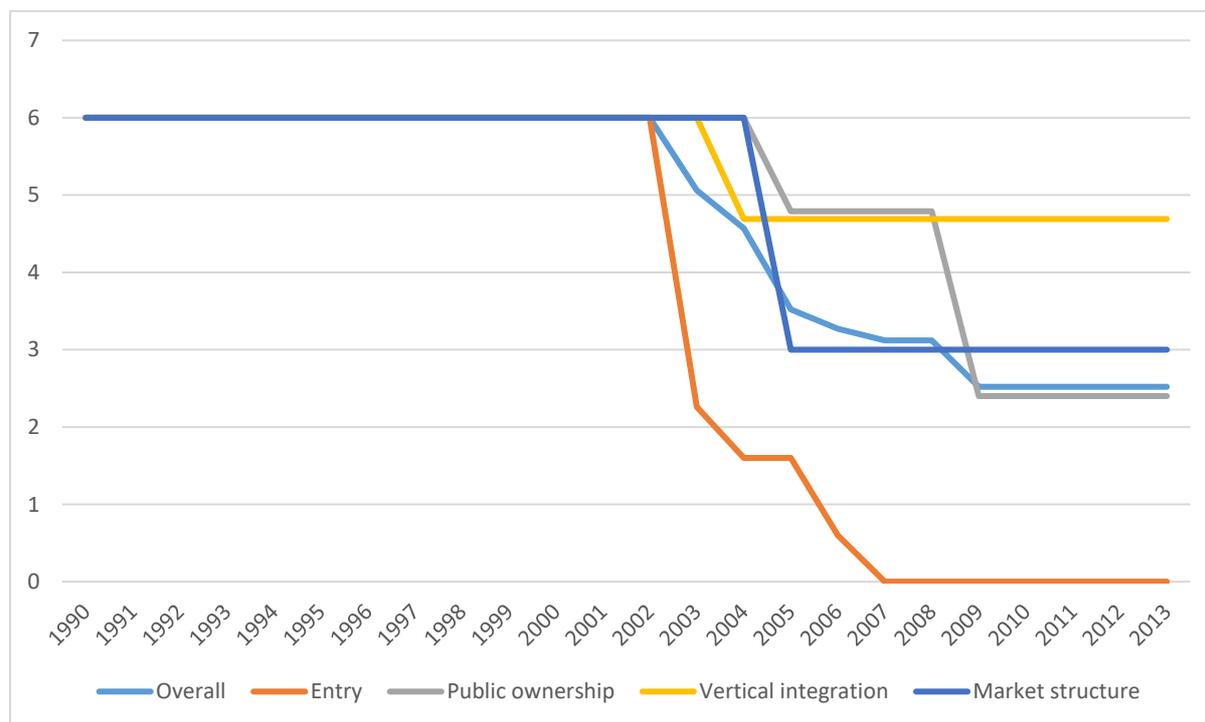
<sup>57</sup> On this issue, a board member of Adriatic LNG (Personal Interview 9) argues that the increase of gas prices in Italy is likely to be caused by a combination of factors, including market power of foreign exporters, oil-indexation of long-term contracts, and price regulation in the downstream.

### *6.2.2. The French market of gas import: a strong heritage from the national model*

France is the fourth largest natural gas market in Europe, with consumption amounting to around 50 bcm yearly. Natural gas represents 13% of the French energy mix, with nuclear energy dominating with 46% and oil accounting for 28%. However, in the next years the share of gas in the energy mix will increase substantially. This is a deliberate choice of energy policy in view of the ongoing dismantlement of nuclear plants, most of which are at the end of their lifetime, which makes it possible to avoid the high costs of their upgrade. Therefore, as in other European countries, gas is identified as the key source in the transition to renewables. Currently, France imports 98% of the gas consumed, of which 70% via pipeline from Russia, Norway and the Netherland, and 30% via LNG from Algeria, Nigeria and Qatar (BP, 2018).

In recent years, France has taken some steps to open up the domestic gas market. However, as in other key sectors of the economy, market concentration remains quite high as compared to other European countries. This can be partially attributed to the French tradition of strong government intervention in the economy. In fact, since the early steps in the creation of a Single Market for energy in the early 1990s, the French government has shown reluctance to participate. In fact, as the French energy prices were among the lowest in Europe, some feared that market competition would create more uncertainties than opportunities. The strongest oppositions derived from the communist party, labour unions and the energy industry, which feared competition from foreign energy firms and subsequent deterioration of consumers' welfare as well as large-scale layoffs. As France's stance on liberalisation became increasingly isolated among European countries, the government worked with the industry to find ways to reconcile national interests with the emerging European energy policy. In the early 2000s, France formally started to liberalise the electricity and gas markets by allowing entry by European companies. Nevertheless, the extent to which liberalization occurred in France was lower than in other European countries, as the ETCR indicators show in figure 3.

Figure 6.3. ETCR reform indicators for the French gas sector, 1990 – 2013



Source: OECD

The shift from 6 to 2.52 in the “overall” indicator shows that liberalization reforms have only partially affected the former national governance. The “entry” indicator, which has gone from 6 to 0, provides a substantial contribution to lowering the average. It reflects a change in the jurisdiction of the energy market regulation from the French government to the French regulatory authority CRE (*Commission de regulation de l’énergie*), whose mandate is to monitor the functioning of the energy market and to protect consumers’ interests.

A different trend occurs in the ownership of gas firms. In this case, the shift from 6 to 2.4 shows that privatisation of SOEs has been only partial. In addition, the indicator does not take into account the *de facto* control that the French government can exercise through mixed ownership, as is the case for the two largest energy companies in France. In Engie, the former monopolist in the gas sector, the government retains 25% of the shares; in EDF, the former

monopolist in the electricity sector, which is now also a big player in the gas sector, the government retains 84% of the shares. As a result, from the viewpoint of ownership of key energy players, the government's direct influence in the market is still extensive.

Another aspect that shows the limited transition to a liberalized model is vertical integration. The indicator shows a small shift, from 6 to 4.68, proving that the French gas supply chain is still quite integrated. This can be explained by the presence of the largest firms in all phases of the supply chain. However, Engie's control of the national grid through the subsidiary GRTGaz remains the most controversial aspect for market competition, as Engie's influence in GRTGaz is likely to prevent competitors from accessing the grid at equal conditions.

Finally, the "market structure" indicator displays a shift from 6 to 3. This shows that firms different from the former monopolist Engie are successfully entering in the gas market. However, the companies that gained the largest market share are actual or former French SOEs, which are former monopolists in other energy markets such as in oil (Total) and electricity (EDF). Although Total and EDF can challenge the leadership of Engie by progressively increasing the volume of their business in the domestic gas market, it is uncertain whether the emerging market structure will provide incentives to the main players to compete with each other. In addition, it is likely that the emerging oligopoly will prevent European competitors from entering the French markets, due to their market power and their ability to influence regulation.

In summary, the ETCR indicators in some cases overestimate the extent to which the French market has been liberalized. For example, the value 0 in the "entry" indicator suggests that there are no regulatory restrictions to market entry. However, restrictions occur *de facto* for other reasons, first and foremost the retention of the national grid company GRTGaz as Engie's subsidiary. Furthermore, the fact that market entry is subjected to CRE's regulation,

whose board reflects the interests of EDF and Engie (Thatcher, 2007), may pose additional challenges to creating a regulatory framework that effectively incentivises market opening.

To understand the real effects of liberalization reforms on market competition, it is important to assess the nature and changes in the market for gas import. As France is dependent for 98% of its gas supply from abroad, this market is crucial for determining the bargaining power of existing players along the whole supply chain. The market for gas import in France is currently dominated by the former gas monopolist Engie and former oil monopolist Total. The two companies retain 95% of the long-term contracts, whereas the remaining 5% of imports is managed by Tegaz and local distributors. This shows that although the share of new importers is rising, the French import market is far from being competitive.

The dominance of Engie and Total in the gas import prevents potential competitors from emerging in other market segments. In fact, their competitive potential is limited by their need to rely on Engie's and Total's supplies with whom they compete in the wholesale and retail markets. Despite a rather negligible market share, twelve foreign companies have succeeded to entry the wholesale market and successfully maintain their market position. The downstream market is also characterised by the high market power of Engie, which controls 96% of distribution and retail. In this case, the control of local distribution networks provides Engie with a strategic advantage vis-à-vis emerging retail competitors. The remaining market share (4%) is shared by local Distribution System Operators (DSOs) and other retailers, including European majors such as Eni, BP and E.ON.

Engie's and Total's dominant positions in the market for gas import are strengthened by their control of the import infrastructure. The French gas market is currently supplied by three transnational pipelines and three LNG terminals. Engie owns and operates the three existing LNG terminals of Montoir-de-Bretagne, Fos Tonkin and Fos Caveau, the latter being co-owned with Total. Engie also has major shares in the transnational pipelines that bring gas

to France. For example, it owns 43% of Megal, which supplies France with Russian gas via Czech Republic and Germany, as well as 12% of Medgaz, which transports gas from Algeria to Spain. Table 3 lists the French gas import infrastructure and related ownership structure.

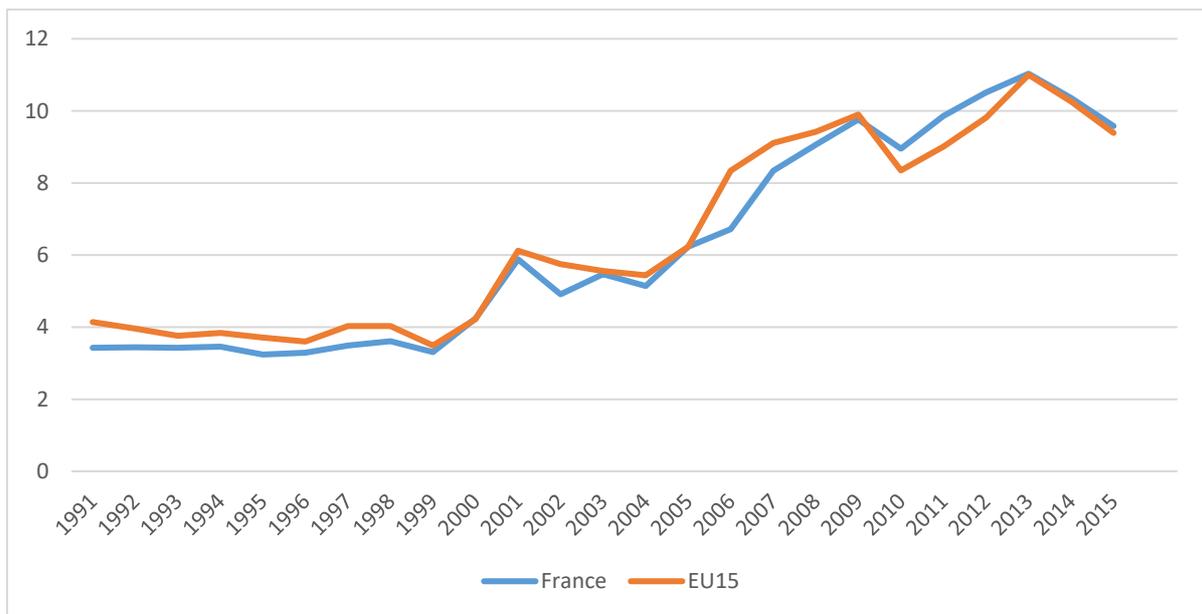
Table 6.3. French gas import infrastructure

	Gas origin	Ownership	Entry point	Capacity (bcm/y)
Belgium/France pipeline	Netherlands Norway	Fluxys; GRT gaz (Engie)	Taisnieres	5
Megal pipeline	Russia	Open Grid Europe; GRT gaz (Engie)	Obergailbach	22
Montoir-de-Bretagne LNG	Various	Engie	Montoir-de-Bretagne (Nantes)	10
Fos Tonkin LNG	Various	Engie	Fos-sur-Mer (Marseille)	3
Fos Caveau LNG	Various	Engie; Total	Fos-sur-Mer (Marseille)	8.25
Loon Plage LNG	Various	EDF; Fluxys; Total	Loon Plage (Dunkirk)	13

Source: GRTgaz

As the data show, the French market is still largely dominated by the former monopolist Engie, although other national firms such as Total and EDF are increasingly investing in the French gas market by buying Engie’s existing assets (e.g. Total’s takeover of LNG and import contracts) or by building new import infrastructure (e.g. EDF Loon Plage LNG terminal). In this context, foreign operators are very marginal, and are not in a position to compete with the oligopoly of French energy giants. Not surprisingly, the data shows that market opening in France had negligible effects on gas prices paid by final consumers. Figure 4 shows the evolution of prices from 1990 to 2013, since liberalisation took place.

Figure 6.4. Gas prices for industrial consumers, 1991-2017 (Euro/gigajoules)



Source: Own elaboration from Eurostat

The graph shows that gas prices in France have been always in line with the average price in the EU. As in the Italian case, the oil-led upward trend in recent years shows the dominance of oil-indexed long-term contracts. Unlike in Italy, the dominant view among French experts (Bauby and Varone, 2007), particularly in industry and government, is that liberalisation does not suit the French interests. More specifically, they argue that the national

model was designed to reconcile the interests of the main stakeholders, namely industry, government and consumers. According to this view, the change in the mission of former SOEs from providers of public services to mere profit-oriented players could be a key factor in the deterioration of consumers' welfare. In contrast, this chapter's view is that the transition from SOEs to SIEs does not necessarily imply a mere focus on the profit motive; the deeper reason why liberalisation can worsen consumers' welfare in the long term is that it is likely to decrease the bargaining power of the French energy industry vis-à-vis extra-EU exporters.

### **6.3. The *long-term* welfare of European consumers: Insights from Neoclassical and Transaction Cost Economics**

To understand how the transition from the national to the EU model of energy governance affects consumers' welfare, the Neoclassical and Transaction Costs Economics (TCE) approaches provide powerful lenses. These two theoretical perspectives make it possible to highlight different aspects of the effects of policy reforms.

The neoclassical approach emphasizes market efficiency. Liberalisation is a key measure for its pursuit as it decreases market concentration and increases competition by allowing the entry of new players. Market competition is the key element to maximise allocative efficiency, as it makes it possible to reduce price for final consumers. Gas market liberalisation in the EU has been inspired by these principles. It has been conceived to erode the market power of incumbents and redistribute monopolistic rents to new players and consumers, with the latter being the main beneficiaries of market competition due to reduction of final prices.

In contrast, if one adopts a TCE lens, consumers' welfare does not necessarily improve after liberalisation reforms, especially in presence of "asset specificity". In fact, when asset-specific investments characterise a given market, constraints to market competition may not

emerge only from regulation, but also from certain features of the asset traded. Key examples are the asset's scarcity in certain geographic areas and the technical constraints to procurement; the advanced technologies and significant capital needed to produce, transport and store it; and the political relevance of its trade. These are all elements that contribute to characterise an asset as "specific" and to generate market structures that are not competitive. Market competition is hindered because of the constraints to production and procurement along the supply chain, which generate scarce availability of these inputs. Scarcity of inputs and the need to secure supplies are major determinants for contractual relations to become bilateral and long-term, which in turn make it difficult to switch suppliers or customers. Long-term, bilateral contractual relations are likely to generate high transaction costs, especially if the bargaining power is unbalanced and one of the counterparties behaves opportunistically. Higher transaction costs will result in higher prices paid by final consumers. On this view, therefore, liberalisation policy is unlikely to lower transaction costs, as these occur because of the specific nature of the asset, which cannot be changed by regulation.

The US liberalization has been considered as a successful case by empirical and theoretical studies adopting both neoclassical and TCE lenses (Joskow, 2006; Arano and Blair, 2008; Makhholm, 2012). Studies adopting the Neoclassical lens agree that the current US liberalised model is ideal to enhance market efficiency. As mentioned in section 6.1, the US gas market is now fully deregulated in all segments of the supply chain. In the upstream, wellhead prices were deregulated in 1978. In the midstream, unbundling the intra-State and inter-States grid operators from their subsidiaries in the upstream and downstream became mandatory by late 1980s. In the downstream, market concentration of retailers is low and consumers can choose among a range of suppliers.

If one adopts a Neoclassical lens, deregulation of wellhead price is important to increase competition among upstream companies. Similar considerations can be extended to the

downstream market, which benefits from a regulatory framework that allows new entries. However, the regulatory provision on unbundling is the key factor that allows market competition to work effectively. In fact, unbundling prevents pipeline operators in the midstream from vertically integrating in the upstream and downstream. This is essential to prevent pipeline companies from granting preferential treatment to their subsidiaries in the upstream and downstream at the expense of competitors. The discrimination against competitors may occur both in terms of capacity allocation in the grid and transport tariffs. These, in turn, are primary elements that obstruct the realisation of a competitive gas market.

In contrast, studies adopting a TCE lens argue that it would be simplistic to interpret the success of liberalisation reforms in the US only as a consequence of the reduction of incumbents' market power. According to them, the key aspect is to understand how changes in regulation decreased the "specificity" of gas in the US. In their view, the imposition of ceilings on wellhead prices and transport tariffs in inter-State pipelines by State regulatory bodies were the main determinants of asset specificity in the gas market. In fact, a regulated price that is set below the equilibrium price discouraged the entries of new players, contributing to low investments and shortages of production and transport capacity. Shortage of gas and infrastructure are in turn primary determinants to asset specificity, as they prevent energy firms from having a wide range of options in terms of distribution channels and procurement. The lack of options, in turn, constrains them into bilateral and binding contractual relations that are likely to generate high transaction costs.

