

Trade Barriers in the 21<sup>st</sup> Century:  
The Case of the Norwegian Defense Industry

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# Executive Summary

The use of conventional trade barriers such as tariffs and import quotas has declined significantly since the signing of the General Agreement on Tariffs and Trade in 1948 (WTO, 2012). It is therefore no surprise that recent economic literature shows that the cost that arises from traditional trade barriers is fairly modest; one estimate put the cost to the world economy at as low as 1 percent of world GDP (Paul R. Krugman, Obstfeld, & Melitz, 2012). Is this to say that barriers have been reduced to such a degree that they no longer impact trading economies? Are trade barriers to be thought of as a problem of the past? For most, the clear answer to this is no. The aim of this thesis is to investigate the extent to which Norwegian products still encounter trade barriers in foreign markets; to measure the relative frequency and severity with which barriers occur; and explore the potential effects on producers and the broader economy.

Because trade barriers vary widely across markets and industries, I have chosen to focus on the case of the Norwegian defense industry vis-à-vis the US market. Limiting the scope of the thesis in this way provides in-depth information needed in order to make valuable predictions as to the impacts of trade barriers on a particular sector and the broader economy.

Relevant barriers were identified through in-depth interviews with Norwegian government officials, representatives from the Norwegian Armed Forces, as well as executives from the defense industry. A business survey covering a total of 16 barriers was subsequently distributed to the Norwegian defense industry. The data collected from the survey was used to assign each barrier two quantitative data points; one related to frequency, and another related to severity. Finally, the frequency measure and the severity measure were combined to provide a measurement of overall impact.

The data from the survey allowed for a ranking of the barriers that revealed the following insights:

1. In certain cases, there seems to be a discrepancy between regulations and reality. This is exemplified by the Buy American Act; which is ranked number 1 according to overall impact, but should in reality not apply to Norwegian end products.

2. High-impact barriers can be a bi-product of (more or less) unrelated regulations. This is demonstrated in this thesis by how barriers related to the US *export* control regime has a relatively large impact on US imports.
3. Informal barriers are of great importance. This pertains particularly to the attitudes of US industry and governmental procurement officials towards Norwegian defense companies.

The analysis of the survey data also revealed that companies with different levels of involvement in the US market assign barriers different overall impact. The data showed that it is companies with the most direct involvement in the US that encounter barriers most frequently, and that it is the same group that find them most challenging to deal with.

Combining the survey data with economic theory allowed for analysis of the likely effects of trade barriers on the defense industry and the broader Norwegian economy. I conclude that the barriers negatively impact company revenue and value added, and that this has implications for their budget restriction and use of inputs. The extent to which these changes are noticeable in the national economy is however likely to be modest, due to the relatively small size of the Norwegian defense industry. Barriers also lead to less efficient resource use, as companies are denied the opportunity to reap benefits from specialization and economies of scale. Lastly, I conclude that there is considerable pressure on the Norwegian defense industry to relocate at least parts of their operations to the US. This will likely be beneficial in terms of revenue, but has the potential to create a one-way transfer of technology from Norway to the US.

# Preface

I would like to thank my academic advisor, Karen Helene Ulltveit-Moe, for her guidance and constructive feedback. Her contributions have truly been invaluable.

I am most grateful to my boss for introducing me to, and teaching me everything I know about the defense industry. Thank you also to everyone at the Norwegian Embassy in Washington, DC, in the Norwegian Armed Services and Ministry of Defence, as well as the Norwegian Defence and Security Industries Association (FSi) for their input and assistance. A special thanks goes out to all the industry representatives who took the time to participate in the business survey, without you there would be no thesis.

Finally, I would like to thank my family and friends for their input, patience, and endless support throughout the process of writing this thesis. In particular, I would like to thank my brother and dad for their help regarding post-stratification and creating indexes of frequency and severity.

Any inaccuracies or errors in this thesis are my responsibility alone.

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# 1 The Special Case of the Defense Industry

The following chapter provides context and motivation for studying trade barriers in markets for defense articles. Subchapter 1.1 provides key figures for the Norwegian defense industry, both in absolute and relative terms. 1.2 explores this industry's relationship with the Norwegian Government and the Armed Forces and provides insight into why this relatively small industry receives the amount of support that it does. Finally, subchapter 1.3 discusses the importance of the US market to Norwegian defense companies.

## 1.1 The Norwegian Defense Industry: Key Figures

The approximately 120 companies that make up the Norwegian defense industrial base are a highly heterogeneous group with little more in common than the fact that they all are suppliers to the Norwegian and/or allied Armed Forces (NDRE, 2012). Companies vary in size between one-man enterprises to companies with multiple business units and thousands of employees. The companies also deliver a wide variety of products and technologies of different sophistication levels. This diversity can make aggregate analysis difficult as statistics are usually reported by product group. Luckily, the Norwegian Defense Research Establishment<sup>1</sup> (NDRE) provides continuous data on the conditions and standing of the industrial base through annual statistical reports. Below follows key figures on employment, value added, exports, and research and development (R&D) investments for the Norwegian defense industry.

**Employment:** Defense-related activity supported approximately 4.500 full-time equivalent positions in Norway in 2011 (NDRE, 2012). This equaled 0.19 percent of the total full-time equivalents across all sectors of the Norwegian economy (SN, 2013b). While the defense industry's contribution to national employment is relatively small, defense jobs are to a large extent concentrated in defense-industrial hubs, and are therefore of great importance to the local communities where they are situated (NDRE, 2007). It is important to note that the figures above reflect only work directly related to producing defense articles; they consider neither employments for the production of dual-use or civilian products within defense companies, nor the spillover effects that follow from defense companies' supply purchases.

