1. Introduction

1.1 BACKGROUND

In the period from the end of the Cold War to the end of the 1990s, several European countries have experienced a substantial decrease in their military budget and a significant loss of market shares *vis-à-vis* other international competitors. This weakening international competitiveness can largely be explained by the fact that the European defence sector is fragmented into several weakly integrated and highly protected domestic markets. This high level of industry concentration and the low level of integration among the domestic markets of European Union (EU) countries have forced economies in this area to accept more costly and less efficient defence equipment, which hampers the international competitiveness of this industry *vis-à-vis* other regions in the world (Edwards, 2011).

Since the mid 1990s, European defence firms and national authorities have reacted to these challenges by undertaking a process of restructuring and consolidation aimed at obtaining cost reductions through, for example, inter-firm collaborations, mergers and acquisitions. This process is currently coupled with the recent attempt of EU public authorities to introduce a greater degree of market liberalization in the future in order to avoid duplications and achieve stronger efficiency and international competitiveness in this market (Guay and Callum, 2002). One specific policy action that intends to introduce a greater degree of market liberalization in the EU defence sector is *The European Union's Defence and Security Procurement Directive (2009/81/EC)*, which is currently being transposed into national law by all EU and European Free Trade Association (EFTA) member states. The Directive makes an explicit effort to liberalize the European defence market, in an attempt to increase the international trade across European countries and make the defence market more open, integrated and competitive than it has been so far.

This Directive is one of several initiatives that the European countries have taken to create a more competitive and transparent European defence market (Schmitt, 2009). Among others, the main European arms-producing nations signed in 1996 a ‘Letter of Intent’ to harmonize their defence market rules and the European Defence Agency (EDA) introduced in 2006 a non-mandatory ‘Code of Conduct’ that should encourage the member states to open their defence markets to foreign bidders – but these initiatives fell far short of creating a common European defence market (Keohane, 2008). The new Directive is supposed to be a stronger political tool since it regulates and limits the use of Article 346 of the Treaty on the Functioning of the European Union (the ‘Lisbon Treaty’), an article that has enabled member states to exempt trade in defence and security equipment from the internal market.

It is still an open question as to what extent and in what form EU and EFTA member states will be able to make use of defence industrial policies after the Directive has been transposed into national law. There are nevertheless some defence industrial policy instruments that most likely will be affected by the new Directive – offset agreements and discriminatory procurement (Heuninckx, 2011; see definition and notes in chapter 2). This means that, regardless of the pace of implementation of the new Directive and the reaction of some member states to the defence liberalization process, these defence industrial policies will gradually be used more cautiously by national authorities in Europe, and considering future scenarios of a more open and more competitive European defence industry becomes relevant for defence companies and policy makers.

The future scenario of market liberalization certainly presents both new opportunities and new challenges. It is vital for national governments and EU public authorities to understand how business firms are responding to the new EU Directive, what innovation and internationalization strategies they are adopting, and how their changing strategies will facilitate, or hamper, the liberalization process. The present book intends to contribute a timely analysis of the implications of the new EU Defence and Security Procurement Directive that is relevant for both EU and national policy makers. The conceptual analysis and empirical evidence presented in this volume will help EU and national policy makers to understand how the new Directive affects the European defence market and the respective national defence industries.

1.2 RESEARCH QUESTIONS

The overall objective of this book is to investigate the effects of the defence liberalization process on European countries, in terms of the innovativeness and international competitiveness of their respective defence industries. In order to investigate this general question, we need to focus on two interrelated aspects, one referring to the micro (firm) level and the other to the macro (country) level of analysis.

The micro-level aspect is important because it is, first and foremost, business companies in the defence sector that will be affected by the challenges and opportunities provided by a more open and more competitive European defence market. The challenges are obviously related to a greater degree of competition and a lower level of industry protection, and hence greater difficulties for defence contractors to maintain market shares and profitability levels in their respective domestic markets. Opportunities, however, are associated with the fact that a more open EU defence market provides national firms with the possibility to sell their products and services in other European national markets (through export, foreign direct investment (FDI) and international collaborations) and also to purchase high-quality and lower-price machineries and equipment, and so improve the quality of final products and/or reduce their sale prices. So the major question that is relevant at the firm level is: *how will defence companies respond to these new challenges and opportunities – will they be able to adjust their innovation and business strategies in order to be more competitive in international markets?*