In contrast, the removal of regulated prices incentivised new investments in infrastructure by new entrants, especially in periods of rising gas demand. This increased supply of gas in a structural way. According to some (Makholm, 2012; Joskow, 2013), overinvestments in production and infrastructure was a driver for the discovery of fracking techniques, as the industry could rely on large-scale financing in different phases of the

innovation chain, from R&D to industrial conversion and commercialisation. The adoption of fracking techniques made it possible to exploit large-scale resources of shale gas, generating a major shift from gas scarcity to gas abundance in the US. Gas abundance made it possible to adopt flexible, short-term contractual models, while keeping the risk of supply low. The adoption of flexible models, in turn, has allowed firms with the possibility to easily switch suppliers or customers and to avoid transaction costs associated with long-term and bilateral contractual relations. In other words, gas abundance has reduced the specificity of gas, by eliminating all the bottlenecks along the supply chain that previously affected firms operating in different market segments.

Liberalisation policy for market competition in Europe has been accomplished to a lower extent than in the US. Liberalisation has only concerned the upstream and downstream, whereas national grids remain regulated monopolies. The reforms took place through three EU energy directives. The 1998 directive required Member States to open domestic gas markets to European competitors in the upstream and downstream. The 2003 directive stressed the need to separate the national grid from the former monopolist via legal unbundling, by creating a subsidiary that owns the national grid. The 2009 directive envisaged ownership unbundling, namely the incumbent's spinoff of the national grid and the creation of an independent company. The rationale for this reform was to prevent the incumbent from granting privileged access to the grid to its subsidiaries at the expense of new entrants.

The economic principles and rationale of the current EU regulatory framework for the gas market seem to have been mainly inspired by Neoclassical Economics. The emphasis on allocative efficiency is evident in the attempt to deregulate the potentially competitive phases of the upstream and downstream, while unbundling the national grid in the midstream, which would remain highly regulated. The option to create a competitive midstream market inspired to the US model has been discarded because European national grids are considered natural

monopolies. Therefore, the existence of more than one operator would be inefficient due to fixed costs' duplication.

However, unlike the US model, the EU model has succeeded neither to create a competitive market structure, nor to decrease price for consumers. The literature provides different interpretations for such failure, depending on the theoretical lens adopted. The strand adopting the Neoclassical lens interprets the European failure to design a competitive market as caused by the economic and institutional advantages that incumbents still retain at the expense of new entrants (Newberry, 2000; Holz et al., 2008; Boots et al., 2004). For example, their retention of most long-term contracts with producing countries and their control of import infrastructure prevent new entrants from gaining market shares. In addition, their close ties with regulatory agencies has made it possible for them to negotiate favourable capacity allocation in the national grid. The solution to this problem has been identified, and partially applied in practice through European laws, in the coercive concession of market shares and capacity allocation by the incumbent to new entrants. The long-term purpose is to fragment the domestic market as much as possible to increase market competition.

In contrast, the strand of literature that adopts the TCE lens provides a different explanation of the factors that prevent market competition from working effectively. For example, Makhholm (2012) suggests that the EU should undertake similar steps as the US in terms of deregulation. In particular, he argues that regulation of the grid undermines the growth of domestic gas markets, preventing new entrants from competing equally with incumbents. In his view, ownership unbundling of the grid from the former monopolist is not sufficient to incentivise market competition. Heavy government regulation of the grid would prevent the rise of competing grids and it would allow the incumbent to perpetrate its market power. Two main regulatory measures applied to the national grid are deemed responsible for obstructing market competition: regulation of capacity allocation and of tariffs.

Regulation of capacity allocation favours former monopolists or a small number of oligopolists. In fact, the EU provision on Third Party Access, which grants new entrants the rights to access national and import infrastructure, was not able to prevent national regulators from conceding priority to the incumbents' long-term contracts over short-term contracts. This entails that new entrants can only obtain spare capacity left in the national grid, with the bulk of capacity being already allocated to incumbents. As a result, the import and midstream markets in Europe are still dominated by monopolies or oligopolies, which have high bargaining power towards downstream operators and retain oligopolistic rents at the expense of consumers.

However, according to Makhholm (2012), the critical aspect is the regulation of tariffs in the national grid, which in his view would discourage the rise of potential pipeline companies as competitors of existing monopolies in the national grid. In his view, deregulation of transport tariffs would incentivise private investments in alternative pipelines or grids, especially during phases of high demand of gas. Competition in the midstream market would eliminate the current bottlenecks in the transport of gas, incentivising greater production or import and greater transport capacity. Gas abundance would decrease the specificity of gas and incentivise the recourse to more flexible contractual arrangements, eroding the market power of incumbents.

This chapter argues that both the strands adopting Neoclassical and TCE lenses (Newberry, 2000; Holz et al., 2008; Makhholm, 2012; Joskow, 2010) neglect problems that energy deprived countries face in terms of energy security and price fluctuations. In fact, the prioritisation of long-term contracts in the national grid stems from the necessity to ensure stable supplies at favourable prices. The demise of long-term contracts and the full transition to spot markets would expose consumers to fluctuations in prices and quantities supplied. This occurs as global gas supply is not stable because of technical, economic and geopolitical

reasons. Furthermore, there are several constraints of technical and economic nature in the transport phase. These constraints prevent import markets from being liquid and constantly supplied in absence of infrastructure and long-term contractual relations that are developed for this specific purpose.

The above-mentioned features of European import markets prove that the European Commission's intention (and more generally the Neoclassical view) to further fragment European gas markets to increase competition would negatively affect the competitiveness of European firms and consumers' welfare. In contrast, reliance on foreign supplies requires domestic firms to be large, at the technological frontier, and to retain market power in the domestic markets. Financial and technological factors are crucial because relying on foreign supplies entails major efforts to build, operate and manage complex infrastructure megaprojects that involve high risk from the economic and engineering viewpoints. Smaller firms would not be able to afford such projects. Furthermore, technology is usually a crucial factor that attracts producing countries to collaborate with European Multi-National Companies (MNCs) and grant access to their domestic resources.

Most importantly, the purpose of liberalisation is to reduce the size and market power of European firms; in this chapter's view, this would reduce their bargaining power vis-à-vis foreign producers. Liberalization would therefore inevitably advantage foreign suppliers as they would exploit the fragmentation of their end market by leveraging on competing energy importers. This is even more true in the European context where the main suppliers (Russia, Algeria and Norway) already have great bargaining power, accounting as they do for 85% of European gas imports. As a result, further fragmenting European domestic markets would bring European importers to be still exposed to binding contractual relations with foreign suppliers, but with worse contractual conditions.

Adopting a TCE lens without considering the external dimension of the gas market could also lead to undertake unsuccessful policy reforms. For example, Makhholm's (2012) proposal to deregulate tariffs on the national grids, and to stimulate the rise of alternative grids in competition among them, is hardly applicable to Europe in a successful way. In fact, exporting countries would probably leverage on competing grid companies to negotiate more favourable contractual conditions.

A similar problem could arise as a result of the EU's support towards import infrastructure projects that are sponsored by new entrants who buy gas from countries that already supply the former monopolist. The creation of alternative routes supplied by the same exporting country increases its bargaining power as the exporter benefits from the possibility to have more options in terms of customers. This would have the effect of transferring rents from domestic to foreign players, rather than to domestic consumers. The same problem arises in the EU provision on Third Party Access<sup>58</sup> (TPA), according to which former monopolists must grant use of their import infrastructure to new entrants once the latter reach gas import deals with foreign producers.

Other relevant factors impede the replication of the US liberalised model in Europe. These are related mostly to geographic and institutional peculiarities. In fact, Europe is not as geographically extended as the US, and it is also characterised by physical constraints that impose barriers to gas trade between Member States and with non-EU exporters. For example, the existence of several peninsulas (e.g. Italy, Spain, Greece and Denmark) discourages investments in competing pipeline grids. Neoclassical Economics would suggest that in narrow strips of land, in which grid capacity already exceeds demand, the creation of another gas grid would cause fixed investment duplication, which would bring to inefficiency. In fact, liberalisation did not generate the expansion of networks by new entrants. In contrast, it

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<sup>58</sup> For further details on TPA, see the third (2009/73/EC) EU directive on gas market liberalisation.

incentivised national grid operators to acquire shares in companies managing existing grids in other EU countries, preventing new entrants from entering the midstream market and enhancing competition.

Other key factors that prevent the application of the US model in Europe have political causes. For example, the relevance of environmental sustainability in the European debate has led to exclude the possibility to rely on large-scale production of shale gas. Other obstacles to the creation of a Single Market of gas derive from the different political stances of Member States in key aspects of energy policy and their rivalry for the procurement of energy resources from abroad.

#### **6.4. Conclusions and policy suggestions**

Models of governance in the gas supply chain and contractual arrangements vary widely in the US, East Asian and EU gas markets. In particular, the US has successfully accomplished a transition to a liberalised gas market where energy firms compete at all levels in the supply chain – upstream, midstream and downstream – whilst the price for consumers has halved. In contrast, in the EU and East Asia vertical integration is still dominant, despite the EU's effort to introduce flexible models both at the supply chain (unbundling) and contractual (spot market) levels. Unlike the US, in the EU and East Asia gas prices for consumers have increased. The increase can mainly be attributed to the dominance of oil-linked long-term contracts and the significant increase in oil prices since the early 2000s. In fact, studies demonstrate that liberalisation reforms, particularly in the EU, had negligible effects on prices for consumers, and so they could not contribute positively to balance the effect of rising oil prices (Florio, 2013).

The negligible influence of the EU liberalisation reforms on prices was shown in section 6.2, by comparing the Italian and French markets. The two countries have implemented

liberalization reforms to a different extent, but they have obtained very similar results in terms of consumer price. Italy has implemented liberalization reforms extensively, including measures to decrease market power of the incumbent and to spinoff critical assets such as the national grid. In recent years, unbundling and other regulatory measures have allowed domestic and foreign competitors to challenge the leadership of the former monopolist. Liberalisation in France was implemented to a lower extent. This is shown primarily by the fact that the national grid is still a subsidiary of the former monopolist, which represents a high barrier to potential new entrants in the French gas market. In fact, the former monopolist dominates the market for gas import as well as the wholesale, distribution and retail. The comparison highlights that, despite the different extents to which liberalisation reforms have been implemented in the two countries, gas price for consumers has followed the same increasing trend. This suggests that prices in gas-deprived contexts are likely to depend more on aspects related to the external dimension of the gas market, such as the level of energy dependence from abroad, the profitability of the import deals, the endowment and strategic positioning of import infrastructure, and the diversification of energy sources and suppliers, rather than on domestic market regulation.

The main strands of the literature provide a different explanation of the failure of EU liberalisation reforms to decrease gas prices for consumers. Through different lines of reasoning, they emphasize regulatory gaps and political-economic constraints related to the domestic market. One view, which is inspired by Neoclassical Economics, argues that high prices in the EU can be explained by the persistence of aspects of the national model. In other words, former monopolists still retain excessive market power and prevent market entry to potential competitors thanks to their influence on political and regulatory bodies as well as their dominance throughout the supply chain. This view recommends to reduce their market power through legal provisions that would force them to sell their assets in segments of the

supply chain that are natural monopolies (i.e. domestic and import pipelines) as well as potentially competitive (i.e. upstream and downstream).

Another view, which is inspired by TCE, agrees that high prices are generated by insufficient degrees of domestic market competition. However, based on the successful experience of the US, this view suggests that an actual transition to a competitive market would only occur when national grids are deregulated. More specifically, State regulation of transport tariffs below certain ceilings prevents potential (domestic or foreign) midstream operators to invest in the development of alternative grids. The lack of alternative grids concurs to perpetrate the market power of the former monopolists, to which most of the transport capacity in the grid is allocated, at the expense of new entrants. The limited access to the national grid and to import infrastructure by new entrants will constrain them to buy gas on the wholesale market from the former monopolist, which still largely controls the import market and applies a mark-up in price to retailers, thus raising transaction costs.

This chapter argues that the above-mentioned views provide an incomplete picture of the dynamics of the European gas markets, and that effective solutions to increase consumers' welfare in the long term can only be identified if the external dimension is considered. More specifically, increasing market competition domestically, either through coercive provisions on market opening or deregulation of national grids, would arguably bring to a more efficient allocation of resources among domestic stakeholders (i.e. energy firms and consumers). However, fragmentation of domestic markets would decrease the bargaining power of domestic importers vis-à-vis foreign exporters, which in the long term will result in a transfer of rents from domestic to foreign firms. This, in turn, would make it much harder for gas prices for consumers to decrease in a permanent way.

The need for domestic players to avoid a decrease in their bargaining power vis-à-vis foreign exporters is particularly important in the European context, where scarcity of gas makes

investments for gas supplies from abroad “asset-specific”. Specificity entails that gas routes are constrained by technical, geographic and political factors, preventing European countries from benefiting from a wide range of options in terms of suppliers. Liberalisation is not suitable in this context as it would increase the number of energy firms operating in the domestic market, which would in turn provide more options to foreign producers in terms of potential customers to supply. This would increase the bargaining power of foreign producers, as these usually are vertically integrated government-owned monopolists.

In conclusion, the long-term welfare of consumers cannot disregard the competitiveness of domestic players vis-à-vis their foreign suppliers. The fact that liberalisation reforms have not yet negatively affected the competitiveness of domestic players is due to the partial nature of the liberalization. In fact, former monopolists have succeeded to partially keep their market power—and to avoid being further weakened—by adopting strategies of internationalisation. Their still extensive control of the market of long-term contracts not only has allowed them to maintain their bargaining power, but has contributed to energy security and to prevent excessive price fluctuations, which are a major determinant for consumers’ welfare. Therefore, considering the specificities of the European gas sector, domestic market competition alone is not enough to increase consumers’ welfare. Market competition should be designed to allow domestic firms to negotiate favourable energy deals with foreign exporters and to efficiently coordinate the supply chain. The chapter suggests that these objectives can only be achieved through vertical integration and the retention of market power in domestic markets.

## **7. Final remarks on the partial transition from the national to the EU model of energy governance**

More than 20 years after the first EU directive on gas market liberalisation, the EU model of energy governance is still in transformation and has not yet accomplished its original objectives. In particular, EU energy policy has not fully succeeded to reshape the gas industry and gas markets to make them compatible with the Single Market policy. The main difficulty was to reconcile market competition, which is a pillar of the Single Market policy, with policy objectives that are specific of the energy sector, namely energy security, price affordability for consumers, and environmental sustainability. The thesis argues that such difficulty results from the specificities of the European gas sector, which require policy approaches that differ substantially from those adopted for other sectors of the economy.

The thesis shows that in Europe the transition to an energy model based on market competition can cause uncertainty over infrastructure investments and gaps of coordination between policy objectives and corporate strategies (Cardinale, 2019a). This has emerged from the analysis of the failure of infrastructure projects for gas import such as Galsi and Nabucco, and the implications of such failures for energy security. The liberalisation reforms have not achieved very successful results also in terms of market competition, as the reforms have generated a transition from monopolistic to oligopolistic market structures. Furthermore, liberalisation has coincided with a reduced ability by governments to intervene in the energy sector, which has resulted in the adoption of a shorter-term investment horizon by energy firms, but also in the decreased government ability to influence the industrial strategy of key firms for energy security. Liberalisation has resulted in higher prices of gas for final consumers, and it has prevented governments from safeguarding consumers' interests through price ceilings.

One of the main obstacles to the development of an effective strategy of EU energy policy is the divergent vision among Member States on fundamental energy issues. The main

divergences concern i) competition policy, as Member States' approaches to liberalisation differ widely; ii) the strategy of diversification of energy imports, which reflects differences in their foreign policies; iii) the commitment on the transition to an environmentally sustainable energy system. The contrasting visions reflect differences in Member States' stages of development, industrial specialisation, geopolitical interests and political culture.

For example, the different stance between Eastern and Western Europe on the transition to a sustainable energy system reflects their different stage of development and a different trade-off between energy costs and environmental sustainability. Another difference concerns the energy relations with energy producers. For example, Eastern European countries emphasize the need to reduce their dependence from the Russian gas, while Western European countries advocate for maintaining such trade, because it is considered an important source of abundant and affordable energy. Disagreements among Western European countries occur mainly as a consequence of their rivalry for being awarded licenses in the upstream of producing countries and for the control of energy imports. This is evident in the lack of coordination among their foreign policies towards producing countries, and in their different diplomatic stances when political crises occur in such countries, as the Libyan case shows.

Positions also diverge between Member States and the European Commission (EC), particularly on competition policy. This is evident in the different extent to which Member States have opened their domestic markets to competition and have privatised their SOEs, showing different degrees of compliance with EU directives. For example, the case of France, analysed in the thesis, shows that political culture and national governance (i.e. the relations between government, trade unions, and energy industry) have played an important role in opposing liberalisation reforms. In contrast, the limited extent to which liberalisation was implemented in countries in the Eastern Europe can be explained by the lower development of

their energy industry and of their economy, and by the potential risks to fully open their energy markets to foreign energy firms that are more competitive.

Besides the differences in policy visions between Member States, the thesis suggests that the core factor explaining the problems of the EU model of energy governance has to do with the inability of policy-makers to understand the specificities of the gas sector vis-à-vis other sectors of the economy, and of the European context vis-à-vis other world regions. This is evident from the fact that EU policy reforms were implemented without considering how mechanisms of interest alignment that existed in the national model could be rethought for the EU model. In particular, for decades, vertical integration and energy diplomacy played a key role in reconciling the commercial interests of domestic (importing) firms with foreign (exporting) firms, which in turn could also reconcile the interests of a wide range of domestic stakeholders, as these deals enhanced energy security, growth and innovation in the energy industry, and consumers' price affordability.

The transition to the EU model has implied that these mechanisms of interest alignment were given up without developing new mechanisms that reconcile the EU principles of market competition with the specificities of the European gas sector. For example, unbundling and partial privatisation of former SOEs have generated uncertainties on the commercial viability of transnational infrastructure for both EU and non-EU energy firms, as governments are not directly involved as investors and guarantors of the deals, while firms have to operate in increasingly fragmented supply chains, which entail problems of coordination and generate transaction costs (Cardinale, 2019b). This has caused the failure of some infrastructure projects of gas import, and has negatively affected energy security, prices affordability for European consumers and economic growth.