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<sup>1</sup> Forsvarets Forskningsinstitutt, or FFI

**Value Added:** In 2011, the value added (calculated as operating profits plus labor costs) by the Norwegian defense industry was \$1.03 billion (6 billion NOK) (NDRE, 2012). Again, this represents a relatively modest portion (0.29 percent) of the total value added by all Norwegian sectors (SN, 2013c). However, while the industry might be small, it is characterized by advanced technology and high productivity. This is reflected in the fact that the value-added per full-time equivalent in 2011 was approximately \$230 000 (1.33 million NOK) for the defense industry, while the corresponding figure for the Norwegian manufacturing sector as a whole was \$123 000 (720 000 NOK) (SN, 2013c). In addition to direct value added activity, the defense industry creates positive externalities in other sectors of the Norwegian economy through purchasing goods and services. According to NDRE estimates, the Norwegian defense industry bought goods and services worth \$550 million (3.2 billion NOK) from other Norwegian companies in 2011 (NDRE, 2012).

**Exports:** The total value of defense exports<sup>2</sup> in 2011 was approximately \$870 million (5.06 billion NOK) (NDRE, 2012), which equaled 1.4 percent of the total value of traditional exports<sup>3</sup> in Norway (SN, 2013a). While defense exports accounts for only a small portion of total Norwegian exports, it is worth noting that this share has been growing rapidly; at around 15 – 20 percent annually over the past decade (NDRE, 2011). Furthermore, exports are of the utmost importance to the defense industry itself. According to the NDRE, exports made up as much as 38 percent of the total defense industry sales in 2012 (NDRE, 2012). According to the head of the Norwegian Defense and Security Industries Association<sup>4</sup> (NDSIA), a Norwegian defense industry would not be viable without exports (Svensgård, 2013).

The defense industry faces very particular global market settings. Not only do they face barriers in foreign markets (which is the focus of this thesis), but restrictions also apply at the Norwegian border. Exports of Norwegian defense articles, services, and technologies are controlled by the Norwegian government to ensure that such exports are

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<sup>2</sup> This total value includes both defense articles subject to export licensing and those that are not.

<sup>3</sup> ‘Traditional exports’ is defined as total exports less exports of crude oil, natural gas, condensates, ships, and oil platforms (NDRE, 2011).

<sup>4</sup> Forsvars- og sikkerhetsindustriens Forening, or FSi

aligned with Norwegian security interests, and to limit the global proliferation of military articles (NMFA, 2013a). Additionally, the Norwegian defense industry must follow the rules laid down in multinational defense trade agreements such as the Wassenaar Agreement (NMFA, 2012) and the recently approved UN Arms Trade Treaty (NMFA, 2013b).

**Research and Development:** Customers in the defense market have very specific and often critical needs. To meet the requirements set forth by the customer, defense companies need to make considerable R&D-investments. The defense industry is known for being knowledge-intensive and innovative, and this is also reflected in empirical evidence. According to the NDRE, 53 percent of defense companies undertook direct R&D-investments. The corresponding figure for the Norwegian private sector was 12 percent (NDRE, 2011).

## 1.2 The Defense Industry and Government: A Unique Relationship

From the data provided above we can conclude that the Norwegian defense industry constitutes a relatively small part of the Norwegian economy. Still, the industry receives considerable support and attention from the government (NDRE, 2008). The extensive support system available to the defense industry comprises programs in multiple Ministries including the Ministries of Defense, Trade and Industry, Local Government and Regional Development, and Education and Research. Governmental entities focused on business promotion, such as the Research Council of Norway, Innovation Norway, the Industrial Development Corporation of Norway (SIVA), and the Norwegian Guarantee Institute for Export Credits (GIEK) also work to ensure a strong and vibrant defense industry.

Governmental backing of the defense industry takes many forms, including direct domestic procurement, sales promotion through offset arrangements, providing tax incentives, direct monetary funding, professional and technical support (NDRE, 2008; NMOD, 2007). The Government also works actively to promote the export of Norwegian defense articles (NMFA, 2012). This is typically done through marketing, networking, and negotiating government-to-government trade promotion agreements.

If relative size and contribution to the Norwegian economy cannot explain the broad support for the defense industry described above, then what can? One explanation is that industries characterized by sophisticated technologies and considerable R&D investments deserve additional governmental support because they provide large external benefits for the broader economy (NDRE, 2009, 2011). Another, and the more likely explanation, is the inherent bond between the defense industry and the Armed Forces. The motivation of the Norwegian government in providing support for the defense industry is clearly stated in Report to the Storting no. 38 (2006 – 2007), which laid out a comprehensive strategy for using military procurement activities as industrial policy. The explicit goals of this strategy were to 1) promote value-adding activities in the Norwegian economy, 2) support the further development of a competitive defense industry, and 3) ensure that the Armed Forces has access to necessary expertise, materiel, and services (NMOD, 2007). It is the latter point, the defense industry's role as supplier to the Armed Forces, which gives the industry a unique position in the Norwegian economy. The Armed Forces have concluded that it is neither possible nor desirable for them to retain a full range of technical expertise. Industry is therefore relied upon to build and retain capabilities in certain technological areas (NDRE, 2008; NMOD, 2007).

The unique relationship with the Armed Forces ensures that the Norwegian defense industry receives considerable support from the Norwegian government. Still, the industry cannot rely solely on the Norwegian market. The fact that there is only one domestic end customer, and that sales are often made in bulk, makes exports vital to the defense industry. The next subchapter explores aspects of the international markets for defense articles by looking at the country that receives the largest share of Norwegian defense exports, the United States.