The investigation of this question is complex, and calls for the analysis of a variety of potentially relevant factors that will be considered in different chapters of this book. One factor relates to the role of firms' expectations with regards to the actual implementation of the Directive, since (as will be shown in chapter 4) business companies are more prone to adjust their business strategies and internationalize their operations if they have a clear perception that the liberalization process will be implemented effectively and rapidly by national authorities; otherwise, they would arguably prefer to postpone the adjustment process and continue their business as usual, in a highly protected national market. Another relevant factor that will be analysed in various parts of the book is firm size. Firms' response to market liberalization will arguably differ between large

defence contractors and smaller specialized supplier companies. These companies typically have different financial, human and managerial resources, as well as different core competencies and specialization patterns, and they therefore face a different set of challenges and opportunities when defence markets move towards liberalization. Further, technological innovation is a crucial competitive strategy for firms in the defence industry, and public policies that support research and development (R&D) investments and close collaboration between private firms and public science and technology (S&T) organizations play a particularly relevant role in this sector. Finally, defence contractors are more likely to succeed in an open, competitive market if they have a well-established national and international network of suppliers and advanced users, and hence are able to undertake national and international collaborations and in this way share production costs and technology-development risks to maintain and strengthen their competitive position.

On the other hand, firm-level dynamics and competitive factors are closely intertwined with the characteristics of the surrounding economic, institutional and political environment. The second specific question investigated in this book, focused on the macro (country) level, is therefore: *What is the likely impact of liberalization on the whole defence sector of a given economy, when both firm-level dynamics and country-level characteristics are taken into account?*

For instance, a relevant aspect refers to country size, since it is reasonable to expect that small, open economies have a different set of resources, competencies and policy objectives from larger European countries. In this book we will therefore investigate whether and the extent to which the impacts of liberalization will differ between large and smaller European countries. National policies are, as noted above, fundamental in the defence industry. We may therefore expect that firms' response to liberalization will largely differ depending on the specific liberalization strategy adopted by each national government, and also on the particular combination of defence industrial policies and innovation policies adopted by each country in the face of liberalization. Liberalization can take different forms and be implemented in different manners, and the specific policy strategy adopted by each national government will shape and largely affect firm-level responses.

1.3 RELEVANT LITERATURE AND THEORIES

The questions investigated in this book call for an eclectic theoretical framework that is rooted in different strands of social sciences research. On the one hand, EU studies in political science research provide important insights to understand the policy aspects of the liberalization process, namely the establishment of EU secondary law and its implementation by national governments, and how this process differs across European countries (sections 1.3.1 and 1.3.2). On the other hand, research in international economics, international business and the innovation studies literature provides insights about factors explaining how private firms respond to liberalization by adjusting their business and innovative strategies (section 1.3.3).

1.3.1 The Establishment of EU Secondary Law in Defence-Related Matters

The literature on the EU defence equipment market and defence industrial policy has so far mainly dealt with the question of how the EU has now (apparently) been able to liberalize the European defence and security market despite several failed attempts in the past. Scharpf (1988) formulated the original *joint-decision trap model* – a general framework that explained why it was so difficult for the EU to get its member states to support market liberalization. Specifically, this model argued that economic integration failed to advance because such supranational decision making depended on hard-to-reach, unanimous consensus among lower-level (national) governments (Scharpf, 1988). While the joint-decision trap model was formulated in general terms and subsequently applied to several different policy domains, the recent literature has presented some possible explanations of how the EU has succeeded in avoiding this trap and achieved approval for the new Defence and Security Procurement Directive. Three distinct types of explanation have put emphasis on different levels of analysis (Weiss, 2012, 2013; Blauburger and Weiss, 2013):

1. *The supranational entrepreneur approach.* This approach focuses on the European Commission as the main actor driving the integration process, and its entrepreneurial ability to negotiate and push its liberalization agenda in different policy

domains. Specifically, in the recent literature on EU defence and security market liberalization, three distinct factors have been discussed: (1) spillover, that is, the progressive extension of the European Commissions policy-making activities from one domain to another (Guay, 1997); (2) framing, that is, the ability of the European Commission to reframe defence liberalization issues by reconciling the ‘market frame’ (economic rationale) and the ‘defence frame’ (national security rationale; see Mörth, 2000); and (3) the push-and-pull strategy, that is, the European Commission’s ability to strategically use judicial politics of the European Court of Justice in order to reach consensus and approval of the new Directive (Blauberger and Weiss, 2013).