The pursuit of these fundamental objectives of economic and energy policy was further hindered by the increasing withdrawal of the government from its entrepreneurial activities in

the energy sector. In fact, privatisation has prevented the government from pursuing large-scale investments through SOEs, and this has negatively affected economic growth and innovation. The government's inability to influence former SOEs has made it difficult to develop long-term strategies for energy security, but also to protect consumers from market fluctuations through price ceilings.

Consumers have been the most vulnerable stakeholders and the most affected by the negative implications of the liberalisation reforms. In fact, the transition has not only generated higher final prices; it has also fragmented energy governance across various institutions at different levels (local, national and EU), making it difficult for consumers to influence decision-making and to contribute to the development of a strategy of energy policy that safeguards their long-term interests.

The thesis argues that the critical aspects of the EU model of energy governance are the result of a vision that puts too much emphasis on the EU Single Market, and particularly on the need to integrate national markets, while largely ignoring energy relations with producing countries. This approach is not suitable for two main reasons: i) European economies are still largely dependent on gas imports from abroad; ii) the global leadership of European economies has been challenged in recent years by emerging economies, which entails a progressive loss of bargaining power with international counterparties, particularly with producing countries.

These critical aspects require rethinking EU energy policy by doing justice to the foreign policy dimension. A key objective would be to develop a strategy of energy diplomacy that is coherent with domestic policy, reconciles the divergent interests of Member States, and suits the specificities of the European gas sector. This is a precondition to i) envisage ways to align the interests between exporting and importing energy firms, and the respective governments; ii) enhance European energy firms' global competitiveness in the long-term, iii)

achieve the main objectives of the EU energy policy – market competition, energy security, consumers' welfare, and environmental sustainability.

To be sure, some recent developments in the European gas markets appear encouraging. For example, in recent years European gas markets have become increasingly liquid thanks to oversupply from abroad and decreasing domestic demand. This has led energy firms to increasingly rely on spot transactions at the expense of long-term contracts. As a result, gas prices have also decreased. However, these encouraging signals should not be interpreted as a structural change in European gas markets. The current abundance of gas is caused by high supply and low demand. In this context, long-term contracts are playing a decisive role, as they provide constant gas flows in addition to the quantity traded in spot markets. Therefore, the European Commission's plan to eliminate long-term contracts not only would deprive European gas markets of a fundamental import source, potentially bringing the situation back to gas scarcity, but it would cause serious concerns for energy security, especially if global gas supply decreases and the transition to renewables proceeds at a slow pace.

On a final note, it is worth mentioning that the European gas industry remains one of the most competitive worldwide, which allows it to ensure security of gas supplies as well as quality and affordability for consumers. In fact, this thesis mainly addresses the long-term potential implications of the policy reforms implemented in the last years, which are not fully visible in the current phase, despite some important signals (e.g. the failure of large infrastructure projects). Although some of the policies suggested by this thesis are likely to be relevant in this phase of transition from the national to the EU model, and in the transition from hydrocarbons to renewables, most of the insights of industrial policy related to the relations with foreign countries are likely to also be relevant when the transition is completed. For example, the need to reconcile corporate strategies with the public interest and to stimulate the

growth and innovation of key firms has been a key challenge across historical phases and it is likely to remain relevant in the future.

To conclude, the difficulties encountered by EU energy policy are the result of criticalities in the broader context of EU industrial policy and of the EU's institutional architecture. More specifically, just as governments have historically relied on industrial policy to reconcile domestic (political-economic) interests to face international challenges (Bianchi, 1998), the EU should adopt an industrial policy that reconciles internal interests, and which is based on shared values and a clear way to move forward in the coming decades. Since the beginning, EU industrial policy has been based on clear principles and strategies, of which market competition and free trade were pillars. Especially in the 1990s and early 2000s, it succeeded to gather a certain level of support among Member States and their respective economic interests. However, the EU's difficulty to keep such interests cohesive across Europe began when the EU industrial policy started proving ineffective to face international challenges. The divisions became apparent in occasion of the economic crisis of the late 2000s, and it subsequently spread to other spheres of EU policies, including energy policy. This thesis suggests that the unsuitability of EU industrial policy to face international challenges can be explained by the fast global changes of the last years, the change of the economic and political relevance of Europe in the world, and the difficulty to adapt the EU principles and policy tools to the new context.

The next sections examine how the above-mentioned insights could be pursued in practice, and how this could benefit the main stakeholders in the energy sector, namely energy firms, governments and consumers. The analysis is a summary of the findings of the main chapters of the thesis. The findings are also contextualised in the light of recent developments in the European gas market and of the broader dynamics of the energy sector, including the transition to renewable energy.

### **7.1. The energy firms' viewpoint**

To understand how the EU policy of market liberalisation affected the profitability of European transnational gas infrastructure, it is important to analyse some key changes in the governance of energy firms. The thesis shows that only to a partial extent was liberalisation able to dismantle the old national model, based on a vertically integrated public monopolist. This was due to the resistance of the State industry towards this process, together with other State bodies who also opposed liberalisation. The thesis employs the lens of Advocacy Coalition Framework (ACF), which explores how policy outcomes are generated by policy disputes between rival coalitions with opposed interests, to interpret the policy dispute that took place between the Italian State industry and the European Commission (EC). The main finding is that the contrast between national and EU institutions and their similar ability to influence the process of policy-making was the main cause of partial liberalisation, which represents a compromise between the two opposed stances.

Partial liberalisation generated a hybrid model of energy governance. The latter includes aspects of both the national model, characterised by a vertically integrated public monopolist, and of the EU model, characterised by unbundled private firms in competition with each other. The hybrid aspect consists in the coexistence of firms with different levels of vertical integration and government ownership. In particular, unbundled firms are the new entrants. They could access the gas market thanks to the EU provision on market opening. As their traditional business occurred abroad or in other energy subsectors such as electricity, their market power is usually limited and mainly concentrated in specific phases of the supply chain, particularly retail and distribution to consumers. In contrast, the vertically integrated firms are the former monopolists. They succeeded to retain most of the assets from upstream to downstream thanks to the EU provision on unbundling, whose mandatory aspect only concerns

the spinoff of the national grid from the former monopolist. Greenstream and Galsi, the gas pipelines connecting Libya and Algeria to Italy, are representative of the above-mentioned models of supply chain governance. In fact, they are managed respectively by a former monopolist and by a consortium of new entrants, making it possible to assess in a comparative way how key aspects of the national and EU models (i.e. vertical integration vs unbundling) contribute to infrastructure profitability.

Greenstream is owned and managed by Eni, the former monopolist of the Italian gas market with extensive assets in the national and global supply chain. As a result, Greenstream is vertically integrated through joint ventures between Eni and the Libyan NOC. In contrast, Galsi is unbundled because it is owned and managed by new entrants in the Italian gas market that lack the market power to operate extensively across the supply chain. In fact, the upstream assets in Algeria are owned and managed by the Algerian SOE Sonatrach, which also retains a majority share in the international section of Galsi.

The chapter finds that Greenstream's profitability benefited from the interest alignment between Eni and NOC, which was brought about by the joint ventures in all the key production and transport phases. In Galsi, interest misalignment between Sonatrach and the consortium of European importers was caused by the lack of these elements. In particular, the lack of a joint venture in the upstream was a primary cause of interest misalignment. In fact, as the counterparties operate in different markets, namely upstream and downstream, changes of demand and supply in each market generated changes in their respective bargaining power, causing constant disagreements over gas import prices, as well as over the allocation of risks and financial burdens across different project phases.

The analysis suggests that vertical integration is a key element for infrastructure profitability also in the newly liberalised EU markets. The lens of Transaction Cost Economics (TCE) makes it possible to understand the economic rationale of this finding, by identifying

“asset specificity” as the key driver to vertical integration. Specificity entails that assets dedicated to production and provision of gas in the foreign upstream and international midstream are ‘transaction-specific’ and cannot be used for alternative purposes. However, specificity is not only generated by regulation, as many argue with reference to the European case (Newberry, 2000; Makhholm, 2012), but by technical and geographical factors that make it difficult to switch suppliers or customers. Liberalisation could not overcome these constraints, due to their technical and geographical nature. These considerations shed light on the importance of maintaining old mechanisms of interest alignment, e.g. vertical integration, to reduce transaction costs also in the newly, partially liberalised European energy markets.

The case study shows how different contractual arrangements make it possible to achieve different levels of vertical integration and to reduce transaction costs in transnational energy deals. For example, Greenstream shows that joint ventures made it possible for Eni to vertically integrate in the Libyan upstream and overcome the Libyan NOC’s bargaining power, reducing transaction costs. This generated a substantial cost reduction for gas imports and prevented potential negotiating disputes with the Libyan NOC. The joint ventures made it possible for Eni to reduce transaction costs also from the viewpoint of ‘governance cost’ (see Williamson, 1981). In fact, the joint venture is designed to share risks and benefits between the counterparties, as importing and exporting firms are equally involved in all supply chain phases of a given project and share the same interests.

In contrast, Galsi shows that the lack of equal joint ventures between Algerian and European firms in the Algerian upstream contributed to generating disputes between negotiating counterparties. In fact, as gas prices at the European hubs started to decrease by the late 2010s, European firms asked for a substantial reduction of import prices. Furthermore, the increasing competition from other gas import pipelines allowed European importers to evaluate alternative sources of supply. These elements changed the bargaining power in favour of

European firms, causing prolonged disputes and the subsequent project stalemate. Galsi's stalemate could arguably be avoided if European firms had operated in Algeria, as their interest to build the pipeline would have been much greater and disputes over import prices would have been avoided. The adoption of long-term contracts has proven insufficient to align the interest of the counterparties, although in other European projects, and under more favourable market conditions, long-term contracts have proven effective for interest alignment.

The analysis suggests that, in addition to joint ventures, energy diplomacy is a major determinant of interest alignment, and thus of infrastructure profitability. For example, the case of Greenstream shows that the diplomatic commitment between the Italian and Libyan governments created mutual advantages. Eni was awarded very advantageous concessions in the Libyan upstream, whilst NOC benefited from the contribution of foreign capitals in the realisation of Greenstream, the transfer of technology, and a constant flow of revenues deriving from the export of gas. However, reaching such favourable deals for both counterparties was possible thanks to the incentives deriving from the wider political-economic cooperation of the two countries. In particular, the existing trade agreements represented a very effective negotiating platform for the energy sector, which could benefit from concessions and exchange deals deriving from other areas of economic and political cooperation. As a result, energy diplomacy reduced transaction costs from Eni's production cost viewpoint; but it also reduced transaction costs from the governance costs viewpoint for both Eni and NOC.

By contrast, Galsi was penalised by several factors of diplomatic nature. For example, the presence of political interests of different countries and institutional levels prevented Galsi from having a clear strategic vision. Furthermore, the diplomatic intervention of the EC was counterproductive, as the request to Algeria to liberalise its domestic market and to adopt the EU regulatory standards was overly ambitious. This made it impossible to reach a compromise on less ambitious, yet very important targets such as tariff reduction on energy trade and other

issues related to trade agreements. The lack of an effective cross-country institutional cooperation has produced disadvantageous contractual conditions for European energy firms, thus preventing them from being awarded almost any contracts in the Algerian upstream during the 2000s. This has largely contributed to increase Galsi's commercial risk, both because it raised concerns over a depletion risk in Algeria and the difficulty to fill Galsi; but also because it gave rise to an unbundled supply chain dominated by the Algerian Sonatrach, which has led to interest misalignment and subsequent disputes with the Europeans counterparties.

Galsi is not the only project in which the EU model of energy governance has shown its criticalities. For instance, the Nabucco gas pipeline has been abandoned on the basis of similar reasons, despite the heavy financial and diplomatic support provided by the EC. Nabucco was conceived in the early 2000s to supply Europe with Azeri gas via Turkey. The support provided by the EC was due to an innovative aspect of Nabucco as compared to other competing projects for gas imports, namely the possibility to supply the Eastern European markets (Yorucu and Mehmet, 2018). This represented a unique chance to challenge Gazprom's monopoly in the area. However, despite the exceptional support provided by the EC, Nabucco has not succeeded to overcome the competition from other projects of gas imports. As in the case of Galsi, Nabucco's failure seems to be also attributable to the interest misalignment generated by its unbundled supply chain and the EC approach to energy diplomacy in the negotiations with Turkey.

Nabucco's supply chain envisaged different Special Purpose Vehicles (SPVs) in the upstream and midstream, owned and managed by different consortia of energy companies. More specifically, a Special Purpose Vehicle (SPV) operated by the Azeri Socar and other upstream partners was supposed to sell the gas extracted to another SPV operated by a consortium of Turkish and European companies in charge of transporting the gas to Turkey and Europe through pipeline infrastructure. The companies involved were Botas (Turkish),

BEH (Bulgaria), MOL (Hungary), OMV (Austria), and Transgaz (Romania). The unbundled supply chain, in turn, created concerns among investors. One of the main concerns was that Socar would have probably prioritised the supply of export infrastructure under its direct ownership rather than Nabucco. This hypothesis became even more realistic when the estimates of gas reserves in the Caspian Sea were revised downwards.

The concerns over Nabucco's commercial risk were aggravated by the frictions in the negotiations between the EC and Turkey. As with the EC-Algeria negotiations for Galsi, the EC's request to liberalise the Turkish gas market by adhering to the Energy Community Treaty (ECT) was not accepted by the Turkish government, except in case of major concessions from the EC. In particular, Turkey requested the EC to provide guarantees over Turkey's membership in the EU (Kardas, 2011). This would have granted Turkey access to other European markets in which Turkey retained a comparative advantage, compensating for the losses generated by opening of the energy market, in which European firms were more competitive.

After the EC's refusal to make substantial progresses over the issue of Turkish membership, the two counterparties agreed to scale down their ambitious negotiating targets and find a common ground to at least allow the realisation of Nabucco. Turkey requested to retain a consistent part of the gas flowing through Nabucco and to pay it at discounted prices. In exchange, Turkey would grant a partial opening of its energy market to European energy firms and full cooperation in the realisation of Nabucco. However, despite the lower ambition of these terms, the counterparties could not reach an agreement. This led Turkey to exclude European firms from operating the pipeline in the Turkish territory and to accept operating it with the Azeri Socar in a new joint venture called Tanap (Kardas, 2011).

The failure to achieve a compromise between the EC and Turkey shows once again the divergent stances within the EU with respect to foreign energy policy, with some European

countries being in favour of a closer cooperation with Turkey while others being opposed to it. Turkey's willingness to negotiate Nabucco in a wider framework of economic cooperation and the EU's inability or reluctance to do so show another missing link in the EU governance, namely the link between economic and energy policy. This suggests that the EU should make additional efforts to include energy into its trade policies, as the main non-EU trading partners rely on cross-sectoral approaches to negotiation.

The lack of a united and effective EU foreign energy policy also reflects the lack of a clear geopolitical stance, which is caused by deep divergences in the interests of Member States. The lack of a shared geopolitical vision is also evident in the recent debate over the realisation of two major projects of gas import, namely East-Med and Nord Stream 2. The two projects show major geopolitical divisions at the highest international levels, namely between the US and Russia, as well as at the regional level among European governments and neighbouring countries in the Middle East.

The East-Med pipeline would connect the newly discovered gas fields in Cyprus and Israel to Europe via Greece. Although the project has recently received the diplomatic support of the US and the EC, its commercial viability is still subjected to major political risks (Ruble, 2017). In fact, some of Cyprus' gas fields are contested by Turkey whilst frictions are arising between Israel and Lebanon for the same reason. Considering the political tensions between these countries, the concerns over potential disruptions on East-Med are well founded.

In contrast, Nord Stream 2 will supply Russian gas to Germany without crossing any third country. A direct link was long awaited by both countries, which in recent years have been affected by disruptions caused by the political instability or open hostility of some Eastern European countries. However, a direct link between Russia and Germany has been opposed by a large coalition within the EU, which is led by the EC and externally supported by the US. Despite this opposition, the project is in its final stage of construction and near completion.

One of the reasons explaining the success of Nord Stream 2 is certainly related to the importance of Germany in the EU and its influence in EU political affairs. However, this result was not obvious considering the strong US opposition and its proven ability to prevent the realisation of infrastructure that runs counter its interests in Europe (see the failure of South Stream). Another major obstacle encountered by the EC in its effort to oppose North Stream 2 was of legal nature. In fact, the recent EC attempt to amend the latest gas directive, by extending the EU jurisdiction over energy import deals with third countries, has been considered unlawful, as EU treaties still establish that Member States have jurisdiction in this domain (Hancher and Marhold, 2019). Many, though, have interpret this move of the EC as motivated mainly by the urgency to prevent the realisation of Nord Stream 2 (Talus, 2019), which is seen by the EC as an additional source of energy dependence from Russia.

To conclude, the EU model of energy governance has not succeeded to fill the gap between the national and EU levels. The issue would probably not be solved by a transfer of power from Member States to EU institutions, especially if the EU policies are not able to reconcile the divergences among national interests. Furthermore, the market for gas import is not under the EU jurisdiction. These elements suggest that the successful creation of a EU foreign energy policy depends on the EU's ability to create a more diversified and multi-objective policy approach, which more accurately reflects the broad interest framework of Member States rather than merely the views and principles of EU institutions.

## **7.2. The governments' viewpoint**

One of the main effects of the EU liberalisation policy was the reduction of direct government intervention in the energy sector. The full or partial privatisation of former State-Owned Enterprises (SOEs), and the transition to State-Invested Enterprises (SIEs) and Private Enterprises (PEs), was one of the main elements that limited governments' influence. Despite

the potential to decrease market inefficiencies, privatisation has also raised concerns over the government's ability to pursue public policy objectives to the same extent as with full government ownership of energy firms. The thesis addresses this problem through the case study of Greenstream and Galsi as both projects are owned and managed by partially privatised SIEs. The case study shows common features among European SIEs but also important differences in the ways European governments pursue policy objectives through them.