### **1.3 The International Defense Market's Biggest Player:**

#### **The United States**

After having discussed the importance of the defense industry to the Norwegian government, as well as the importance of exports to the defense industry, it is time to turn to the international markets. The reason for choosing to focus on the United States is its undisputable importance to the Norwegian defense industry, both in the past, present, and future:

**In the past:**

Norwegian defense industry involvement in the US defense market goes back more than a century, and stories of defense trade barriers go back just as far. One example is from the 1890s, when then Kongsberg Våpenfabrikk was awarded a contract for production of a new US Army rifle. After protests from US competitors and Congress, the contract was temporarily placed on hold (USSC, 1901). However, in the end, the US Army did adopt Kongsberg's Krag-Jørgensen rifle as their standard arm (Kongsberg, 2013). The Norwegian Government's history of support for the defense industry has a similarly long history, and is exemplified in the 1978 signing of the bilateral Memorandum of Understanding concerning research and development, production, and procurement of defense equipment (DOD/NMOD, 1978) and subsequently the related Declaration of Principles in 2002 (DOD, 2002). The industrial and governmental relationships that have emerged, the reputations that have been built, and the investments that have been made, makes the US-Norwegian trade relationship particularly interesting to study.

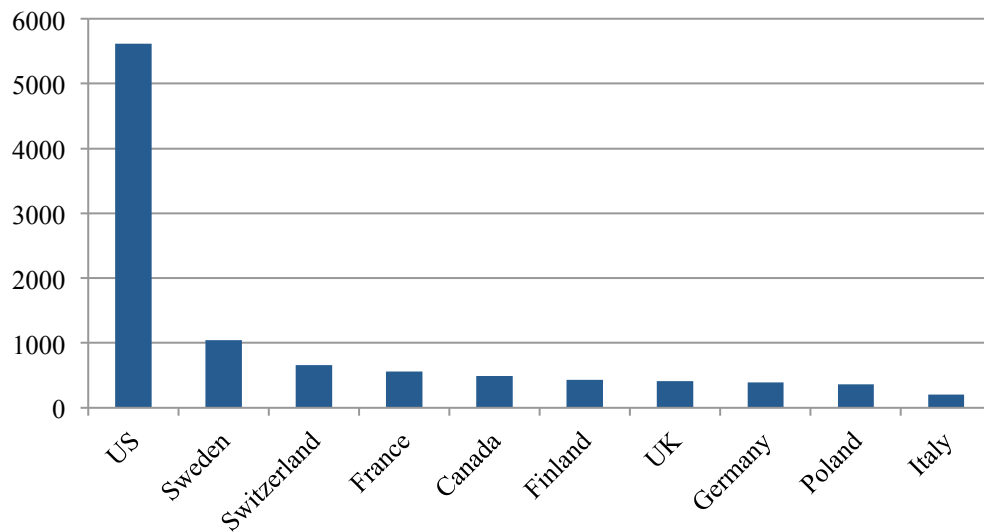
**In the present:**

The US market is currently of great importance to Norwegian defense companies. In the years between 2008 and 2011 the US received an average of 37.4 percent of total Norwegian defense exports<sup>5</sup>, for a total value of \$966 million (5.6 billion NOK) (NMFA, 2012). Figure 1.1 provides an illustration of the relative importance of the US market; it shows the dispersion of Norwegian defense exports among some of our major defense trading partners for the years 2008 to 2011.

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<sup>5</sup> The Ministry of Foreign Affairs' annual report includes data only on defense articles that require export licenses.

Figure 1.1 Norwegian defense exports by receiving market, 2008 – 2011, in million NOK

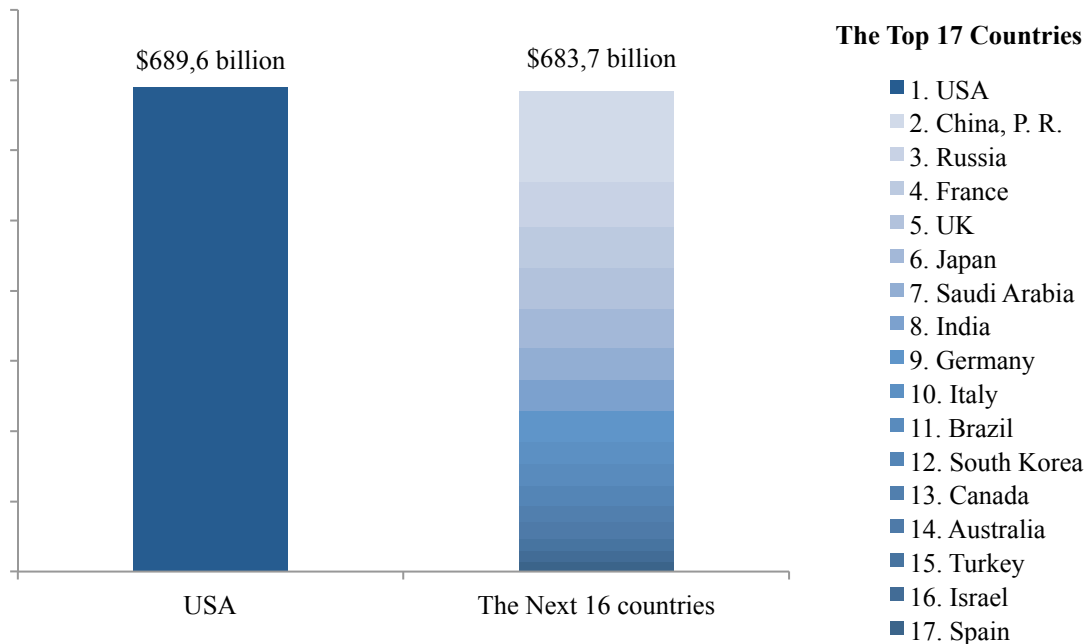


Source: Norwegian Ministry of Foreign Affairs (2012).