2. *The economic patriotism approach.* This approach investigates more explicitly member states’ own interests and agenda in promoting liberalization (Clift and Woll, 2012: 308; Hoeffler, 2012: 436). Defence liberalization can be explained by a shift in national attitudes – from a belief that a country’s economic interests are best served through national protectionism to a belief that these benefits are outweighed by the new business opportunities granted by participating in a larger, liberalized market. Further, this approach points out that there is still considerable room for governments to provide ‘hidden’ forms of protectionism and industry support even in markets that are formally liberalized, and that countries will pursue these policies to varying degrees and with varying levels of success (Clift and Woll, 2012: 315).
3. *The transnational business approach.* This approach points out the importance of transnational actors, and in particular business companies, and their dynamic interactions with the supranational level (Stone Sweet and Sandholtz, 1997). According to this view, EU integration is driven primarily by transnational firms that are interested in, and push for, the liberalization of EU markets. This creates a demand for supranational rules and regulations that EU institutions can provide. In any given policy domain, once EU rules and organizations are established, a dynamic process of interaction between transnational and supranational actors sets in, thus further supporting the need for deeper integration and hence enlarging the scope of the liberalization process. According to this view, the integration process must be understood in a dynamic framework in which business

companies' internationalization interests and strategies assume crucial importance (Stone Sweet and Sandholtz, 1997). To the best of our knowledge, this theoretical approach has not yet been applied to the study of defence and security market liberalization. This book will take some important insights from this approach and apply it to the case of defence (see in particular chapter 4).

1.3.2 Implementation and Compliance Literature in EU Studies

Once EU secondary law is established, the next important step is its implementation by national member states, that is, the process by which national governments transpose EU Directives into domestic laws, and whether these are willing to comply with EU secondary law. In fact, as pointed out by Treib (2008: 5), 'crucial decisions that may decide on the success or failure of a particular policy are regularly taken at the implementation stage. What is more, it is far from self-evident that implementers will behave dutifully.' The literature on implementation and compliance has attracted a great deal of attention in EU studies, and it has so far proceeded along three subsequent phases (see overviews in Mastenbroek, 2005; Sverdrup, 2007; and Treib, 2008).

A first wave of research followed a top-down approach, focusing for example on the administrative capability of member states to interpret and apply EU-driven legislation. A second strand of the literature followed instead a bottom-up approach, and focused on the degree of fit (or misfit) between EU laws and national institutional and legal traditions, explaining the lack of implementation in terms of a possible mismatch between the two governance levels.

More recently, a third wave of research has combined insights from the previous traditions, and investigated in greater detail cross-country differences in implementation patterns. Specifically, an important advance has been the observation that groups of countries vary in the way they fulfil their EU-related duties and that these groups can be divided roughly into three distinct 'worlds of compliance'. While the Nordic countries belong to a 'world of law observance', where EU Directives are typically transposed quickly and correctly, countries such as France and Greece belong to the 'world of neglect', where transposition is hampered by bureaucratic inertia, and countries like Germany and the UK belong to the 'world

of domestic policy', where compliance with EU law depends on the fit with the political preferences of the government and other powerful domestic players (Sverdrup, 2004; Falkner et al., 2005; Falkner and Treib, 2008).

In short, this brief summary of the literature indicates two key points that are relevant to motivate our study. The first point refers to the EU compliance literature. This has been applied to several different policy domains, but there exists no empirical study on the implementation of the new EU Directive on defence and security procurement. In order to achieve a better understanding of the future prospects and expected outcomes of the ongoing liberalization process in European defence and security, it is not only important to look at the phase of establishment of the new EU Directive, but also to investigate the process of its implementation by member states, and the two-way dynamic interaction between them. As discussed by Edwards (2011), the new EU Directive opens up different possible scenarios for the future: the implementation process that is currently ongoing will affect the next steps that the European Commission will decide to take, and thus largely determine the future prospects and final outcomes of the market liberalization reform. A dynamic perspective that considers the two-way interaction between the establishment and the implementation of the EU Directive is therefore warranted.

The second point refers to the importance of defence companies in this process, and particularly large international defence contractors. In line with Stone Sweet and Sandholtz's (1997) transnational business approach, we argue that transnational actors play an important role in demand for the establishment and implementation of EU legislation to liberalize EU markets, given their interest in finding new business opportunities in international markets through export and FDI. This argument is all the more relevant in such a highly concentrated market as the defence industry, in which one or a few large oligopolistic companies typically dominate each national market and have a strong influence and active lobbying strategy with their respective governments. This explains why it is important to look at defence companies' reaction to the Directive, since this response will largely affect member governments' political willingness to support the ongoing liberalization process in the future, as well as the overall economic impact of the Directive.