The findings indicate that governments can still pursue some, though not all, policy objectives through SIEs. In particular, the government can still pursue objectives related to SIEs' external sphere of action such as energy security and foreign economic policy. In fact, SIEs play a key role in supplying the domestic market with energy produced or imported from abroad, thus contributing to energy security. Furthermore, they build and maintain long-term commercial relationships with producing countries, facilitating the extension of existing cooperation to other sectors of the economy. The possibility to reconcile government and private interests in SIEs' external action occurs as profitability of the energy import deals and energy security share important interfaces and therefore are in the interest of both public and private shareholders.

However, governments are unable to pursue most of the domestic objectives through SIEs, for example employment, economic growth, consumers' price affordability and geographical access. This can mainly be explained by the conflicting interests between SIEs' private shareholders and the government in domestic markets, and by SIEs' prioritisation of profitability over the pursuit of public policy objectives. An example of interest misalignment between governments and SIEs' private shareholders in domestic markets emerges from their reluctance to pursue price affordability for consumers, as this would come at the expense of profitability.

The case of Greenstream shows that the Italian government's diplomatic support to Eni was granted in order to improve energy security, as the project represents an additional energy route over the existing ones. The diplomatic effort was also addressed towards the negotiation of lower cost of imports, which are important preconditions for consumers' price affordability and economic growth. However, Eni's private shareholders could also benefit from diplomatic support. In fact, from the firm's viewpoint energy security corresponds to constant flows of revenues, whilst lower cost of imports contributes to securing a production cost advantage over competitors in the European gas market.

In addition to these factors, Greenstream played a key role in enhancing economic and political cooperation between Italy and Libya. The creation of a physical link between the two countries was not only a symbolic element, but a real long-term contractual commitment involving large-scale investments. This had the effect to increase mutual trust and encourage investments and trade across several other sectors in the years to come, thus contributing to increase exports and economic growth in Italy. This shows that national firms are not the only beneficiary of a government-firm cooperation, as governments also take advantage from the long-term presence of national firms in strategic countries and from the positive effects of their business for the economy as a whole.

Economic growth and consumers' price affordability are difficult to pursue through SIEs' domestic business. Economic growth is negatively affected by the risk-averse nature of SIEs' private shareholders, which leads to a narrower investment horizon. This has large-scale negative consequences for economic growth and innovation, considering energy SIEs' role of providers of an essential input for the whole economy, but also because of their innovative potential and contribution to GDP. In addition, the presence of private shareholders in SIEs makes it difficult for the government to protect consumers from market fluctuations, as any measure directed towards the decrease of price for consumers would consequently affect the

financial gains of the shareholders. This is evident in the substantial increase of gas price for industrial and household consumers since the partial privatisation of SOEs.

As a result, the interests of the government and private shareholders are aligned when SIEs operate abroad, as their effort is addressed towards overcoming international competition and extracting rents from foreign stakeholders. In contrast, in domestic markets their interests are often opposed and they tend to address the redistribution of oligopolistic rents to their favour and at the expense of each other. Nevertheless, the government retains additional tools to pursue public policy objectives. One of the most important is the veto power, which is usually available to the major shareholder in the firm. The veto power may also be attributed to the government by law, and can be extended to different types of decisions taken by the board, depending on the legal provisions.

In Italy and France, the provision on veto power has been justified to prevent hostile takeovers from foreign SOEs with conflicting political goals, as foreign SOEs' influence in the board of a domestic SIE could negatively affect national interests. For example, foreign SOEs could advocate for diverting existing energy routes towards their country of origin, or for increasing gas prices at the expense of domestic consumers. The veto power can also be functional to prevent hostile takeovers from financial investors with speculative purposes or with short-term investment horizons.

However, the thesis shows that veto powers are much more effective for pursuing energy security when SIEs retain vertically integrated supply chains, rather than unbundled ones. For example, in the case of Greenstream, the Italian government's control share in Eni makes it possible to exercise a veto power if Eni's management plans divestments from the production fields in Libya and the import infrastructure, or to divert energy flows towards more profitable markets. In contrast, Galsi's shareholders could not achieve similar results through veto powers as they lack production assets in Algeria and hence have no influence on the

management of Algerian exports. This recently became apparent when, because of raising gas prices in the Asian market, Algeria redirected a consistent part of gas flowing through existing pipelines to Europe into LNG cargoes to Japan.

In recent years, the European Commission (EC) has exercised pressures on Member States to abrogate the national legislation on the Golden Share, and fully privatise SIEs. The demise of the Golden Share was deemed necessary to prevent governments from vetoing the entry of European investors into SIEs' ownership structure, as this runs counter the EU principle of free movement of capital. To address Member States' concerns over potential negative effects on energy security, the EU has adopted the provision of the Golden Power. The latter makes it possible for Member States to veto divestments from critical infrastructure when energy security is at stake, regardless of the ownership structure of the firm that owns and manages such assets. However, the provisions on Golden Power do not consider that energy security in Europe mainly depends on the assets that are located outside the EU, where Member States have no legal authority. Therefore, the veto has no effect if divestments or diversion of energy routes occur in sections of the supply chain that are in the foreign upstream or international midstream. Furthermore, the Golden Power addresses only emergency circumstances and does not envisage the development of a long-term strategy of energy security through energy firms.

In contrast, government ownership of vertically integrated firms not only allows the government to take emergency measures on all critical assets along the transnational supply chain. It also makes possible for governments to implement a long-term strategy of energy security, which is supported by investments in infrastructure and production facilities within and outside the national borders. This approach to energy security also benefits from the development of long-term relations with the producing countries and the expansion of interdependence in other fields of political-economic cooperation. Economic interdependence

and the development of joint investments are strong deterrents of opportunistic behaviour from the producing country, and are effective incentives to long-term cooperation. This is evident in the energy relations between Eni and the Libyan NOC, which have not witnessed substantial changes despite the start of the Libyan war in 2011. War does not only represent the greatest risk to energy disruptions because of lack of security and disputes for the control of the facilities among rival armed groups; it also entails changes in the political leaderships and potential overturns of the existing contractual terms as well as of the strategies of energy export, which are also based on geopolitical logics.

In the currently prevailing model, based on mixed ownership of energy firms, the government can still develop long-term strategy of energy security through SIEs, to a similar extent as before the partial privatisation. For example, in Eni's board the Italian government could advocate for prioritising investments in producing countries that are geographically close to Italy, and thus relevant for energy security, if expected returns are equal. This influence could be hypothetically exercised by the Italian government, considering that the CEO and 6 out of 9 of Eni's board members are nominated by the government. In practice, this influence is not exercised systematically in order to avoid private investors in Eni to fear regular interference from the Italian government at the expense of profitability. Another reason that justifies the lack of government cooperation with SIEs is the absence of a clearly defined government strategy of energy policy, which is the result, among other reasons, of the Italian energy industry's global leadership and its ability to supply the domestic market with abundant and diversified energy sources. These factors explain the inclination of the Italian government to intervene only sporadically, namely in key negotiations with producing countries, when interests of the government and private shareholders are aligned.

Another main factor that explains the convergence of interests between governments and SIEs is that the latter, before their partial privatisation, had been conceived and developed

to serve national interests, addressing their investments towards markets that were relevant for energy security. This explains why SIEs' business abroad already contributes to energy security, sometimes making government intervention unnecessary. This is shown for example by Eni's extensive assets in Libya, their current relevance for the Italian energy security, and the absence of specific provisions by the Italian government on how to manage them. However, the long-term absence of a government strategy of energy policy could progressively reorient SIEs' business towards markets that are not relevant for energy security or other policy objectives, decreasing the relevance of SIEs for national interests.

The approach of the French government with respect to SIEs has shown some differences in comparison to the Italian approach. In fact, the French government has often attempted to use its SIEs as industrial policy tools. This is evident in the French government's support for mergers between national SOEs to make them larger and more competitive internationally. French SOEs have also been very active in the global market for Mergers & Acquisition (M&A). For example, EDF, the largest French SOE, has recently purchased the Italian second largest gas firm Edison, which is a shareholder of Galsi. The acquisition can be functional to French energy security, considering Edison's leadership in the Italian market and Italy's strategic position in gas routes connecting North African producers to European consumers. For example, one of Edison's plans since its acquisition by EDF has been to divert part of the gas flowing through Galsi towards Corsica and to subsequently supply the French mainland.

However, the French government's ability to pursue policy objectives through SIEs is not as extensive as it may appear, despite the substantial shares held. In fact, SIEs' management has in many occasions shown the ability to take key decisions of energy policy without direct consultation with the government. For example, Edison's acquisition by EDF occurred without

consulting the French government, and despite the potential frictions that could arise with the Italian government.

However, despite the increasingly limited ability of the French government to influence SIEs, and the increasing power of SIEs' management, SIEs have not undergone a full transformation from public policy tools to purely market-driven actors. In fact, the thesis suggests that French SIEs' strategy takes into account economic and societal interests. In domestic market, their industrial strategy is coordinated with the trade unions and their pricing policy is subjected to the opinion of the French government and citizens, which still see SIEs as providers of public services. In global markets, French SIEs are expanding their influence through M&As of key energy firms to supply the domestic market with abundant and affordable energy.

To summarise, the transition from SOEs to SIEs has generated some changes in corporate governance and in the government's ability to pursue policy objectives through them. In particular, SIEs' private management and profit-oriented nature makes them suitable to the EU Single Market policy and to compete in domestic market; but also to operate in global markets, where they compete with energy majors for the production, transport and distribution of energy. Their global business has also strategic implications for European governments, particularly for long-term economic competitiveness, as they supply the domestic market with an input that is used in every economic activity. The cost advantage for the domestic industry deriving from cheap and abundant energy contributes to develop industrial leadership and to increase the influence of governments in global governance.

The thesis suggests that in the current phase of increasing global competition for the control of strategic inputs (e.g. energy, high-tech goods and transnational infrastructure), European SIEs could play a crucial role to avoid the decline of European economies. However, to achieve concrete results, European governments should cooperate more closely with their

SIEs, exploit their strategic potential in global markets, and maximise mutual synergies. In global markets, governments' and SIEs' interests may be more easily reconciled than domestically, as their collaboration is conceived to extract rents from foreign (political and economic) players rather than from each other. If coordination between public bodies and SIEs also occurs at the EU level, it could be a driver for the emerging EU foreign industrial policy.

Another key industrial policy objective that the EU could pursue through SIEs is the transition to a more environmentally sustainable energy system. SIEs are the most suitable actors to trigger such transition, thanks to their financial and technological leadership, their market power in national and international markets<sup>59</sup>, and the governments' direct influence on executive management. SIEs have systemic relevance especially when they own and manage national infrastructure networks or when they operate in sectors that produce key inputs for final productions. This entails that their commitment to environmental sustainability would result in a systemic change in production along the supply chain, because of their contribution to green growth in intermediate phases of production (often neglected by environmental policies and the public opinion) and the need for contractors and final producers to upgrade their standard of sustainability accordingly.

At the moment, European SIEs are at the forefront in the transition to a sustainable energy system, and they are increasingly coordinating in joint initiatives to reduce carbon emissions. In the gas sector, one of the the main initiatives is "Gas for Climate". It involves 7 European Transmission System Operators (TSOs) and two gas industry associations. Most of the TSOs involved are SIEs, and overall they transport 75% of gas consumed in Europe. Gas for Climate aims to replace existing gas imports with domestic production of renewable gas,

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<sup>59</sup>On this issue, a Head of Relations with International Partners of Snam (Speech 4) stresses that energy firms such as Snam, the Italian Transmission System Operator (TSO) in the gas sector and a SIE, are the most suitable to provide a contribution to the transition to a sustainable energy system even though their core business is not yet focussed on renewable energy. In fact, their technological leadership and market power provides them with an advantage towards competitors and the ability to drive the entire energy sector towards large-scale change.

which will be transported through the existing national grids. This would allow advantages in terms of cost savings, thanks to the stop of gas imports from abroad and the use of existing infrastructure. However, the advantages would be mainly environmental, as this plan is likely to generate a transition towards a fully decarbonised gas sector in accordance with the agenda of the Paris agreements (Ecofys, 2018). The initiative also shows how the strong EU commitment towards decarbonisation is being fruitful and effective in attracting the energy industry towards the pursuit of industrial policy targets.

However, tackling issues such as climate change requires global coordination. This suggests once again that the EU emphasis on reaching domestic targets is not sufficient to generate effective and long-lasting results. For this reason, the EU should develop a global strategy that envisions the cooperation of major energy consumers such as China. At the moment, only inter-governmental or inter-firm initiatives have been undertaken at the global level, showing the limitations of their potential impact and limited ambitions. For example, following recent inter-governmental summits between Italy and China, the Italian TSO Snam and the Chinese Beijing Gas have launched a series of joint industrial projects to develop and commercialise technologies for the production and distribution of renewable gas. Deals between European utilities and developing countries for the production and distribution of clean energy are multiplying around the world. For example, EDF has recently agreed to form a joint venture with the Indian SITAC to supply around 1.3 million Indian people with electricity produced from wind farms.

However, such initiatives remain isolated and occur only when there are evident commercial gains. It is not clear if the commercial logic will be a powerful enough driver for energy transition, especially if such initiatives lack an institutional framework of inter-governmental coordination that incentivises systemic change. To tackle climate change and achieve the targets set by the Paris agreements, the EU should consider acting in the framework

of a “climate diplomacy” that envisages the implementation of its green industrial vision in cooperation with global energy players. EU climate diplomacy can help reconcile conflicting interests among key global energy players, which have recently shown different stances on the energy transition and different sets of priorities.

European SIEs can play a key role to realise this EU vision, thanks to their technological leadership and their dominant positions in global energy markets. Furthermore, SIEs’ major presence in developing countries could potentially broaden the space of the EU climate diplomacy to include countries that have historically prioritised industrial development at the expense of environmental sustainability. SIEs can play a key role in helping them reconcile their priority of development with the adoption of sustainable standards and techniques of production. SIEs could provide incentives to cooperate on climate issues by means of technological transfer or by investing extensively in the production and transport of clean energy. However, this requires a EU strategy of climate diplomacy that is based on a clear and pragmatic vision of cooperation with foreign countries, which takes into account their interests and provides tangible incentives to domestic players such as SIEs to carry out such strategy.

### **7.3. The consumers’ viewpoint**

The liberalisation of the European gas markets has coincided with rising prices for consumers, although in the most recent years prices have slightly decreased due to global oversupply and lower domestic demand. Nevertheless, the long-term trend since liberalisation indicates a significant increase in prices, and thus a relative worsening of consumers’ welfare as compared to the years before liberalisation.

The increase in gas prices is mainly the result of fluctuations in oil prices. However, the liberalisation has made it difficult for governments to protect consumers from such fluctuations, for example through price ceilings. The welfare of consumers has also

deteriorated because of the privatisation of former SOEs, which has entailed a redistribution of oligopolistic rents from consumers to various financial actors. This thesis argues that a full-scale liberalisation will further affect the welfare of European consumers. However, this will not be only the result of a transfer of rents from consumers to SIEs' private shareholders or PEs. Rather, it will occur as a consequence of a transfer of rents from domestic firms to non-EU exporters, as domestic market competition will increase the bargaining power of foreign suppliers, increasing the cost of energy imports in the long-term.

This view differs from those prevailing in academic and policy debates, which are mainly devoted to explore the welfare of consumers as a result of the relation between domestic market players. One of the main strands in the literature considers domestic market structure as the key element that influences gas prices. This view has also prevailed among EU policymakers, and has inspired the liberalisation of the energy market. It is based on an allocative logic, and has its theoretical underpinning in Neoclassical Economics. The strand argues that rising prices in Europe can be explained mainly by the still excessive market power of former monopolists in domestic markets, despite the recent entry of new players.

Another strand, which adopts the lens of Transaction Cost Economics, agrees that gas prices in Europe are still high because the transition to full market competition in Europe has not been fully accomplished. However, this strand adopts a different approach to analysis, which emphasizes a contractual perspective, particularly the bargaining power between firms operating at different vertical levels of the supply chain. This strand argues that the monopoly of the national grid in the midstream is the main obstacle to market competition because it imposes a high level of regulation in the transport phase, preventing upstream and downstream firms from easily switching suppliers and customers. This would in turn perpetrate the bargaining power of dominant players, which is a precondition for high transaction costs in the energy sector. The solution suggested by this literature is to deregulate the national grid by

eliminating tariff ceilings and capacity allocation. The potential to increase tariffs would incentivise competitive grid companies to enter the market and challenge the current monopoly, eliminating the current bottleneck in the midstream.

However, these perspectives do not consider gas scarcity in Europe and hence its dependence on foreign imports. This thesis questions the aforementioned strands because they neglect this central aspect. It suggests that their analysis and policy solutions to bring about lower prices should be rethought in the light of this consideration.

In contrast to these views, this thesis argues that market power of European domestic firms is a precondition for consumers' price affordability. In fact, in energy-deprived countries, market power of domestic firms makes it possible to contain the bargaining power of firms from producing countries, which is extensive and stems from their monopolistic power in their own country and their oligopolistic power in the market for gas export towards Europe.

Introducing competition in domestic markets would decrease European firms' bargaining power because foreign exporters would benefit from more options in terms of downstream customers, and as a result they would be able to impose a higher price. In the long term, higher import prices will transfer the current oligopolistic rents from European firms to foreign exporters. This would make European consumers' welfare deteriorate further and irreversibly, because domestic firms would impose higher prices following the increase in import costs. So far, the deterioration of consumers' welfare has concerned only a rent redistribution to financial shareholders, due to partial or full privatisation of former SOEs. The decrease of European firms' bargaining power, and the redistribution of current rents to non-EU firms, would make it impossible to redistribute the rents back from financial stakeholders of domestic firms to consumers.

In addition to increasing the number of domestic players, the European Commission suggests to introduce contractual models based on short-term transactions. The reform aims to

replace long-term contracts of gas import, which are seen as one of the major obstacles to market competition. In fact, the quantity of gas contracted by former monopolists through long-term contracts almost entirely meets domestic demand and saturates the transport capacity of the national grid.