**In the future:**

The sheer size of the US military expenditure makes it an enormous potential market for Norwegian defense exports. Figure 1.2 illustrates this fact. In 2011, US military expenditures were greater than those of the next 16 biggest spenders combined, implying that the market potential in the US outranks that of any other nation.

Figure 1.2. Military expenditure by country (2011), in constant (2010) USD.



Source: Stockholm International Peace Research Institute (SIPRI, 2012)

In addition to the absolute importance implied by the size of the market, the US might also become a relatively more important market in coming years. The reason for this is the adoption and implementation of an EU directive that significantly limits the use of offset-agreements within the European defense market (NMOD, 2012). Empirical evidence suggests that being able to participate such repurchase-agreements is a major success factor for Norwegian defense companies (Castellacci & Fevolden, 2012), implying that future Norwegian defense exports may pivot towards the US, where such agreements would still be permissible.



# 2 Theory and Empirical Evidence: the Economics of Trade Barriers

## 2.1 The benefits of trade

According to economic theory, there are two reasons why countries find it beneficial to engage in international trade: 1) Differences between countries yield comparative advantages that give rise to trade benefits through specialization and 2) Cross-border coordination and collaboration can yield economies of scale (Paul R. Krugman et al., 2012). I will explain both types of benefit in turn.

David Ricardo developed the theory of comparative advantage in the early 19<sup>th</sup> century (Paul R Krugman, 2008). Simply put, country 1 has a comparative advantage in producing good A if the opportunity cost of producing A in terms of other goods is lower in country 1 than in other countries. Ricardo showed that trade between two countries can be mutually beneficial if each country specializes in, and exports, the good in which they have a comparative advantage. A brief numerical example illustrates the concept: consider a production of fighter jets and military naval vessels in Norway and the US. Table 2.1 shows the labor required to produce one unit of each product in each country. Numbers are for illustrational purposes only and do not reflect real-world labor input requirements for this type of production.

Table 2.1. Example: Labor input per unit of output in Norway and the US

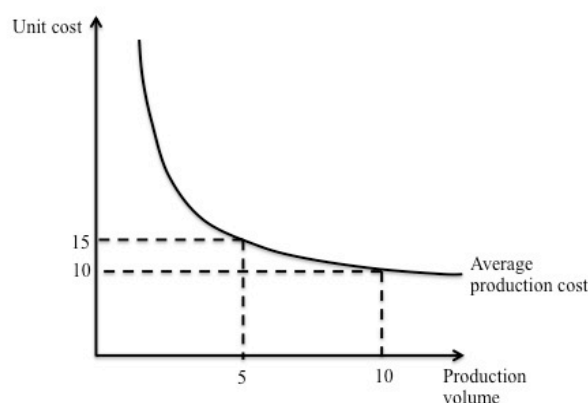
	Military Naval Vessels	Fighter jets
Norway	100	110
The United States	90	80

In this example, the US has an absolute advantage in production of both goods; they can produce both fighter jets and naval vessels more efficiently than Norway. Still, Ricardian theory predicts that both countries will benefit from specialization and trade. The opportunity cost in Norway of producing one military naval vessel in terms of fighter jets is equal to  $100/110 = 0.909$ , while the same opportunity cost in the US is  $90/80 = 1.125$ . The opportunity cost in Norway of producing one fighter jet in terms of military naval vessels is equal to  $110/100 = 1.1$ , while the same opportunity cost in the US is  $80/90 = 0.888$ . Norway

has a comparative advantage in producing military naval vessels and the US has a comparative advantage in producing fighter jets. It is straightforward to show that both countries can benefit from specializing in the good where they have a comparative advantage: if the US wanted one naval vessel and one fighter jet they would need to commit 170 labor units under autarky. With trade, and assuming that the price of one military naval vessel is one fighter jet, it would be sufficient to spend 160 labor units to produce two fighter jets, and then trade one jet for one naval vessel. Conversely, if Norway wanted one naval vessel and one fighter jet, they would need to commit 210 labor units if only domestic procurement was available. With trade they can use 200 labor units on producing two naval vessels and then trade one for a fighter jet. This example clearly shows the efficiency-related benefits of trade; we can use less input to produce the same amount of output if countries specialize and trade. When trade is restricted, neither the American nor the Norwegian economies can reap these benefits.

The second source of benefits from trade arises from economies of scale (Paul R Krugman, 2008). The concept of economies of scale refers to the notion that production becomes more efficient as production volume grows. This typically happens in industries where fixed costs are large. In such cases increased production volume implies that the fixed costs are spread across a larger number of produced units, thereby lowering the average total production cost per unit. Other reasons why economies of scale might be present include the fact that firms might be able to buy intermediary goods in bulk (and thus at a lower price), labor and capital specialization within the firm might be possible, and labor expertise might increase efficiency in production after some time. Diagrammatically, economies of scale are portrayed as a decreasing average-cost curve. Figure 2.1 below provides an illustration. If Norway and the US each were to produce 5 units of a good, the unit cost would equal 15. However, if production is centralized in one location, unit cost is reduced to 10. Clearly, coordinating production is beneficial as it allows for a more efficient use of resources.