1.3.3 Firm Heterogeneity and International Trade

Emphasizing the importance of business companies and their reaction to the liberalization process, it is natural to turn our attention to a different strand of research, rooted in international economics, which investigates the factors determining private firms' internationalization strategies and performance. Specifically, a new literature on firm heterogeneity and international trade has started to investigate the determinants of export at the firm level. Theoretical models have challenged the conventional wisdom and investigated the reasons why only a small number of enterprises within each industry are able to export, whereas most others are not (Melitz, 2003; Helpman et al., 2004). Empirical work in this new strand of international economics and business research has pointed out a set of key factors explaining firm heterogeneity and export performance within each industry, among which are firm size and productivity (Mayer and Ottaviano, 2007; Wagner, 2007), R&D and innovation (Aw et al., 2007; Damijan et al., 2008), and the ability of the firm to interact with external actors such as advanced users and the public science system (Alvarez et al., 2009).

Empirical tests of these models based on large firm-level datasets for selected countries have largely confirmed their main theoretical predictions (Bernard et al., 2007; Mayer and Ottaviano, 2007; Wagner, 2007). In a nutshell, this literature points out that, within each industry, there is substantial heterogeneity, which is mostly accounted for by companies' characteristics such as size, productivity and capital intensity. Only a select number of large firms (so-called 'superstar exporters') are able to overcome the sunk export costs and trade barriers that are faced in order to sell their products in foreign markets, whereas smaller and less productive enterprises are typically not able to become exporters.

A large number of empirical contributions rooted in firm heterogeneity and international trade literature have focused on technological innovation as a possible key factor contributing to explain enterprises' export activities (Roper and Love, 2002; Barrios et al., 2003; Lachenmaier and Wößmann, 2006; Aw et al., 2007; Castellani and Zanfei, 2007; Damijan et al., 2008; Ganotakis and Love, 2011). R&D and innovative investments are expected to enhance firms' export performance for two main reasons. On the one hand, they may lead to the introduction and commercialization of new high-quality

products, thus increasing innovative firms' shares in foreign markets (Zervos and Swann, 2009). On the other hand, R&D activities may also lead to the creation of new processes that may in turn determine higher efficiency in the production process, lower sales prices and hence stronger international competitiveness dynamics.

Although this literature has led to a substantial leap forward in our understanding of firms' internationalization strategies, the focus of this research has predominantly been to point out the general factors that may be important to investigate firm dynamics for all industries in the economy, but it has so far neglected the study of how industry-specific characteristics and sectoral specificities may shape and affect firm-level patterns and dynamics.

The defence sector is in many respects a peculiar market that differs substantially from many other industries of the economy. First, as explained in chapter 2, defence firms are heterogeneous and produce in several different industry segments (Markowski et al., 2010). Secondly, they invest heavily in R&D and innovation, but the lag between input and output of the innovative process is often very long (Zervos and Swann, 2009; Gonzalez and Lopez, 2013). Thirdly, the industry is heavily regulated and protected, and public instruments such as R&D procurement and offset agreements are commonly used to support national interests and domestic firms (Martin and Hartley, 1995; Guay and Callum, 2002).

Our strategy to cope with these specificities of the defence branch is that, while our theoretical framework will be rooted in this recent strand of international economics and international business research, we will explicitly point out some specific factors that may be particularly important for analysing the export performance of defence firms (see chapters 3 and 4).

1.4 METHODOLOGICAL APPROACHES

The research themes that will be investigated in this book, as noted above, centre around the general question of the possible impacts of market liberalization on the economic performance and international competitiveness of the European defence industry. This is a difficult question to analyse, since the liberalization process in the defence sector is an ongoing process and is far from having a certain and clearly predictable outcome. National policy makers in some

European countries fear that this process may limit the possibility they have to protect the domestic defence sector, and some companies fear that this process may turn out to be unequal and favour disproportionately big enterprises in the larger European countries. Given this resistance of some of the actors involved in the process, it is hard to say when and to what extent defence market liberalization will actually take place in the coming years. From a methodological point of view, these uncertainties imply that our investigation must use a combination of *ex-post* and *ex-ante* methodological approaches.

Ex-post approaches are those that can be used to analyse the behaviour and actions of agents (policy makers and defence companies) as they have developed so far in the defence industry and in the short time span after market liberalization has begun to take effect. For instance, in chapter 3 we will use statistical firm-level data on the whole population of defence firms in Norway and their main characteristics, resources, strategies and market performance during 2007–2008. Further, we use secondary data (e.g. policy documents) and interviews to analyse a few case studies of successful export products that may be useful to illustrate the dynamics and determinants of exports in the defence market.