However, the suitability of spot markets for energy-deprived countries is questionable, for several reasons. In fact, spot markets are organised on daily transactions that are driven by the interaction between demand and supply of regional and global energy players. This entails that gas is delivered to customers that offer better deals, and large-scale supplies may be redirected to other customers in short periods of time. Although this is not a concern for energy-independent countries, which can rely on their own production, spot markets may pose a threat to energy security in energy-importing countries. This is especially true if trade occurs only through LNG infrastructure, which has been recently encouraged by the EU regulation to promote the diversification of supplies. In fact, spot transactions and excessive flexibility in the transport of energy might incentivise energy producers to switch customers. In addition, in periods of production shortages, the import price may soar considerably if not mitigated by price ceilings such as those that typically occur in long-term contracts. The potential disruptions and short-term price fluctuations that the adoption of short-term transactions may generate suggest the need to refrain from a full transition to spot markets. A potential solution to reconcile market competition with price stability and security of supply could be to rely on hybrid models, in which long-term and short-term transactions coexist.

To explore the main hypothesis of this chapter, which argues that consumers' welfare is negatively affected by full-scale liberalisation of energy importing markets, the chapter compares the three main world gas markets, namely US, East Asia, Europe. The comparison makes it possible to contrast regulation of energy markets in gas abundant countries, namely the US, with the reforms implemented in gas scarce markets such as Europe and East Asia. The

analysis shows that the difficulty to liberalise gas markets in Europe and East Asia is mainly driven by the the lack of domestic production and the need to contain the bargaining power of foreign producers whilst securing energy supplies. In contrast, gas abundance in the US was a key factor for the transition from a highly regulated and oligopolistic gas market to a liberalised one. Furthermore, this transition has succeeded to reduce gas prices for consumers, which did not occur in Europe and East Asia due to high import prices.

The chapter then focusses on Europe by comparing the cases of Italy and France. The analysis shows that although the two markets have been liberalised to different extents, they recorded very similar trends on gas prices. This supports the validity of the initial hypothesis, stating that in gas-deprived markets prices are mainly shaped by the contractual relations with producing countries and availability of import infrastructure, rather than by domestic market regulation.

The analysis of the main East Asian markets, namely China, Japan and South Korea, shows that their reliance on government-owned (or regulated) vertically integrated monopolies is driven by the need to contain import supply risk and the bargaining power of foreign producers. The high prices paid by consumers are not only the result of the market power of domestic firms, but also of the high import prices. The latter, which are among the highest in the world, are generated by the need to rely on maritime transport of Liquefied Natural Gas (LNG), and by long distances from the production areas in Oceania, Southeast Asia and the Middle-East.

The US market displays very different characteristics. The main difference is the abundance of domestic production, which has emerged recently thanks to the shale revolution, transforming the US from an energy importer to an energy exporter. The preeminent role of gas abundance over deregulation in creating the condition for low prices for final consumers is evident from the fact that price reduction occurred only by the 2000s, in occasion of the shale

revolution, rather than in the previous 25 years, when liberalisation reforms were implemented. In fact, gas abundance gave new entrants the possibility to trade the additional production and challenge the dominant players. The regulatory framework certainly played a role too, by preventing the dominant players from appropriating the additional capacity.

Liberalisation reforms in the US consisted mainly in the removal of price ceilings in both the upstream and midstream markets. In the upstream, it was functional to incentivise new entries and large-scale investments for production. In the midstream, it incentivised the entry of additional pipeline companies, which offered alternative transport routes and competitive tariffs. These regulatory provisions induced an expansion of the US gas market both in terms of output and number of market players, which is a precondition for energy firms to be able to switch suppliers and customers. The possibility to rely on different alternatives induced energy firms to increasingly adopt short-term contractual arrangements, reducing the bargaining power of dominant market players, and thus making it possible to redistribute their oligopolistic rents to consumers.

The European case displays important differences, because of gas scarcity. The analysis of the Italian and French markets shows that in both cases liberalisation was only partial, reflecting concerns on the potential negative implications of full liberalisation for energy security and consumers' price affordability. The comparison between Italy and France also shows the marginal importance of domestic regulation compared to major impediments in the market for gas imports, which are similar in both cases, as both Italy and France draw from the same gas import market and are supplied by the same producers. In fact, although Italy and France have adopted different approaches to liberalisation, for example by opening their domestic market to different extents, prices for consumers in both countries have followed very similar trends and indeed almost converge.

Italy has implemented liberalisation reforms extensively, including coercive measures towards the incumbent to decrease market power and spinoff the subsidiaries that own and manage the national grid and storage facilities. In recent years, unbundling and other regulatory measures have allowed domestic and foreign competitors to substantially increase their operations in Italy at the expense of the former monopolist. In contrast, liberalisation in France occurred to a lower extent, as the national grid is still a subsidiary of the former monopolist. Furthermore, the former monopolist almost entirely controls the market for gas import and dominates in the wholesale, distribution and retail. The comparison shows that despite the different extents to which liberalization reforms have been implemented in the two countries, gas price for consumers was not affected. This suggests that gas prices in gas-deprived contexts are likely to depend more on energy relations with producing countries, the endowment and strategic positioning of import infrastructure, the diversification of energy sources and suppliers, and the bargaining power of domestic firms vis-à-vis foreign suppliers, than merely on the structure of the domestic market.

Interpreting the recent price convergence between long-term contracts and hubs, as well as among European hubs, as the result of the EU energy regulation on market competition is misleading and potentially dangerous for energy security. In fact, price convergence is mainly the result of the recent global oversupply and the decreased demand in Europe. As demand and supply are highly volatile, a full transition to spot markets could potentially expose Europe to sudden gas shortages and significant increases in import prices. This suggests that only in case of large-scale domestic production of gas or substitutable sources would Europe be able to reconcile market competition and energy security.

For example, the planned transition to an environmentally sustainable energy system, based on domestic production of renewable energy, could arguably be conceived in a framework of full (or quasi) deregulation. In fact, this energy system would not be exposed to

the risks related to energy supply from abroad and the market fluctuations deriving from the global competition for energy resources. However, other questions would arise under this new scenario, especially over the effectiveness of a fully deregulated and privatised energy sector to incentivise investments with long-term returns, which are essential to long-term economic competitiveness as well as quality and price affordability for European consumers. Another important question is related to whether the transition to renewables will lead to full energy independence from abroad, or if it will require to import other types of raw materials for the construction and operation of production facilities. This issue suggests that this thesis' emphasis on the relations with producing countries and on the importance of adopting a strategy of foreign economic policy for interest alignment with trading partners will remain relevant in the future, regardless of the type of energy mix.

Another key issue concerns the choice between alternative market structures. In fact, on the one hand, large corporations are needed to generate large-scale innovations and allow Europe to be at the technological frontier in the production of renewable energy. However, this model, based on large corporations, would lead to an oligopoly in which consumers' welfare is either penalised or must be safeguarded through extensive government regulation (Bianchi, 2018). On the other hand, the promotion of a model based on decentralised networks and micro-producers may be suitable for market competition as well as to avoid inefficiencies deriving from oversupply and overinvestments, especially in areas that are not densely populated (Sokona et al., 2012). However, full reliance on this model might penalise large-scale innovation. In fact, this might lead to a situation where domestic firms would depend on foreign technologies, which would result in the emergence of a new form of dependence from abroad, based on technology rather than raw materials. This suggests that the future decarbonised energy system in Europe should rely on both large and small energy producers, while regulating potential abuses of dominant position by large producers to safeguard consumers.

#### **7.4. Theoretical contribution to the debate on the EU gas market liberalisation and to Transaction Cost Economics**

Beside the contributions discussed above, the thesis contributes to the theoretical debate on the EU gas market liberalisation. This is done in two main ways. The first contribution is to assess the two key theoretical perspectives used in energy studies, namely Transaction Cost Economics (TCE) and Neoclassical Economics and to show how the different theoretical assumptions can lead to envisage different ways to organise the supply chain. The thesis finds that, although both perspectives are necessary as they highlight different aspects of energy markets, the current debate on the EU gas market liberalisation shows important limitations in the way these perspectives are interpreted. More specifically, both the strands adopting TCE and Neoclassical lenses put too much emphasis on the domestic sphere of the EU energy market, whilst neglecting the external sphere.

The second contribution consists in an extension of the theoretical framework of TCE to include political and diplomatic aspects. It focusses primarily on how different tools of government intervention (e.g. diplomatic, regulatory and financial), exercised through different forms (e.g. different degrees of government ownership), contribute to align the interests and to decrease transaction costs between firms and governments in transnational deals; and how this leads to enhance consumers' welfare.

The thesis relies on the TCE framework for its suitability to interpret the dynamics affecting the European markets for gas import. In fact, these markets are affected by the way transnational supply chains are organised and by the contractual relations between exporting and importing firms, which are key research questions in TCE studies. However, the Neoclassical framework is an important starting point to understand some specific aspects of the energy sector and to interpret achievements and failures of EU energy policy in the last

decades, which was largely inspired by such theoretical framework. As highlighted in other contributions, the importance of adopting different theoretical approaches stems from their different assumptions and possibility to show different aspects of markets and economies under analysis (Cardinale, 2019b). In addition, different assumptions and analytical perspectives inspire different policy suggestions, whose comparison makes it possible to inform policy-making with long-term visions and short-term policy solutions needed to overcome sectoral challenges.

As previously mentioned, both theoretical perspectives are necessary to analyse policy reforms in energy markets, as they highlight different aspects. The neoclassical paradigm emphasizes market efficiency. Liberalisation is a key measure for its pursuit as it makes it possible to decrease market concentration and increase competition through new entrants. Gas market liberalisation in the EU has been inspired by these principles. It has been conceived to erode market power of incumbents and redistribute monopolistic rents to new entrants and consumers.

However, policies for market competition cannot disregard sectoral specificities. For this reason, the EU liberalisation has taken into account two specific aspects of the energy sector: the existence of natural monopolies in some phases of the supply chain and the potential to realise large economies of scale and scope. Neoclassical theory provides important insights on these two issues. In particular, it suggests to avoid increasing market competition when natural monopolies occur. In these cases, the presence of more than one firm creates fixed cost duplication. This is the case of national gas grids in Europe, which require a single firm to bear high fixed costs and achieve a scale of production that covers the whole national demand (Sharkey, 1982; Waterson, 1989; Train, 1991).

In contrast, economies of scale, another driver of efficiency in Neoclassical Economics, may be achieved in many sections of the energy supply chain. This is due to the capital-

intensive nature of these production segments and the possibility to lower long-run average costs. However, fixed costs in such segments are not as high as in natural monopolies (e.g. in the downstream), and/or demand is much higher thanks to the possibility to supply other national markets (e.g. in the upstream). This makes it possible to achieve market efficiency also in the presence of more than one firm, and thus to potentially achieve forms of market competition. If such firms have a comparative advantage in international markets, the scale of production and distribution has the potential to increase even further (Krugman, 1980). Similar drivers of efficiency emphasized by the theory are economies of scope and network externalities. Economies of scope occur when the firm lowers long-run average costs by producing differentiated products and by serving different end markets. Economies of scope can be realised for example when energy firms are able to recover the cost of investments in gas infrastructure through sales in both gas and electricity markets, thanks to the possibility to use gas as an input in the production of electricity. Network externalities typically occur in the transmission and distribution networks, as the expansion of the network to serve additional users enhances the connectivity of the network, increasing its commercial value, its strategic importance for the country, and its attractiveness towards other potential users in the country.

EU policy has been inspired by these theoretical principles in an attempt to enhance market efficiency. For example, the liberalisation of the gas market has distinguished between potentially competitive phases, namely production and retail in the upstream and downstream respectively, and natural monopolies such as the national grid in the midstream. The purpose was to take advantage of the potential to realise economies of scale and scope in the upstream and downstream, which was made possible by opening national markets to energy firms from other European countries, whilst at the same time allowing Transmission System Operators (TSOs) to operate as regulated monopolies.

However, access to other European markets requires unbundling and market opening in the domestic market. Although the access to European markets can lead to expand the scale of production, unbundling and market opening can result in losses of bargaining power vis-à-vis foreign exporters, as these reforms make it possible for foreign exporters to leverage on a greater choice in terms of potential customers in the domestic market. This aspect is not considered by the contributions adopting the Neoclassical lens (see Perry, 1978), which only conceive of vertical integration as a tool for firms holding dominant positions in domestic markets to perpetrate their market power at the expense of new entrants.

TCE provides a suitable lens to shed light on this aspect. In fact, the theory suggests that in case of high “asset specific” investments, such as those for gas imports in Europe, vertical integration and high market power are key elements to contain the bargaining power of foreign producers. Asset specificity indicates the impossibility to employ a certain asset for functions that are different from those to which it was initially conceived. This characteristic entails that two or more counterparties may remain locked into a contractual relation after having heavily invested (either jointly or singularly) in such a type of asset. If the balance of power in their contractual relation is not equal, i.e. because one of the counterparties is more exposed financially or because it cannot rely on alternative options in terms of suppliers or customers, one of the counterparties may behave opportunistically and advocate for changing the contractual terms or simply avoid to comply with them. The lack of compliance with the original terms is identified as a source of transaction costs for the counterparty with lower bargaining power, which is likely to cope with the terms until this circumstance generates higher costs than those involved in abandoning the deal.

The contractual relations between EU importing firms and non-EU exporting firms have similar features. In particular, the investments in transnational infrastructure that make their gas trade possible are highly “asset specific”. In fact, both counterparties undertake large-

scale investments from upstream to downstream to support their trade. As a result, both counterparties are exposed financially and depend on each other for the sale and provision of gas. However, their exposure may vary greatly depending on their financial commitment, which may be very different depending on the deals; but also depending on their respective need to export or import gas and the availability of alternative suppliers and customers.

As a result of their different exposure to risks, importing and exporting energy firms developed a specific model of energy trade with a series of checks and balances that reconcile their respective interests. For example, as a result of their financial and technological superiority, European firms obtain concessions in the producing countries' upstream in exchange of bearing the exploration risks and of engaging in technological transfer. This compromise made it possible for European countries to safeguard energy security, whilst producing countries benefited from constant sales and industrial upgrade.

If one analyses these energy deals from a contractual perspective, two main contractual arrangements prevail over others. One is based on long-term contracts between exporting and importing firms, whilst another relies on joint ventures along the cross-country supply chain. Long-term contracts help decrease transaction costs only to a certain extent, as suppliers and customers operate in different markets. Therefore, their incentive to cooperate and comply with the original terms may change if changes in the market in which they respectively operate increase their bargaining power. For example, the reduction of gas production in the region may incentivise the producing country to advocate for a higher export price, bringing to negotiating disputes, thus raising transaction costs. In contrast, joint ventures prove to be more effective to limit opportunistic behaviour, not only because the counterparties are equally committed financially to each phase of the supply chain, but also because they share the same interests as sellers, transporters and buyers. Any change in upstream, midstream and

downstream markets would be unlikely to alter their incentive to cooperate; this prevents negotiating disputes and the increase in transaction costs.

The thesis has shown that the strands of the literature that adopt TCE to analyse the EU gas market have largely neglected the contractual relations between exporting and importing countries, focussing on the transaction between domestic firms. They suggest to fully deregulate the EU gas market to overcome high market power of the largest firms, neglecting the loss of bargaining power vis-à-vis foreign exporters and the subsequent rise in the cost of imports.

The second dimension of the theoretical contribution suggests that TCE can offer a much broader perspective than the one adopted so far by empirical and theoretical contributions. In particular, TCE can be extended to analyse the effects of political intervention on contractual relations, and the implications for energy firms, governments and consumers. For example, the thesis shows the contribution of energy diplomacy to decreasing transaction costs in cross-country energy deals. In particular, it shows that energy diplomacy plays a decisive role in reducing energy firms' production costs as it helps them negotiate favourable deals to access the foreign upstream, making it possible to vertically integrate. A systematic diplomatic effort also helps reduce governance costs by establishing long-term governance mechanisms among political and economic actors, thus increasing trust and mutual benefits.

The effectiveness of energy diplomacy derives from the possibility to obtain favourable energy deal by offering attractive deals in other areas of the political-economic cooperation. It results in interest alignment between importing and exporting energy firms and incentivises vertical integration, which is key to reduce transaction costs. Seen from this perspective, energy diplomacy may be functional to fill the gaps left by various types of contractual arrangements (e.g. long-term contracts or joint ventures) in their ability to align the interests between exporting and importing countries.

These insights suggest to think of TCE as a framework that can potentially explore both economic and political variables. Bridging these elements under a common theoretical framework is useful because the effects of political and economic actions in market dynamics are difficult to separate. Furthermore, the contractual perspective of TCE and its emphasis on the balance of power and need to align interests among players is relevant in both the economic and political fields.

The extension of the TCE lens may be wide-ranging and touch upon several other aspects of political economy beside the role of diplomacy. For example, the policy of liberalisation could be interpreted as a process whereby the government outsources its entrepreneurial activities to the private sector. The adoption of this view of liberalisation makes it possible to use TCE to analyse the boundaries of the entrepreneurial government, i.e. the opportunity to make or buy, in a similar way as TCE does with firms. As a result, the question is whether outsourcing has the effect to increase or decrease transaction costs between the government and other stakeholders in the energy sector. More specifically, has the government's outsourcing to the market increased or decreased its bargaining power vis-à-vis the other relevant stakeholders in the energy sector? Is the new energy governance organised in such a way that transaction costs between the main stakeholders are minimised?

If one adopts a strictly economic logic, i.e. by considering the entrepreneurial activities of the government in the market, the partial outsourcing of the energy business to private players may be seen as a driver of both advantages and disadvantages for the government in terms of changes in its bargaining power vis-à-vis other economic stakeholders and variations of transaction costs. For example, partial privatisation has decreased the government's ability to influence the board's decisions, which have to be negotiated with representatives of private shareholders. This has decreased the government's bargaining power in the board whilst potentially resulting in an increase of transaction costs between public and private

shareholders. Furthermore, unbundling and market opening can result in higher transaction costs for energy firms, both in the domestic market, due to increasing transactions with the new entrants, and in international markets, due to their progressive weakening in domestic markets and their loss of bargaining power when dealing with foreign suppliers.