Figure 2.1. Average production cost under economies of scale



Despite these benefits of free trade, we still frequently observe that trade is far from free. The next subchapter covers the motivations behind trade restrictions.

## 2.2 Motivations for restricting trade

The reasons for imposing trade barriers are many. Some are economic, others social or purely political. The following paragraphs provides a brief overview of the most commonly used arguments for trade restriction.

**Protecting domestic consumers:** Restricting imports or imposing quality standards is often defended on the basis of protecting the health and safety of domestic consumers. Goods such as medical supplies and foodstuffs are typical examples where this argument is applied. This reasoning is often considered legitimate, and trade restrictions aimed at protecting health and safety are regularly allowed under international trade regimes.

**Protecting domestic producers:** Governments frequently work to shield domestic producers from foreign competition. The argument for doing so is that domestic production has positive externalities that benefit the broader economy. Such additional benefits include for instance employment, spillovers from technological innovations, or in the case of the defense industry; ensuring national security and military capabilities. The argument is that protection from international markets is needed in order for these potential externalities to be realized.

**Terms of trade gains:** As we will see in subchapter 2.4, trade barriers such as tariffs have the potential to change world market prices. For large countries with global market power it is possible to use trade policies to lower the price of imports, thereby generating a terms of trade<sup>6</sup> benefit. While this is a possibility for large countries, backlash is likely as trading partners see the price of their exports fall (Paul R. Krugman et al., 2012).

**Retaliation:** Retaliatory trade barriers are put in place in cases where countries experience trading partners who are not abiding by the rules of free trade and fair competition. Provided there is proof of initial wrongdoing, retaliatory trade barriers are allowed under international trade regimes.

**Revenue generation:** Seeing as certain barriers can represent a considerable source of income, governments are incentivized to impose these types of trade restrictions. Examples typically include tariffs and import quotas.

## 2.3 Methods to restrict trade

There are many types of trade barriers available for governments to use as policy tools. It is common to distinguish between tariffs (taxes levied on imports) and non-tariff barriers. While the former is well known, it is becoming increasingly less relevant as its use has been reduced since the signing of the General Agreement on Tariffs and Trade (GATT) in the late 1940s. Non-tariff barriers, or NTBs, can refer to all policy measures, other than tariffs, that can potentially affect trade in goods (WTO, 2012). This is clearly a very broad definition. Within NTBs we find regulatory, procedural, and informal barriers spanning everything from import quotas and outright prohibitions, local content requirements and domestic preference provisions, to cultural disconnects and informal barriers. Additionally, some barriers are (more or less) unintended consequences of other policies. One example that will be cited repeatedly in this paper is the effect of the US *export* control regime on US *imports*.

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<sup>6</sup> A country's terms of trade equals the price of its exports divided by the price of its imports.

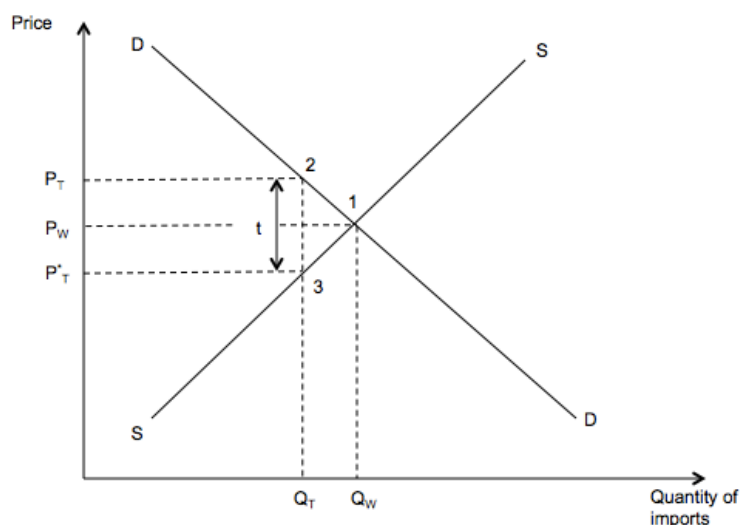
## 2.4 Basic effects of trade restrictions on prices and quantities

Before looking specifically at the consequences of barriers for the defense industry and the broader economy, a review of fundamental economic theory is necessary. I will use two specific examples, tariffs and import quotas, to show the basic effects of barriers on prices and quantities of traded goods. While examples are provided for only two types of barriers, the frameworks can easily be applied to other types of barriers. Barriers that impact the relative price of imports will, for instance, have effects that are similar to those of tariffs. Likewise, barriers that restrict imported volume in some way will have effects similar to those of import quotas.

### **Example 1: The effects of a tariff**

Tariffs are taxes levied on imports at the border. They make imported goods less competitive by raising their price relative to that of domestic goods. If the establishment of a tariff leads to no goods being traded, the importing country will be left with surplus demand, while the exporting country will have surplus supply of the good. Thus, the price in the importing country will rise, and the price in the exporting country will fall. These price movements will continue until the difference between the two prices equals the tariff, at which point imports are again able to compete and trade is feasible. In short, a tariff drives a wedge equal to the tariff between the prices observed in the importing and exporting markets. Figure 2.2 illustrates the situation described above.