Ex-ante approaches, by contrast, are necessary to investigate current trends and future scenarios, in order to discuss possible impacts and outcomes that the ongoing policy changes will have in the years ahead. This is the type of methodological approach adopted in chapter 4 of the book that make use of new primary data based on interviews with the main defence companies in Sweden and Norway asking them about their expectations of the possible impacts of the new EU Directive and how they are preparing to cope with it. Further, in the later part of the book (chapters 5 and 6), we make use of agent-based modelling (ABM), which is a flourishing methodology to build up theoretical models of economic markets where a population of heterogeneous agents (firms) interact, compete and collaborate with each other. ABM models make it possible to set up different policy scenarios that may arise in the future as a result of different policy actions and strategies, and hence carry out simulation exercises and *ex-ante* analysis of policy impacts.

A general characteristic and methodological approach adopted in this book is that it does explicitly take a small-country perspective. In chapters 2 and 3, we will in particular focus on the case of Norway and bring new empirical evidence on the defence industry

and defence-related policies adopted in the Norwegian economy (Fevolden et al., 2009). Although the Norwegian defence industry is small compared with the defence industries of the larger European countries, it has a surprisingly broad set of technological competencies and a remarkably high level of export. Norwegian defence contractors produce everything from tactical communication and crypto equipment to ammunitions and military explosives and earn on average about half of their revenues in overseas markets (Castellacci and Fevolden, 2014).

Norway has historically had a highly protected defence market, in which firms have received substantial amounts of financial support, for example, through industrial and innovation policies. Norwegian defence companies, as those in other small European countries, currently fear that the EU liberalization process may threaten their dominant position in the domestic market due to the increasing competition they will face from foreign enterprises of larger EU countries (e.g. the UK, France, Germany). The Norwegian case is thus highly interesting, since it provides a situation where we can analyse not only the possible future effects of market liberalization but also the ongoing process of implementation and the related resistance posed by some of agents in this sector.

1.5 AN OVERVIEW OF THE BOOK

Chapter 2 will present a brief background to the Norwegian defence industry, pointing out some of its peculiar characteristics and the main public policy instruments that are typically adopted to support private firms' technological activities and international competitiveness, and how the use of these may be limited by the introduction of the new EU Directive.

The next two chapters provide a set of firm-level analyses focusing on the micro question noted in section 1.2 above about defence firms' main characteristics and strategies and their response to market liberalization. Chapter 3 investigates the factors that explain the economic performance of defence firms, and how these factors differ and are related to the set of characteristics typically highlighted by the recent literature in international economics and business studies. Focusing on the Norwegian case, the analysis makes use of two complementary methodologies: the first is based on quantitative firm-level data

analysis for the whole population of defence companies in Norway, whereas the second is based on qualitative case study research on the three most important defence export products (weapon stations, ammunition, electronics). The empirical results highlight the importance of a few major success factors for Norwegian exporting firms, and discusses how these will be affected in a more liberalized and open market in the future. Chapter 4 investigates how the defence companies are responding to the changing policy regime by carrying out a set of interviews with a selected sample of some of the most important defence contractors in Norway and Sweden. The specific aspect highlighted in this chapter is the important role played by firms' expectations in determining their response to liberalization (or lack of such), and how these vary for different groups of companies (large firms vs. small and medium enterprises (SMEs)) and in different countries (more vs. less protected national policy regimes).

Chapters 5 and 6 then shift the focus to the analysis of the macro question noted in section 1.2 on the overall future (expected) impacts of liberalization for the defence sector as a whole.

Chapter 5 presents a stylized agent-based model of the European defence industry that addresses these issues and reproduces some of the main empirical characteristics and stylized facts pointed out in existing literature and in the previous chapters of this book. This ABM model studies how firms in this market respond to the opportunities provided by a higher degree of openness and liberalization by investing in R&D, collaborating with other defence contractors and learning from them, and securing public funds and policy support by means of R&D grants to develop innovative products. Chapter 6 then carries out a simulation analysis of this model, pointing out that European defence firms, in a dynamic perspective, will on average become more efficient, less dependent on public procurement and innovation policy support, and more prone to knowledge sharing and inter-firm collaborations. This firm-level dynamics will in the long run lead to an increase in the industry's export performance and a less concentrated market. Further, the simulation analysis will investigate the trade-off and optimal policy mix between innovation and defence industrial policies, with a focus on small, open economies. We calibrate our agent-based simulation model to resemble some of the characteristics of a small European country's defence industry, and build up different policy scenarios that might be realized during the implementation of the new EU Directive.

Chapter 7 concludes the book by summarizing some of the main results and discussing a few relevant policy implications. The results presented in this book on the whole provide relevant indications for national and EU public authorities. The EU liberalization process in the defence sector does in principle provide new relevant opportunities for defence companies, although these potential benefits will only be realized if private firms effectively expect and perceive that a full and well-coordinated implementation process is in place.