However, governments can rely on a wide range of tools to decrease transaction costs among stakeholders in the energy sector, and to harmonise their interests. For example, in the domestic market the government could finance the development of strategic assets, for example physical and research infrastructure, which are characterised by high risks and long-term returns. These government initiatives generate potential incentives for private firms to cooperate, and to share the benefits arising from new business opportunities and innovations. In international markets, the government could act through its diplomatic bodies to improve the relations with producing countries, in order to reduce transaction costs in cross-country energy deals and across other sectors of political-economic cooperation.

The above-mentioned forms of government intervention may provide a starting point to think about how to reduce transaction costs in the supply chain in ways that are compatible with the EU vision, which does not envision direct and extensive government intervention in the energy sector. This suggests that the current EU model of energy governance could be modified to include new policy tools that reduce transaction costs and reconcile the main interests in the European energy sector.

## **7.5. Policy suggestions**

After more than two decades since the start of the energy market liberalisation, the complete transition to the EU Single Market has still to be realised, despite the accomplishment of some important steps. Market opening has certainly contributed to the integration of European markets, although each country shows wide differences in this respect. Although

former monopolists retain dominant positions (to different extent in each country) the remaining market shares are held by new entrants, and this shows an increasing levels of integration between European markets.

Another important factor that shows increasing integration is the progressive convergence of gas prices at the respective hubs, although spot transactions are not yet prevalent vis-à-vis long-term contracts. This result, together with a price convergence with long-term contracts, is considered a success of the EU liberalisation policy and a step forward towards the Single Market. The achievement was attributed to the effect of the EU provisions on market competition, but also to the recent EU investments on the intra-EU links and reverse flow infrastructure, which are seen as pivotal for price equalisation across the EU and for energy security.

Despite these encouraging results, this thesis warns about the likelihood that such trends will be permanent and that these are the result of a structural change towards a liquid, gas abundant Single Market. In fact, one should consider that in recent years the global supply of gas has increased, for example because of the shale revolution in the US and the increasing reliance on renewables. Furthermore, the demand for energy in Europe has slightly decreased, following a protracted economic recession. These trends have created the conditions for greater liquidity and slightly lower prices across European gas markets. However, as the history of energy cycles shows, global demand and supply may change suddenly, potentially turning situations of gas abundance into shortage of supply, especially in countries that are unable to satisfy most of their energy consumption through domestic production.

This suggests that the EU regulation should consider the coexistence of both short-term forms of transactions such as spot markets, which enhance market competition in periods of oversupply, and vertically integrated contractual arrangements such as long-term contracts and joint ventures, which are crucial for energy security in phases of undersupply in import

markets. In periods of oversupply, as in the current phase, the reliance on both short-term and long-term contractual arrangements generates gas abundance and price convergence, which benefit the economy and consumers. This suggests that long-term contracts in Europe play a crucial role for energy security and consumer welfare at each phase of the energy cycle; hence giving them up completely may have serious implications. Arguably, enhancing the flexibility of the take-or-pay clauses and reducing their duration in periods of gas abundance could be an ideal compromise to benefit from favourable market trends while not giving up a fundamental tool for energy security.

Another key flaw identified by this thesis is the lack of harmonisation between the domestic and foreign energy policies, which are under the jurisdiction of the EU and Member States respectively. The divergence in their interests and strategic visions has caused an increasing rate of failures among gas infrastructure projects. This thesis provides specific policy suggestions to overcome such divergences and harmonise the two dimensions of the gas market.

A decisive step in this direction would be to increase efforts and resources for the realisation of a EU energy diplomacy. Although this should reflect the political culture and vision of the EU institutions, it should also reconcile the different energy policies of Member States, which differ widely in terms of approaches to energy cooperation with producing countries. More specifically, the EU energy diplomacy should envisage the inclusion of the energy sector among the EU trade deals with producing countries. Another important step would be to provide diplomatic support towards specific energy deals that are strategic for the EU energy security.

The energy sector is not currently included among the EU trade agreements with neighbouring countries, nor is it in the context of WTO. In fact, energy trade is still regulated by the bilateral trade agreements that Member States stipulate with each producing country.

Negotiating energy deals in the context of EU trade agreements would provide greater bargaining power to Member States, compared to a situation in which they negotiate separately. This would make it possible for European firms to import gas at lower prices and access the upstream market of producing countries with profitable deals.

The adoption of trade agreements would ease the access of European energy firms to producing countries' markets. This is a key factor that allows them to vertically integrate their supply chain. Vertical integration, in turn, is essential for the pursuit of a wide range of objectives of corporate and policy nature. For example, it creates the conditions for interest alignment between EU and non-EU firms, increasing the likelihood of reaching successful deals, thus contributing to EU firms' profitability. The profitability of the deals is an essential condition for the pursuit of two main objectives of EU energy policy, namely energy security and domestic market competition. Energy security is enhanced by the creation of new energy routes and strengthened by energy firms' interest to ensure constant energy flows.

Energy diplomacy would also provide an important contribution to domestic market competition, strengthening the EU Single Market. In fact, it would help new entrants (i.e. those with the lowest bargaining power vis-à-vis NOCs) vertically integrate in the foreign upstream and create alternative routes from those managed by former monopolists, which usually retain full control over gas imports. Incentivising new entrants to vertically integrate is the only viable solution to simultaneously strengthen domestic market competition and energy security.

However, to prevent new energy corridors managed by new entrants from increasing the bargaining power of producers, who could then impose higher prices, it is important to incentivise new entrants to import from countries that are not current suppliers. This suggests that the provision on Third Party Access (TPA), which allows new entrants to import gas through existing infrastructure, should be modified or abolished. In fact, TPA has increased the bargaining power of producing countries, which take advantage of competition between

incumbents and new entrants. This is likely to increase the import price without bringing any advantages in terms of additional quantities supplied to the domestic market.

So far, the fragmentation of domestic firms and the lack of a EU strategy for the coordination of energy imports have allowed producing countries to increase their bargaining power. This has encouraged them to vertically integrate from their upstream to the European downstream markets, preventing European firms from doing the same. In addition, the attempt of the European Commission (EC) to pursue its own foreign energy policy and its unsuccessful attempt to reconcile the different visions among the Member States have decreased the EU bargaining power even further as compared to the situation before the liberalisation, when each Member State negotiated its own energy deals.

The case of Nord Stream 2, including the recent measures adopted by the EC to hinder its construction (Talus, 2019), shows the EC's divergence vis-à-vis Germany over energy relations with Russia. However, such unclear overlaps between national and supranational decision-making spheres create uncertainty for investors while damaging the international reputation of EU institutions and Member States. One possible solution to reconcile interests within the EU would be to allow differentiated policy solutions. This would allow Member States in Western Europe to pursue their energy relations with Russia while making it possible for Member States in Eastern Europe to develop their own strategy of diversification from Russian supplies, overcoming the current stalemate over this issue.

Another important step towards the revision of the current EU regulation concerns government ownership of energy firms, both in its full and mixed versions. In particular, EU regulation should be updated to recognise government ownership as legitimate and as a tool of EU energy policy. The thesis has shown that mixed (public-private) ownership can allow the government to veto hostile takeovers from private firms or SOEs of foreign countries that intend to underinvest or redirect existing energy routes towards markets that are either more

profitable or politically relevant for the potential investor. The veto is a powerful tool that EU Member States can use to safeguard energy security, and one which should not be abandoned. However, governments have often struggled to implement such vetoes, as the current EU legislation in many cases identifies such interventions as forms of protectionism, which are banned by EU law.

Government ownership of energy firms is not only functional to avoid foreign interference in sectors of strategic relevance. SOEs and SIEs are also potential key players of industrial policy, thanks to their financial and technological superiority over other market players and their direct links with political leadership. European SOEs are already cooperating actively for the pursuit of EU policy objectives and have shown high levels of success in doing so. For example, they are currently key players in the realisation of cross-country infrastructure links and reverse flows, which are functional to the accomplishment of the EU Single Market. Furthermore, they are working actively to the diversification of existing gas routes from abroad, by following the EC's strategic vision. They are also cooperating to improve EU energy security and plan the transition to a more sustainable energy system through large-scale investments in renewables.

However, this cooperation has the potential to expand and achieve a greater scale if SOEs are recognised as policy tools and if the EU is able to gather support from Member States in initiatives related to the cooperation with non-EU producing countries. This is currently occurring in other sectors of the European economy, where European SOEs merge or develop joint ventures to overcome competition from global players. So far, the energy sector has not benefited from such synergies, probably because of the divergences among Member States and EU institutions over foreign energy policy issues.

To improve the long-term welfare of consumers, national and EU regulation need to undertake several steps forward from the current provisions. A key factor is to halt the process

of unbundling and energy firms' fragmentation. As shown in Chapter 4, unbundling and supply chain fragmentation weaken the bargaining power of European energy firms vis-à-vis non-EU exporters, preventing them from negotiating lower import prices, which in turn will result in higher prices for consumers. The lack of integrated firms also prevents from benefiting from cross-sectoral technological spillovers, which undermines innovation. Technology is a fundamental element for the success of European firms abroad. In fact, its application to energy projects or its transfer has been crucial to operate in producing countries, to overcome the global competition from other energy dependent countries, and to negotiate favourable deals for production and import of gas abroad.

A practical step in this direction would be to modify the existing EU law that prevents national or cross-country mergers above a certain threshold. In this way, European firms could be able to compete globally with firms that are not restricted by such laws. Although market competition in Europe would still in principle represent a disadvantage, as non-EU exporters could leverage on greater choice in terms of European importers, greater firm size would reduce such disadvantage. This would allow them to negotiate a low import price, as the exporter would lose significantly if an agreement is not reached. In addition, another lever on import price is given by the possibility for a big firm to diversify its suppliers, for example by investing in non-EU countries' upstream or by launching the construction of import infrastructure that supplies gas from alternative countries. These alternatives are usually not feasible for small firms, given their limited capability to invest.

If the aforementioned strategy of merges between European firms leads them to benefit from dominant positions, such firms could be subjected to EU regulatory provisions that monitor potential abuses towards domestic consumers. This solution could potentially provide great advantages to European consumers, as they could benefit from the increasing global competitiveness of European firms. For example, their greater profits abroad may allow them

to lower prices in domestic markets with greater ease, or to reinvest such profits in R&D and for the expansion of domestic businesses, thus contributing to increase domestic employment.

To conclude, the process of European integration requires further efforts not only in terms of better coordination between EU and national jurisdictions in the field of energy, but also to be updated to the rapidly changing global trends. The path for the EU to become an influential global player cannot disregard a certain level of sophistication in domestic governance, particularly in the ability to reconcile different national instances and to create a common foreign policy stance to overcome global challenges. The energy sector, for its crucial role for the economy and society, should be one of the core sectors to undertake such changes, to ensure long-term prosperity as well as to reassert the central role of Europe in international affairs. The policy measures proposed in the thesis, informed by an empirical and theoretical analysis of EU transnational infrastructure for gas import, aim to address such challenges.

### **Personal interviews**

1. Interview with a former Minister of Industry and former board member of Eni and Snam, 15 July 2015, Bologna.
2. Interview with a former manager of Enel, 30 September 2015, Rome.
3. Telephone interview with a former manager of EDF, 1 February 2018, London-Paris.
4. Interview with a former CEO of Eni and Enel, 8 June 2016, Cambridge, UK.
5. Interview with a former manager of Rosetti Marino S.p.A., 21 July 2015, Bologna.
6. Interview with a Head of Division of the European Investment Bank, 31 January 2018, London.
7. Interview with the Head of Government and Political Affairs of BP, 1 December 2016, Cambridge UK.
8. Interview with the former Financial Controller of the UK Central Electricity Generating Board, 23 May 2019, London.
9. Interview with a board member of Adriatic LNG, 26 June 2016, Milan.

### **Speeches**

1. Deputy Director-General of the Agence des Participations de l'État, June 2017, Rouen.
2. Former Director of SNCF-Réseaux, June 2017, Rouen.
3. President of the supervisory board at Peugeot, June 2017, Rouen.
4. Head of Relations with International Partners of Snam, May 2017, Athens.

## References

- ACER, 2017. *Opinion of the Agency for the cooperation of Energy Regulators on the Draft Regional Lists of Proposed Gas projects of Common Interest*, 10 October 2017.
- Adolff, J., 2002. Turn of the Tide? The Golden Share: Judgements of the European Court of Justice and the Liberalization of the European Capital Markets. *German Law Journal*, 3(8).
- Agénor, P.R. & Moreno-Dodson, B., 2006. *Public infrastructure and growth: New channels and policy implications*, 4046, Washington D.C: World Bank Policy Research Working Paper.
- Aissaoui, A., 2016. *Algerian Gas: Troubling Trends, Troubled Policies*, NG 108, Oxford: OIES Working Paper.
- Amato, G., 2005. Privatizzazioni, liberalizzazioni e concorrenza nel sistema produttivo italiano. In L. Torchia & F. Bassanini, eds. *Sviluppo o declino: il ruolo delle istituzioni per la competitività del paese*. Firenze: Passigli, pp. 41–55.
- Anderson, E. & Gatignon, H., 1986. Modes of Foreign Entry: A Transaction Cost Analysis and Propositions. *Journal of International Business Studies*, 17(3), pp.1–26.
- Arano, K. & Blair, B., 2008. An Ex-Post Welfare Analysis of Natural Gas Regulation in the Industrial Sector. *Energy Economics*, 30(3), pp.789–806.
- Austvik, O.G., 2016. The Energy Union and security-of-gas supply. *Energy Policy*, 96, pp.372–382.

- Bahl, S., 2012. Emerging risks in securitization of infrastructure and other project financing. *Asia Pacific Journal of Marketing & Management Review*, 1(2), pp.211–224.
- Baldassarri, M. & Macchiati, A. eds., 1997. *The Privatization of Public Utilities: The Case of Italy (Central Issues in Contemporary Economic Theory and Policy)*, Palgrave Macmillan UK.
- Bance, P., 2012. *L'Action publique dans la crise: vers un renouveau en France et en Europe?* Rouen: PURH.
- Bance, P. & Bernier, L., 2011. *Contemporary crisis and renewal of public action: Towards the emergence of a new form of regulation?* CIRIEC Col., Brussels: Peter Lang.
- Bance, P. & Obermann, G., 2015. Serving the general interest with public enterprises: new forms of governance and trends in ownership. *Annals of Public and Cooperative Economics*, 86, pp.529–534.
- Bass, E. & Chakrabarty, S., 2014. Resource security: Competition for global resources, strategic intent, and governments as owners. *Journal of International Business Studies, Special Issue: Governments as Owners: Globalizing State-Owned Enterprises*, 45(8), pp.961–979.
- Bassan, F., 2014. From Golden Share to Golden Power: The European Shift of Paradigm for State Intervention in the Economy. In *Studi Sull'integrazione Europea*. Bari: Cacucci Editore.
- Bauby, P. & Varone, F., 2007. Europeanization of the French electricity policy: Four paradoxes. *Journal of European Public Policy*, 14(7), pp.1048–1060.

- Beard, R., Kaserman, D. & Mayo, J., 2001. Regulation, Vertical Integration and Sabotage. *The Journal of Industrial Economics*, 49(3), pp.319–333.
- Bianchi, P., 1998. *Industrial policies and economic integration: Learning from European experiences*, London; New York: Routledge.
- Bianchi, P., 2002. *La rincorsa frenata: L'industria italiana dall'unità nazionale all'unificazione europea*, Bologna: Il Mulino.
- Bianchi, P. & Labory, S., 2010. Economic crisis and industrial policy. *Revue d'économie industrielle*, 129-130(1-2), pp.301–326.
- Bianchi, P., 2018. *4.0. La nuova rivoluzione industriale*, Bologna: Il Mulino.
- Bilgin, M., 2009. Geopolitics of European natural gas demand: Supplies from Russia, Caspian and the Middle East. *Energy Policy*, 37(11), pp.4482–4492.
- Boardman, A. & Vining, A., 1989. Ownership and Performance in Competitive Environments: A Comparison of the Performance of Private, Mixed, and State-Owned Enterprises. *The Journal of Law & Economics*, 32(1), pp.1–33.
- Boddewyn, J.J., 2016. International business–government relations research 1945–2015: Concepts, typologies, theories and methodologies. *Journal of World Business*, 51(1), pp.10–22.
- Boots, M.G. et al., 2004. Trading in the Downstream European Gas Market: A Successive Oligopoly Approach. *The Energy Journal*, 25(3), pp.73–102.

- Borcherding, T., Pommerehne, W. & Schneider, F., 1982. Comparing the Efficiency of Private and Public Production: The Evidence from Five Countries. *Journal of Economics*, 2, pp.128–156.
- Bordo, M.D., Taylor, A.M. & Williamson, J.G., 2005. *Globalization in Historical Perspective*, Chicago: University of Chicago Press.
- Borins, S. & Boothman, B., 1985. Crown Corporations and Economic Efficiency. In D. McFetridge, ed. *Canadian Industrial Policy in Action*. University of Toronto Press.
- Bortolotti, B., Fantini, M. & Siniscalco, D., 2004. Privatisation around the world: evidence from panel data. *Journal of Public Economics*, 88(1-2), pp.305–332.
- Botta, A., 2014. Structural Asymmetries at the roots of the Eurozone crisis: What’s new for industrial policy in the EU? *PSL Quarterly Review*, 67(269), pp.169–216.
- Boussena, S. & Locatelli, C., 2013. Energy institutional and organizational changes in EU and Russia: Revisiting gas relations. *Energy Policy*, 55, pp.180–189.
- BP, 2018. *Statistical Review of World Energy*. Annual report, June 2018.
- Brau, R. et al., 2010. EU Gas Industry Reforms and Consumers’ Prices. *The Energy Journal*, 31(4), pp.167–182.
- Brautigam, D., 2009. *The dragon’s gif: The real story of China in Africa*, Oxford; New York: Oxford University Press.
- Brealey, R.A., Cooper, I.A. & Habib, M.A., 1996. Using Project Finance to Fund Infrastructure Investments. *Journal of Applied Corporate Finance*, 9(3), pp.25–39.