Figure 2.2. Effects of a tariff



The line *DD* represents demand for imports while *SS* represents supply of imports. Under free trade,  $Q_W$  would be imported at price  $P_W$ . Introducing a tariff equal to  $t$  causes the quantity of imported goods to fall to  $Q_T$ . The price in the importing country rises to  $P_T$ , while the price received by exporters falls to  $P^*_T$ . In the importing market, the price increase causes domestic supply to rise and domestic demand to fall, causing an overall reduction in demand for imports (move from point 1 to 2). In the exporting market, the price reduction causes domestic supply to fall and domestic demand to rise, thereby reducing the overall volume available to be exported (move from point 1 to 3).

Figure 2.2 additionally demonstrates who benefits from and who bears the burden of a tariff. Higher prices and increased domestic production means that producers in the importing country benefit at the expense of consumers and those using imported goods intermediary in their own production. The government of the importing country benefits from tariff revenue equal to area  $(P_T - P^*_T) \times Q_T$ . Countries exporting to this market are hurt by the tariff as it causes a reduction in both the amount sold and the price received. Reduced revenue for exporters is equal to  $Q_W \times P_W - Q_T \times P^*_T$ .

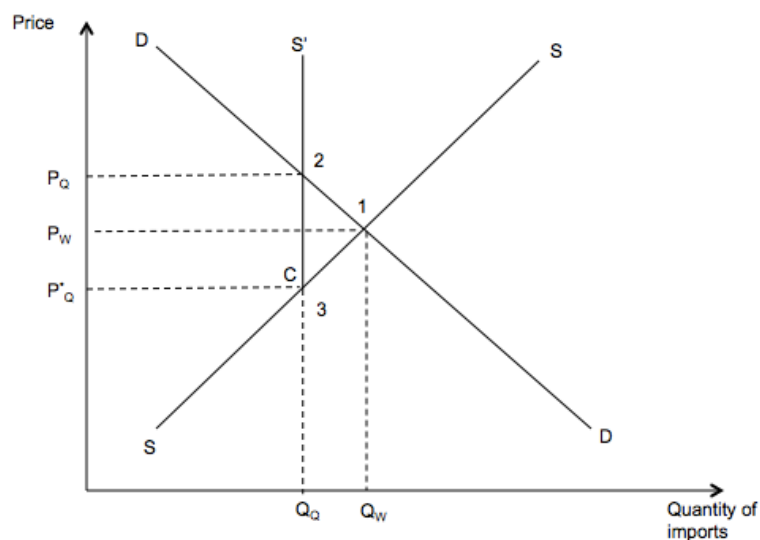
While Figure 2.2 portrays a situation where the rise in price for importers equals the reduction in price for exporters, such an even split is rarely observed in the real world. Most importing countries are too small to impact world market prices. In cases where small countries impose tariffs, it is normally assumed that price adjustments will happen solely in

the importing country, without any impact on prices in the exporting country. Given that the US is a large country by any measure, it is likely that US actions will be able to impact world prices to some degree. Due to the highly particular nature of defense goods pricing, it is difficult to speculate further as to what degree US trade policies might impact world prices for defense goods. However, it is important to note that US actions are likely to effect the world market to a larger extent than most other countries.

### Example 2: The effect of import quotas

While tariffs target price, quotas target volume by placing direct restrictions on the quantity of goods that can be imported. Quota regimes are usually implemented by giving some entity or entities import licenses. Effects of quotas on price and quantity are similar to those of a tariff, and are shown in Figure 2.3 below. Under a free trade regime  $Q_W$  would be imported at price  $P_W$ . Imposing an import quota restricts the imported volume to  $Q_Q$ , implying that the supply curve becomes vertical at this point so that the new supply curve is  $SCS'$ . Producers in the importing country will have to compensate for the restricted access to imports, which, given the domestic supply curve, can only be done if prices in the importing country rise. Analogously to the results of a tariff, there is a reduction in both overall demand for imports (move from 1 to 2) and overall supply of imports (move from 1 to 3).

Figure 2.3. Effects of an import quota



As under a tariff, domestic producers benefit at the expense of domestic consumers. However, unlike the case for tariffs, the government of the importing country does not

automatically benefit from an import quota. Instead, the benefit of any price discrepancies between countries is accrued by the entity that holds import licenses. Whoever holds these licenses can buy goods at reduced price abroad and resell at the higher domestic price. This benefit can be reaped by domestic importers, the domestic government, or foreign exporters. It is theoretically possible for the latter to increase their overall revenue despite a reduction in quantity, depending on the elasticity of demand and whether or not exporters have sufficient market power to claim parts of the price increase in the importing country.

## **2.5 Further effects of trade barriers and empirical evidence from the defense market**

The previous subchapter showed how tariffs and import quotas impact prices and quantities in the market. This subchapter details further implications trade restrictions may have on producers and the broader economy.

Barriers to trade are designed to limit cross-border flow of goods, services and technology. Clearly, if barriers work as they are intended to do, they can have considerable impact on firms looking to service a protected market, as well as on the domestic industry and economy of these firms. This subchapter explores three potential effects of trade barriers; 1) trade barrier effects on revenue, value added, and input use, 2) trade barrier implications for the efficient use of resources, and 3) trade barrier effects on industry's localization decisions. Each case will be supported references to general economic theory, as well as theory and empirical evidence from the defense market in particular. Chapter 4 revisit these three potential effects explored here, and analyze their likely magnitude in light of the results from the business survey.