- Brouthers, K. & Brouthers, L., 2000. Acquisition or Greenfield Start-up? Institutional, Cultural and Transaction Cost Influences. *Strategic Management Journal*, 21(1), pp.89–97.
- Brutschin, E., 2016. *EU gas security architecture: the role of the commission's entrepreneurship*, London: Palgrave Macmillan UK.
- Buvik, A. & Grønhaug, K., 2000. Inter-Firm Dependence, Environmental Uncertainty and Vertical Co-Ordination in Industrial Buyer–seller Relationships. *Omega*, 28(4), pp.445–454.
- Cao, Y., Qian, Y. & Weingast, B., 1999. From Federalism, Chinese Style to Privatization, Chinese Style. *Economics of Transition*, 7(1), pp.103–131.
- Capobianco, A. & Christiansen, H., 2011. *Competitive Neutrality and State-Owned Enterprises: Challenges and Policy Options*, Paris.
- Cardinale, I. & Scazzieri, R., 2016. Structural liquidity: The money-industry nexus. *Structural Change and Economic Dynamics*, 39, pp.46–53.
- Cardinale, I., Coffman, D. & Scazzieri, R., 2017. *The political economy of the Eurozone*, Cambridge, UK: Cambridge University Press.
- Cardinale, R., 2017. The European gas sector: political-economy implications of the transition from state-owned to mixed-owned enterprises. In M. Florio, ed. *Network Industries Reform: Evaluating Privatisation, Regulation and Liberalisation in the EU*. Cheltenham, UK; Northampton, MA, USA: Edward Edgar publishing, pp. 220–234.
- Cardinale, R., forthcoming. The Industrial Policy of European State-Invested Enterprises in the 21st century: Continuity and Change across Phases of Global Development. In P. Bance,

- L. Bernier, & M. Florio, eds. *State Owned Enterprises in the 21st century: A new Handbook*, Routledge.
- Cardinale, R., 2019a. The profitability of transnational energy infrastructure: A comparative analysis of the Greenstream and Galsi gas pipelines. *Energy Policy*, 131, pp.347–357.
- Cardinale, R., 2019b. Theory and Practice of State Intervention: Italy, South Korea and Stages of Economic Development. *Structural Change and Economic Dynamics*, 49, pp.206–216.
- Carter, C. & Rogers, D., 2008. A Framework of Sustainable Supply Chain Management: Moving toward New Theory. *International Journal of Physical Distribution & Logistics Management*, 38(5), pp.360–387.
- Cavaliere, A., 2007. *The Liberalization of Natural Gas Markets: Regulatory Reform and Competition Failures in Italy*, NG 20, Oxford: Oxford Institute for Energy Studies.
- Ceriani, L. & Florio, M., 2011. Consumer Surplus and the Reform of Network Industries: A Primer. *Journal of Economics*, 102(2), pp.111–122.
- Chang, H.-J., 1994. *The political economy of industrial policy*, Basingstoke; New York: Macmillan; St. Martin's.
- Chang, S.-J., Chung, J. & Moon, J.J., 2013. When do wholly owned subsidiaries perform better than joint ventures? *Strategic Management Journal*, 34, pp.317–337.
- Chang, Y.H., 2007. *State-Owned Enterprise Reform*, New York: United Nations, Department for Economic and Social Affairs.
- Chen, C. & Messner, J.I., 2003. *Comparative Analysis of Chinese BOT Projects in Water Supply*, University Park: The Pennsylvania State University.

- Christiansen, H., 2011. *The size and composition of the SOE sector in OECD countries*, 5, Paris: OECD Corporate Governance Working Papers.
- Christiansen, H., 2012. *Balancing Commercial and Non-Commercial Priorities of State-Owned Enterprises*, 6, Paris: OECD Corporate Governance Working Papers.
- Christiansen, H. & Kim, Y., 2014. *State-Invested Enterprises in the Global Marketplace: Implications for a Level Playing Field*, 14, Paris: OECD Corporate Governance Working Papers.
- Clastres, C. & Locatelli, C., 2012. *European Union Energy Security: The Challenges of Liberalisation in a Risk-Prone International Environment Society*, St Louis: Federal Reserve Bank of St Louis.
- Clò, S., Del Bo, C., Ferraris, M., Florio, M., Vandone, D. & Fiorio, C., 2015. Public Enterprises in the Market for Corporate Control: recent worldwide evidence. *Annals of Public and Cooperative Economics*, 86, pp.559–583.
- Clò, S., Fiorio, C. V. & Florio, M., 2017. The targets of state capitalism: evidence from M&A deals. *European Journal of Political Economy*, 47, pp.61–74.
- Coase, R., 1937. The Nature of the Firm. *Economica*, 4(16), pp.386–405.
- Coase, R., 1960. The Problem of Social Cost. *Journal of Law and Economics*, 3, pp.1–44.
- Coats, C., 2013. Galsi pipeline suffers what could be final blow. *Forbes*, p.14 February. Available at: <https://www.forbes.com/sites/christophercoats/2013/02/14/galsi-pipeline-suffers-what-could-be-final-blow/#2b4e0d133b30>.

- Coffman, D. & Lockley, A., 2017. Carbon dioxide removal and the futures market. *Environmental Research Letters*, 12(1).
- Collier, 1993. The Comparative Method. In A. W. Finifter, ed. *Political Science: The State of the Discipline II*. Washington D.C.: American Political Science Association.
- Coralluzzo, V., 2010. Italy and the Mediterranean: Relations with the Maghreb countries. *Modern Italy*, 13(2), pp.115–133.
- Cronshaw, I. et al., 2008. *Development of Competitive Gas Trading in Continental Europe: How to Achieve Workable Competition in European Gas Markets?* Paris: IEA Information Paper.
- Cyert, R. & March, J., 1963. *A behavioral theory of the firm*, Englewood Cliffs, N.J.: Prentice-Hall.
- Dahl, C. & Matson, T., 1998. Evolution of the U.S. natural gas industry in response to changes in transaction costs. *Land Economics*, 74(3), pp.390–408.
- Dahlstrom, R. & Nygaard, A., 1993. Market Structure and Integration in the Norwegian Oil Industry. *Omega*, 21(2), pp.199–203.
- Dalton, D. et al., 1998. Meta-Analytic Reviews of Board Composition, Leadership Structure, and Financial Performance. *Strategic Management Journal*, 19(3), pp.269–290.
- Dannreuther, R., 2015. Energy Security and Shifting Modes of Governance. *International Politics*, 52(4), pp.466–483.
- Darbouche, H., 2011. *Algeria's Shifting Gas Export Strategy: Between Policy and Market Constraints.*, NG 48, Oxford: OIES Working Paper.

- Davids, M. & Zanden, J.L. van, 2000. A Reluctant State and Its Enterprises: State-Owned Enterprises in the Netherlands in the “Long” Twentieth Century. In P. A. Toninelli, ed. *The Rise and Fall of State-Owned Enterprise in the Western World*. Cambridge, UK; New York: Cambridge University Press, pp. 253–272.
- Davies, S. & Waddams, C., 2007. Does Ownership Unbundling Matter? Evidence from UK Energy Markets. *Intereconomics*, 42(6), pp.297–301.
- Davis, C., Fuchs, A. & Johnson, K., 2014. *State Control and the Effects of Foreign Relations on Bilateral Trade*, 74597, Munich: MPRA Paper.
- De Alessi, L., 1980. The economics of property rights: A review of the evidence. *Research in Law and Economics*, 2, pp.1–47.
- DeCanio, S. & Frech, H.E., 1993. Vertical Contracts: A Natural Experiment in Natural Gas Pipeline Regulation. *Journal of Institutional and Theoretical Economics*, 149, pp.370–392.
- Delios, A. & Henisz, W., 2000. Japanese Firms’ Investment Strategies in Emerging Economies. *The Academy of Management Journal*, 43(3), pp.305–323.
- Delvaux, B., Hunt, M. & Talus, K., 2010. *EU Energy Law and Policy Issues*, Cambridge, UK: Intersentia Publishing Ltd.
- Dion, D., 2003. Evidence and Inference in the Comparative Case Study. In *Necessary Conditions: Theory, Methodology, and Applications*. Rowman & Littlefield, pp. 95–112.

- Domberger, S. & Piggott, J., 1994. Privatisation Policies and Public Enterprise: A Survey. In M. Bishop, J. Kay, & C. Mayer, eds. *Privatisation and Economic Performance*. Oxford: Oxford University Press.
- Duan, Z., 2017. *China natural gas market status and outlook*, Beijing: CNPC Economics & Technology Research Institute.
- Ecofys, 2018. *Gas for Climate. How gas can help to achieve the Paris Agreement target in an affordable way*, A report prepared for Gas for Climate, Utrecht, 5 February 2018.
- Ehrlich, I., Gallais-Hamonno, G.Z.L. & Lutter, R., 1994. Productivity Growth and Firm Ownership: An Analytical and Empirical Investigation. *Journal of Political Economy*, 102(5), pp.1006–1038.
- EIA, 2002. *Libya. Country analysis brief*. Report prepared by US Energy Information Administration, July 2002, Available at: <http://www.mafhoum.com/press3/108E14.htm>.
- EIA, 2019. *Short-term energy outlook*. Report prepared by US Energy Information Administration, Available at: <https://www.eia.gov/outlooks/steo/>
- Ellis, Andrew, Einar Bowitz, and K.R., 2000. Structural Change in Europe's Gas Markets: Three Scenarios for the Development of the European Gas Market to 2020. *Energy Policy*, 28(5), pp.297–309.
- Ericson, R., 2009. Eurasian Natural Gas Pipelines: The Political Economy of Network Interdependence. *Eurasian Geography and Economics*, 50(1), pp.28–57.
- Erramilli, M.K. & Rao, C.P., 1993. Service Firms' International Entry-Mode Choice: A Modified Transaction-Cost Analysis Approach. *Journal of Marketing*, 57(3), pp.19–38.

- Estache, A., 2008. Infrastructure and development: A survey of recent and upcoming issues. In F. Bourguignon & B. Pleskovic, eds. *Rethinking infrastructure for development. Annual World Bank Conference on Development Economics-Global 2007*. Washington D.C.: The International Bank for Reconstruction and Development / The World Bank, pp. 47–82.
- European Commission, 2001. *Loyola de Palacio sets out the conditions for successful gas and electricity liberalisation*, Brussels.
- European Commission, 2005. *Free movement of capital: Commission calls on Italy to modify law on privatised companies and to apply Court ruling on investment in energy companies*, Brussels.
- European Commission, 2016. *Commission welcomes agreement to ensure compliance of Intergovernmental Agreements in the field of energy with EU law*, Brussels.
- European Parliament and Council Directive 2003/55/EC, of 26 June 2003 concerning common rules for the internal market in natural gas and repealing Directive 98/30/EC, Brussels.
- European Parliament and Council Directive 2009/73/EC, of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC, Brussels.
- European Parliament and Council Directive 98/30/EC, of 22 June 1998 concerning common rules for the internal market in natural gas, Brussels.
- Fan, J., 2000. Price Uncertainty and Vertical Integration: An Examination of Petrochemical Firms. *Journal of Corporate Finance*, 6(1), pp.345–376.

- Finnerty, J., 1996. Preparing the Project Financing Plan. In *Project Financing – Asset-based financial engineering*. Hoboken: Wiley & Sons.
- Fiorio, C. & Florio, M., 2009. *The Reform of Network Industries, Privatisation and Consumers' Welfare: Evidence from the EU15*, Milan: IDEAS Working Paper Series from RePEc
- Flick, U., 2006. *An Introduction to Qualitative Research*, London; Thousand Oaks; New Delhi; Singapore: SAGE Publications.
- Florio, M., 2013. *Network industries and social welfare: The experiment that reshuffled European utilities*, Oxford: Oxford University Press.
- Florio, M., 2004. *The Great Divestiture: Evaluating the Welfare Impact of the British Privatizations, 1979-1997*, Cambridge, Mass.; London: MIT Press.
- Foreign Affairs Council, 2015. EU Energy Diplomacy Action Plan. In *Outcome of proceeding*. p. 20 July.
- Furtado, C., 1964. *Development and underdevelopment*, Berkeley: University of California Press.
- Galsi, 2009a. *Galsi: Shareholders meet to approve the financial statements and appoint the board of directors*, Press release, Milan, April 23.
- Galsi, 2009b. *The Galsi gas pipeline: New energy for Sardinia*, Press release, Cagliari, 23 November.
- Galsi and Snam Rete Gas, 2008. *Galsi and Snam Rete Gas confirm commitments to build new gas pipeline from Algeria to Italy via Sardinia*, Press release, Milan, 30 September.

- Garcia, L., 2006. The liberalisation of the Spanish gas market. *Energy Policy*, 34(13), pp.1630–1644.
- Gatti, S., 2013. Valuing the Project and Project Cash Flow Analysis. In *Project Finance in Theory and Practice*. San Diego: Academic Press.
- Ghoshal, S. & Moran, P., 1996. Bad for Practice: A Critique of the Transaction Cost Theory. *The Academy of Management Review*, 21(1), pp.13–47.
- Glachant, J.M. & Hallack, M., 2009. Take-or-pay contract robustness: A three step story told by the Brazil–Bolivia gas case? *Energy Policy*, 37, pp.651–657.
- Godfrey, P.C. et al., 2016. What is organizational history? Toward a creative synthesis of history and organization studies. *Academy of Management Review*, 41(4), pp.590–608.
- Gorak, T. & Ray, D., 1995. Efficiency and Equity in the Transition to a New Natural Gas Market. *Land Economics*, 71(3), pp.368–385.
- Graaf van den, T. & Sovacool, B.K., 2014. Thinking big: Politics, progress, and security in the management of Asian and European energy megaprojects, 74, pp.16–27.
- Granovetter, M., 1985. Economic Action and Social Structure: The Problem of Embeddedness. *American Journal of Sociology*, 91(3), pp.481–510.
- Greenstream BV, 2008. *Annual Report Greenstream BV*, Amsterdam, 31 December.
- Grover, V. & Malhotra, M., 2003. Transaction Cost Framework in Operations and Supply Chain Management Research: Theory and Measurement. *Journal of Operations Management*, 21(4), pp.457–473.

- Hancher, L. & Marhold, A., 2019. A common EU framework regulating import pipelines for gas? Exploring the Commission's proposal to amend the 2009 Gas Directive. *Journal of Energy & Natural Resources Law*.
- Hart, O. & Moore, J., 1990. Property Rights and the Nature of the Firm. *Journal of Political Economy*, 98(6), pp.1119–1158.
- Hauteclouque, A. & Glachant, J.M., 2009. Long-term energy supply contracts in European competition policy: Fuzzy not crazy. *Energy Policy*, 37(12), pp.5399–5407.
- Helm, D., 2007. *The New Energy Paradigm*, Oxford: Oxford University Press.
- Hennart, J.F., 1991. The transaction costs theory of joint ventures: An empirical study of Japanese subsidiaries in the United States. *Management Science*, 37, pp.483–497.
- Herranz-Surrallés, A., 2016. An emerging EU energy diplomacy? Discursive shifts, enduring practices. *Journal of European Public Policy*, 23(9), pp.1386–1405.
- Hirschhausen, C. & Neumann, A., 2008. Long-Term Contracts and Asset Specificity Revisited: An Empirical Analysis of Producer–Importer Relations in the Natural Gas Industry. *Review of Industrial Organization*, 32(3), pp.131–143.
- Hobbs, J., 1996. A Transaction Cost Approach to Supply Chain Management. *Supply Chain Management: An International Journal*, 1(2), pp.15–27.
- Holz, F., Hirschhausen, C. & Kemfert, C., 2008. A strategic model of European gas supply (GASMOD). *Energy Economics*, 30(3), pp.766–788.
- Honoré, A., 2013. *The Italian gas market: Challenges and opportunities*, NG 76, Oxford: Oxford Institute for Energy Studies.

- Hoppe, E. & Schmitz, P., 2010. Public versus private ownership: Quantity contracts and the allocation of investment tasks. *Journal of Public Economics*, 94(3-4), pp.258–268.
- Hoven van den & A. Froschauer, K., 2004. Limiting regional electricity sector integration and market reform. The cases of France in the EU and Canada in the NAFTA region. *Comparative Political Studies*, 37(9), pp.1079–1103.
- Huang, Z. & Chen, X., 2016. Is China Building Africa? *The European Financial Review*. Available at: <https://www.europeanfinancialreview.com/is-china-building-africa/>.
- IEA, 2006. *Energy policy of IEA countries: The Republic of Korea*, International Energy Agency, Paris.
- IEA, 2016. *Gas resiliency assessment of Japan*, International Energy Agency, Tokyo.
- Inderst, G., 2010. Infrastructure as an asset class. *EIB papers*, 15(1), pp.70–104.
- IPCC, 2018. *Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change*, Paris
- Jamasb, T., Pollitt, M. & Triebs, T., 2008. Productivity and Efficiency of US Gas Transmission Companies: A European Regulatory Perspective. *Energy Policy*, 36(9), pp.3398–3412.
- Jefferson, G.H., 1998. China's state enterprises: public goods, externalities, and Coase. *The American Economic Review*, 88(2), pp.428–432.

- Jenkins-Smith, H. et al., 2014. Advocacy Coalition Framework: Foundations, Evolution and Future Challenges. In P. A. Sabatier & C. Weible, eds. *Theory of the policy processes*. Westview Press.
- Jiang, Y., Peng, M., Yang, X. & Mutlu, C. 2015. Privatization, Governance, and Survival: MNE Investments in Private Participation Projects in Emerging Economies. *Journal of World Business*, 50(2), pp.294–301.
- John Gault S.A., 2004. *Natural Gas Pipeline Project: Potential Gas Acquisition Strategies*. A report prepared for Enemalta Corporation, April 2004, Geneva.
- Joskow, P., 1985. Vertical Integration and Long-Term Contracts: The Case of Coal-Burning Electric Generating Plants. *Journal of Law, Economics, & Organization*, 1(1), pp.33–80.
- Joskow, P., 1987. Contract Duration and Relationship-Specific Investments: Empirical Evidence from Coal Markets. *The American Economic Review*, 77(1), pp.168–185.
- Joskow, P., 1990. Price Adjustment in Long-Term Contracts: Further Evidence from Coal Markets. *Rand Journal of Economics*, 21, pp.251–274.
- Joskow, P., 2008. Lessons Learned from Electricity Market Liberalization. *The Energy Journal*, 29(2), pp.9–42.
- Joskow, P., 2010. Vertical Integration. *Antitrust Bulletin*, 55(3), pp.545–586.
- Joskow, P., 2013. Natural Gas: From Shortages to Abundance in the United States. *American Economic Review*, 103(3), pp.338–343.
- Kang, W., 2014. China's energy security: Oil and gas. *Energy Policy*, 73, pp.4–11.

- Kardas, S., 2011. Geo-strategic position as leverage in EU accession: the case of Turkish- EU negotiations on the Nabucco pipeline. *Southeast European and Black Sea Studies*, 11(1), pp.35–52.
- Kerkvliet, J., 1991. Efficiency and Vertical Integration: The Case of Mine-Mouth Electric Generating Plants. *The Journal of Industrial Economics*, 39(5), pp.467–482.
- Klein, B., 2000. Fisher—General Motors and the Nature of the Firm. *The Journal of Law & Economics*, 43(1), pp.105–142.
- Klein, B., Crawford, R. & Armen, A., 1978. Vertical Integration, Appropriable Rents, and the Competitive Contracting Process. *Journal of Law and Economics*, 21(2), pp.297–326.
- Kogut, B., 1988. Joint Ventures: Theoretical and Empirical Perspectives. *Strategic Management Journal*, Vol. 9, 319–332, 9, p.319–332.
- Kuhn, K.U. & Vives, X., 1999. Excess Entry, Vertical Integration, and Welfare. *The RAND Journal of Economics*, 30(4), pp.575–603.
- Lafontaine, F. & Slade, M., 2007. Vertical Integration and Firm Boundaries: The Evidence. *Journal of Economic Literature*, 45(3), pp.629–685.
- La Porta, R., López-de-Silanes, F. & Shleifer, A., 2000. *Government Ownership of Banks*, Cambridge, Massachussets.
- Lemos de, T., Betts, M., Eaton, D., de Almeida, L.T., 2000. From Concessions to Project Finance and the Private Finance Initiative. *The Journal of Structured Finance*, 6(3), pp.19–37.

- Lieberman, M., 1991. Determinants of Vertical Integration: An Empirical Test. *Journal of Industrial Economics*, 39(5), pp.451–466.
- Lockley, A. & Coffman, D., 2018. Carbon dioxide removal and tradeable put options at scale. *Environmental Research Letters*, 13(5).
- Lockley, A., Mi, Z. & Coffman, D., 2019. Geoengineering and the blockchain: Coordinating Carbon Dioxide Removal and Solar Radiation Management to tackle future emissions. *Frontiers of Engineering Management*, 6(1), pp.38–51.
- Lorot, P., 2001. La géoéconomie, nouvelle grammaire des rivalités internationales. *L'information géographique*, 65(1), pp.43–52.
- Luttwak, E.N., 1990. From geopolitics to geo-economics: logic of conflict, grammar of commerce. *The National Interest*, 20, pp.17–23.
- Majumdar, S.K., 1996. Fall and Rise of Productivity in Indian Industry: Has Economic Liberalisation Had an Impact. *Economic and Political Weekly*, 31(48), pp.46–53.
- Makholm, J., 2015. Regulation of Natural Gas in the United States, Canada, and Europe: Prospects for a Low Carbon Fuel. *Review of Environmental Economics and Policy*, 9(1), pp.107–127.
- Makholm, J., 2012. *The Political Economy of Pipelines: A Century of Comparative Institutional Development*, Chicago: University of Chicago Press.
- Maltby, T., 2013. European Union energy policy integration: A case of European Commission policy entrepreneurship and increasing supranationalism. *Energy Policy*, 55(100), pp.435–444.

- Masten, S., 1984. The Organization of Production: Evidence from the Aerospace Industry. *The Journal of Law & Economics*, 27(2), pp.403–417.
- Mathewson, F. & Winter, R., 1984. An Economic Theory of Vertical Restraints. *RAND Journal of Economics*, 15, pp.27–38.
- Mazzucato, M., 2015. *The entrepreneurial state: Debunking public vs. private sector myths*, London; New York: Anthem Press.
- Mazzucato, M., 2018a. *The value of everything: Making and taking in the global economy*, New York: Public Affairs.
- Mazzucato, M., 2018b. *Towards a Mission-Oriented Research and Innovation Policy in the European Union*, European Commission, Directorate-General for Research and Innovation, Brussels.
- Meggison, W. & Netter, J., 2001. From State to Market: A Survey of Empirical Studies on Privatization. *Journal of Economic Literature*, 39(2), pp.321–389.
- Meza, D. & Lockwood, B., 1998. Does Asset Ownership Always Motivate Managers? Outside Options and the Property Rights Theory of the Firm. *The Quarterly Journal of Economics*, 113(2), pp.361–386.
- Middleton, R. et al., 2017. The shale gas revolution: Barriers, sustainability, and emerging opportunities. *Applied Energy*, 199, pp.88–95.
- Millward, R., 1982. The Comparative Performance of Public and Private Ownership. In Lord Roll of Ipsden, ed. *The Mixed Economy*. London: Palgrave Macmillan.

- Millward, R., 2005. *Private and Public Enterprise in Europe: Energy, Telecommunications and Transport 1830–1990*, Cambridge: Cambridge University Press.
- Millward, R., 2011. Public Enterprises in the Modern Western World: An Historical Analysis. *Annals of Public and Cooperative Economics*, 82(4), pp.375–398.
- Monteverde, K. & Tecce, D., 1982. Supplier Switching Costs and Vertical Integration in the Automobile Industry. *The Bell Journal of Economics*, 13(1), pp.206–213.
- Mulugetta, Y., Hagan, E.B. & Kammen, D., 2019. Energy access for sustainable development. *Environmental Research Letters*, 14(2).
- Musacchio, A. & Lazzarini, S.G., 2014. *Reinventing State Capitalism. Leviathan in Business, Brazil and Beyond*, Cambridge, Mass.: Harvard University Press.
- Newberry, D., 2000. *Privatization, Restructuring and Regulation of Network Utilities*, Cambridge, Mass.: MIT Press.
- OECD, 2009. *Reviews of Regulatory Reform Regulatory Impact Analysis: A Tool for Policy Coherence*, Paris: OECD Publishing.
- Omonbude, E.J., 2013. *Cross-border oil and gas pipelines and the role of the transit country: Economics, challenges and solutions*, Basingstoke: Palgrave Macmillan.
- Orekeke, C. Coke, A. Geebreyesus, M., Ginbo, T., Wakeford, J., Mulugetta, Y., 2019. Governing green industrialisation in Africa: Assessing key parameters for a sustainable socio-technical transition in the context of Ethiopia. *World Development*, 115, pp.279–290.

- Pandian, S., 2005. The Political Economy of Trans-Pakistan Gas Pipeline Project: Assessing the Political and Economic Risks for India. *Energy Policy*, 33(5), pp.659–670.
- Pargendler, M., Musacchio, A. & Lazzarini, S.G., 2013. In Strange Company: The Puzzle of Private Investment in State-Controlled Firms. *Cornell International Law Journal*, 46, pp.569–610.
- Peng, H.A., Zhou, Q. & Jiang, Y., 2003. Lessons in Broadband Adoption from Singapore. *Journal of Interactive Advertising*, 4(1), pp.33–38.
- Peng, M. et al., 2016. Theories of the (state-owned) firm. *Asia Pacific Journal of Management*, 33(2), pp.293–317.
- Perrow, C., 1986. *Complex Organizations: A Critical Essay*, New York: Random House.
- Perry, M., 1978. Price Discrimination and Forward Integration. *The Bell Journal of Economics*, 9(1), pp.209–217.
- Prontera, A., 2018. The new politics of energy security and the rise of the catalytic state in southern Europe. *Journal of Public Policy*. 38(4), 511–551.
- Quadrio Curzio, A., & Miceli, V., 2010. *Sovereign Wealth Funds: A Complete Guide to State-Owned Investment Funds*. Petersfield, UK: Harriman House.
- Reinert, E., 1999. The Role of the State in Economic Growth. *Journal of Economic Studies*, 26(4-5), pp.268–326.
- Riordan, M., 1998. Anticompetitive Vertical Integration by a Dominant Firm. *American Economic Review*, 88(5), pp.1232–1248.

- Rogers, H., 2015. *The impact of lower oil and gas prices on global gas and LNG markets*, NG 99, Oxford: OIES Working Paper.
- Ronzitti, N., 2009. The Treaty of Friendship, Partnership and Cooperation between Italy and Libya: New Prospects for Cooperation in the Mediterranean. *Bulletin of Italian Politics*, 1(1), pp.125–133.
- Ruble, I., 2017. European Union energy supply security: The benefits of natural gas imports from the Eastern Mediterranean. *Energy Policy*, 105, pp.341–353.
- Ruester, S. & Neumann, A., 2009. Linking Alternative Theories of the Firm—a First Empirical Application to the Liquefied Natural Gas Industry. *Journal of Institutional Economics*, 5(1), pp.47–64.
- Russo, M., 1992. Power Plays: Regulation, Diversification, and Backward Integration in the Electric Utility Industry. *Strategic Management Journal*, 13(1), pp.13–27.
- Sabatier, P., 1998. The Advocacy Coalition Framework: Revisions and Relevance for Europe. *Journal of European Public Policy*, 5(1), pp.98–130.
- Sander, M., 2016. The Rise of Governments in Global Oil Governance: Historical Dynamics, Transaction Cost Economics, and Contemporary Implications. *Energy Research & Social Science*, 17(1), pp.82–93.
- Sartori, N., 2013. *Energy and Politics: Behind the Scenes of the Nabucco-TAP Competition*, 13, Rome: IAI Working Papers.
- Saussier, S., 2000. Transaction costs and contractual incompleteness: the case of Électricité de France. *Journal of Economic Behavior & Organization*, 42(2), pp.189–206.

- Sharkey, W., 1982. *The theory of natural monopoly*, Cambridge, UK; New York: Cambridge University Press.
- Shelanski, H. & Klein, P., 1995. Empirical Research in Transaction Cost Economics: A Review and Assessment. *Journal of Law, Economics, & Organization*, 11(2), pp.335–361.
- Signorini, G., Ross, B. & Peterson, C., 2015. Governance strategies and transaction costs in a renovated electricity market. *Energy Economics*, 52(A), pp.151–159.
- Slater, G. & Spencer, D., 2000. The Uncertain Foundations of Transaction Costs Economics. *Journal of Economic Issues*, 34(1), pp.61–87.
- Smith, C., 2013. US pipeline operators sink revenue growth into expansion. *Oil & Gas Journal*, 9 February.
- Sokona, Y., Mulugetta, Y. & Gujba, H., 2012. Widening energy access in Africa: Towards energy transition. *Energy Policy*, 47(1), pp.3–10.
- Spanjer, A., 2007. Russian gas price reform and the EU-Russia gas relationship: Incentives, consequences and European security of supply. *Energy Policy*, 35(5), pp.2889–2898.
- Stern, J., 1998. *Competition and Liberalization in European Gas Markets: A Diversity of Models*, London: Royal Institute of International Affairs.
- Stern, J. & Rogers, H., 2014. *The Dynamics of a Liberalised European Gas Market: Key determinants of hub prices, and roles and risks of major players*, NG 94, Oxford: OIES Paper.
- Stukey, J.A., 1983. *Vertical Integration and Joint Ventures in the Aluminium Industry*, Cambridge, Massachusetts: Harvard University Press.

- Sutherland, R., 1993. Natural gas contracts in an emerging competitive market. *Energy Policy*, 21(12), pp.1191–1204.
- Tadelis, S. & Williamson, O., 2013. Transaction Cost Economics. In *The Handbook of Organizational Economics*. Princeton: Princeton University Press.
- Talus, K., 2019. EU Gas Market Amendment - Despite of Compromise, Problems Remain. *Oil, Gas & Energy Law Intelligence*. Available at: ISSN 1875-418X.
- Teece, D., 1986. Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy. *Research Policy*, 15(6), pp.285–305.
- Thatcher, M., 2007. Regulatory agencies, the state and markets: A Franco-British comparison. *Journal of European Public Policy*, 14(7), pp.1028–1047.
- Toninelli, P.M. ed., 2011. *The Rise and Fall of State-Owned Enterprise in the Western World*, Cambridge, UK; New York: Cambridge University Press.
- Townsend, D., 2002. Maybe the beginning of the end. *Petroleum Economist*, 69(3), p.8.
- Train, K., 1991. *Optimal regulation: The economic theory of natural monopoly*, Cambridge, Massachusetts: MIT Press.
- Trouille, J.-M., 2007. Re-inventing industrial policy in the EU: A Franco-German approach. *West European Politics*, 30(3), pp.502–523.
- Vaid, M., 2014. India's Natural Gas Infrastructure: Reassessing Challenges and Opportunities. *Strategic Analysis*, 38(4), pp.508–527.

- Varvelli, A., 2009. *L'Italia e l'ascesa di Gheddafi: La cacciata degli italiani, le armi ed il petrolio, 1969 – 1974*, Milano: Baldini Castoldi Dalai.
- Verbeke, A. & Kano, L., 2015. The new internalization theory and multinational enterprises from emerging economies: A business history perspective. *Business History Review*, 89(3), pp.415–445.
- Victor, D., Hults, D. & Thurber, M., 2012. *Oil and Governance: State-Owned Enterprises and the World Energy Supply*, Cambridge, UK; New York: Cambridge University Press.
- Victor, D.G., Jaffe, A. & Hayes, M.H., 2006. *Natural Gas and Geopolitics: From 1970 to 2040*, Cambridge: Cambridge University Press.
- Walker, G. & Weber, D., 1984. A Transaction Cost Approach to Make-or-Buy Decisions. *Administrative Science Quarterly*, 29(3), pp.373–391.
- Wallace, H., Pollack, M.A. & Young, A.R., 2010. *Policy-making in the European Union*, Oxford; Toronto: Oxford University Press.
- Waterson, M., 1989. *Regulation of the firm and natural monopoly*, Oxford: Basil Blackwell.
- Watson, W., 1992. *The gas sellers companion: A practical guide to gas contracts*, Tulsa, OK: Pennwell Press.
- Weber, B., 2014. *The EU's external energy policy and the neighbouring suppliers Azerbaijan and Algeria: Is the pipeline half full or half empty?* Science Po, Paris.
- Wilkins, M., 1974. *The maturing of multinational enterprise: American business abroad from 1914 to 1970*, Boston, MA: Harvard University Press.

- Williamson, O., 1975. *Market and Hierarchies*, New York: Free Press.
- Williamson, O., 1981. The Economics of Organization: The Transaction Cost Approach. *Journal of American Sociology*, 87(3), pp.548–577.
- Williamson, O., 1983. Organization Form, Residual Claimants, and Corporate Control. *Journal of Law and Economics*, 26(2), pp.351–366.
- Williamson, O., 2002. The Theory of the Firm as Governance Structure: From Choice to Contract. *Journal of Economic Perspectives*, 16(3), pp.171–195.
- Williamson, O., 2008. Outsourcing: Transaction Cost Economics and Supply Chain Management. *Journal of Supply Chain Management*, 44(2), pp.5–16.
- Williamson, O., 2013. *The Transaction Cost Economics Project. The Theory and Practice of the Governance of Contractual Relations*, Cheltenham; Northampton, MA: Edward Elgar Publishing.
- Witteloostuijna van, A., Brakmanb, S. & Van Marrewijk, C., 2007. Welfare Distribution Effect of a Price Reduction in the Dutch Gas Transport Market: A Scenario Analysis of Regulatory Policy, Market Form and Rent Allocation. *Energy Policy*, 35(12), pp.6299–6308.
- Wolf, C. & Pollitt, M.G., 2008. *Privatising national oil companies: Assessing the impact on firm performance*, 0811, Cambridge: Cambridge Working Papers in Economics
- Xu, X. & Yan, W., 1997. *Ownership Structure, Corporate Governance, and Corporate Performance: The Case of Chinese Stock Companies*, 1794, World Bank Policy Research Working Paper.

- Yescombe, E.R., 2002. *Principles of Project Finance*, Amsterdam: Academic Press.
- Yin, R., 2009. *Case Study Research: Design and Methods*, Thousand Oaks, Calif.; London: SAGE Publications.
- Yorucu, V. & Mehmet, O., 2018. *The Southern energy corridor: Turkey's role in European energy security*, Cham, Switzerland: Springer.
- Zafirova, Z., 2010. Natural Gas Short-Term Trading Markets: Legal Inputs and Policy Outputs. In B. Dekvaux, M. Hunt, & K. Talus, eds. *EU Energy Law and Policy Issue*. Brussels: Euroconfidential.
- Zhang, S. et al., 2015. PPP application in infrastructure development in China: Institutional analysis and implications. *International Journal of Project Management*, 33(3), pp.497–509.
- Zhang, Y. Gao, Y., Feng, Z., Sun, W., 2014. Asset Specificity and Complementarity and MNE Ownership Strategies: The Role of Institutional Distances. *Industrial Marketing Management*, 43(5), pp.777–785.
- Zhao, Z.-Y., Zuo, J. & Zillante, G., 2013. Factors influencing the success of BOT power plant projects in China: A review. *Renewable and Sustainable Energy Reviews*, 22(0), pp.446–453.