### **2.5.1 Trade barrier effects on revenue, value added, and input use**

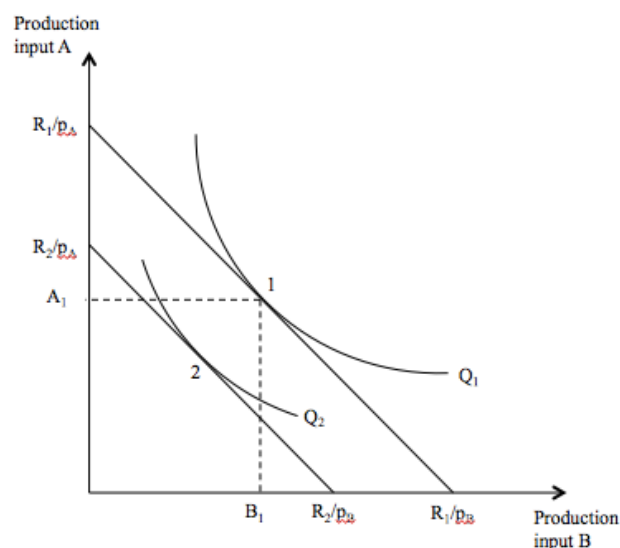
A firm's revenue and value added (operating profits plus labor costs) are to a large extent determined by the demand that exists for their products and technologies. This is of course true whether the demand is domestic or foreign. As was shown in figures 2.2 and 2.3, trade barriers can reduce the demand for imported goods. In addition, economists have identified determinants for import demand that are specific to the defense market. Not surprisingly, military needs and foreign policy have been found to be highly important in a nation's import



decisions (Pearson, 1989). Economic considerations such as foreign currency constraints, overall defense expenditure, substitution opportunities, and domestic supply have also been shown to influence defense imports (Looney, 1989; Mintz, 1986; Pearson, 1989). Recent studies have in addition introduced increased home bias in defense procurements (J. P. Dunne, Garcia-Alonso, Levine, & Smith, 2002; P. Dunne, Garcia-Alonso, Levine, & Smith, 2005) and higher relative prices of imported goods (Smith & Tasiran, 2005) as explanations for lower demand for defense imports. This recent introduction of home bias and relative prices is particularly useful for the analysis of trade barriers. Home bias is in itself a trade barrier, and appears, as we shall see, in a large number of the barriers analyzed in this paper. Relative prices and trade barriers are linked through the fact that the latter can be designed to distort the former. One example is tariffs, as outlined above.

Basic economic theory tells us that lower demand causes prices and sales volume to drop. A shift in demand curves creates excess supply at original prices, resulting in downward pressure on prices and a reduction in quantity traded. This translates to a reduction in revenues, which in turn can impact a firm's budget constraint. Figure 2.4 provides an illustration: imagine that in a free global market, the firm's level of revenue implies optimal input allocation in point 1; where the isocost (budget) line  $R_1/p_A$   $R_1/p_B$ , is tangent to the isoquant (production level) curve  $Q_1$ . Here, firms will use  $A_1$  of input A and  $B_1$  of input B. If the introduction of trade barriers yields a reduction in demand, thus reducing firm revenue, we can expect the isoquant to shift inwards to  $R_2/p_A$   $R_2/p_B$ , implying that the firm will reduce their use of inputs and produce less output (Frank, 2008).

Figure 2.4. Isocost-lines under reduced revenue



While it is reasonable to expect lower demand to cause a negative shift in the isocost line, it is less straightforward to predict exactly what the new input mix will be. In Figure 2.4 this is drawn as point 2, but it might as well be any other point along  $R_2/p_A$   $R_2/p_B$ . This will depend on a host of factors, including for instance short-term rigidity in wages and employment, capital restraints, or the availability of external R&D funding to replace internal financing. The figure above is merely meant as an illustration; predicting firm-level changes in input use due to trade barriers would require far more data and resources than are available to me, and is beyond the scope of this thesis.

### 2.5.2 Trade barrier implications for the efficient use of resources

Subchapter 2.1 showed that benefits of trade arise due to specialization and economies of scale. Trade barriers are costly because they limit the extent to which such potential benefits are realized. In general, this cost occurs because resources are used less efficiently when trade is restricted. This is true for both specialization and economies of scale; Table 2.1 showed that a given input yields a lower total volume of output under autarky than under specialization and trade. Conversely, Figure 2.1 showed that when trade barriers limit production volumes, average costs increase in cases when economies of scale are present. This implies a less efficient use of resources; one dollar or unit of one unit of yields less output when trade barriers are present (Paul R. Krugman et al., 2012).

Empirical evidence from the defense market suggests that efficiency gains from trade through specialization and economies of scale could potentially be very large, implying that the cost of restricting trade will also be high. In a recent study Hartley uses export data, comparative unit prices, and data on economies of scale from defense firms to estimate that the unit cost of production would be reduced 10 to 25 percent by increased competition, 10 to 20 percent by taking advantage of economies of scale, and 5 percent by economies of learning (Hartley, 2006). Furthermore, defense economists have argued that gains from specialization in the defense market may be larger than in other markets due to the fact that the defense sector is characterized by sophisticated technology and widely differentiated products that require a similarly wide range of supplies, ingenuity and technology (Hitch & McKean, 1960). Maintaining a domestic industrial base that can deliver a broad selection of defense articles will therefore require substantial amounts of resources. Specializing according to one's comparative advantage and focusing on building expertise in a limited number of product groups can therefore yield great savings.

Additionally, Hitch and McKean (referenced above) argue that there are good reasons to believe that gain from economies of scale will be more prominent in the defense industry than in most civilian industries. There are several reasons for this. First, the defense industry is characterized by large up-front investments; research, development, testing and evaluation usually takes years and require substantial investments. Increased production rates will divide these up-front investments on a larger number of produced units, thereby driving the unit cost of production down. Secondly, in production of platforms and complex defense systems such as military aircraft and missiles, producers often experience economies of learning; that is, they improve their production processes as they go along (Hitch & McKean, 1960). Limiting access to markets and thereby reducing production volumes denies industry the chance to take full advantage of such learning curves.

### **2.5.3 Trade barrier effects on industry's localization decisions and further implications for the broader economy**

In general, companies looking to undertake foreign direct investment (FDI) through establishing production in a foreign country must consider the costs and benefits of doing so. On one hand, relocating production to the foreign country means that the company can avoid trade costs that accrue in transit or at the border. On the other hand, establishing operations in

a new market is costly as it implies incurring fixed costs from starting operations. Companies will choose to establish production in a foreign country if the savings from circumvention of trade costs is greater than the investments needed to establish production in the foreign market (Paul R. Krugman et al., 2012):

$$Q * t > F$$

Where  $Q$  equals units sold in the foreign market,  $t$  equals trade cost per unit, and  $F$  equals fixed costs related to establishing new production facilities in the foreign country. A deciding factor is clearly the cost of trade; higher trade costs means increased likelihood of foreign production being the most profitable option. Trade barriers increase the cost of trade  $t$ , as exporters either need to devote resources to circumvent barriers, or face a direct reduction in sales or revenue. Thus, an increase in trade barriers gives companies greater incentives to relocate production to the protected markets.

There exists a large body of literature on the potential implications of companies moving production (entirely or in parts) from the home country to a foreign market. The following bullet points give a brief overview of the potential effects most relevant to the Norwegian defense industry:

- **Effects on sales and profits:** We can assume that relocation of operations on average is beneficial for a firm, as they undertake such activities voluntarily. More specifically, firms benefit because they can take advantage of larger markets, closer proximity to the customer, potential economies of scale, international differences in factor endowments, and lower trade costs (Kokko, 2006). The positive impact foreign investment can have on profitability has been shown multiple times in economic literature (Benvignati, 1983; Pagoulatos & Sorensen, 1976). This is not to say, however, that profits would not be even higher if trade barriers were eliminated. In addition, there is no guarantee that an increase in profitability for firms will translate into benefits for the home economy. Firstly, firms with foreign operations have great flexibility in where they invest any additional profits, and the current business environment (tax rates, infrastructure, labor quality etc.) is likely to influence the extent to which profits are reinvested in the home country (Kokko, 2006). Secondly; even in cases where profits are reinvested in the home country, there is no guarantee

that the broader economy would benefit substantially. One example is defense R&D investments, which according to broad empirical evidence does not seem to stimulate civilian R&D to a noticeable degree (Frank R Lichtenberg, 1995), has very limited effect on technical change or the formation of technical skills in the economy (Chakrabarti & Anyanwu, 1993), and does generally not produce a discernible effect on broader industrial productivity (Frank R. Lichtenberg, 1989).

- **Effects on domestic employment:** A common concern is that establishing production abroad will hurt domestic employment. Much of the available empirical evidence suggests that home country operations become less labor-intensive as firms invest or move operations abroad (Kokko, 2006). Studies of Swedish and Japanese companies offer an interesting exception; these countries have seen labor intensity of parent companies increase as firms invest or move operations abroad. One possible explanation is that foreign-based operations require additional supervisory resources, and that these are placed in the home country. While the empirical evidence on the effect of relocations on domestic employment is somewhat inconsistent, most economists agree that the best option is to allow for trade and free relocation of operations, and then compensate those who might suffer under job losses (Paul R. Krugman et al., 2012). The economic importance of job loss will also depend on the current state of the home economy. In countries where labor is in high demand, relocating jobs abroad might seem less detrimental than in countries suffering from high unemployment.
- **Effects on technology transfers:** One of the benefits of investing abroad is the possibility of bringing new technologies and experience back to the home country (Kokko, 2006). While this is a perfectly valid assumption for most industries, the defense industry is a special case when it comes to technology transfers. Most countries impose strict export control regimes for defense articles and technologies. This makes it difficult to bring new technologies from the host to the home country, but also means that technologies transferred from the home to the host country may not be easily re-exportable, causing home country technologies to become ‘stuck’ in the host country. This results in a one-way transfer of technology, and limits the

ability of parent companies to leverage technical investments made in a foreign affiliate (Decision/US-Crest, 2009).

Empirical evidence suggests that the pressure to reallocate defense production to the US is high. A comprehensive study from 2009 explored the different strategies adopted by European defense firms servicing the US market (Decision/US-Crest, 2009). The study concluded that the *only* strategy that has proven capable of generating sustainable business in the US is indeed one of establishing US-based operations with a high degree of independence from the European parent company. The study emphasizes that while this strategy generally yields considerable revenue for the parent company, it also leads to a loss of control over technology.

This chapter outlined the economic theory of the benefits of trade and some of the likely effects of trade barriers. While the economic theory referenced in this chapter suggests the general direction of effects from trade barriers, not much can be said about the actual existence or magnitude of these effects without detailed information on relevant barriers, how they are implemented, how frequently firms encounter them, and how much resources are needed to circumvent them. Providing such information for the Norwegian defense industry vis-à-vis the US market is the goal of this thesis. The next chapter details the methodology used to attain this information.

## **3 Methodology**

Clearly, the occurrence of trade barriers will vary across industries. Industry-specific analyses can therefore be very helpful in understanding the potential consequences of barriers. The following chapter explains the methodology used in this thesis to attain such information on the occurrence and severity of barriers in the defense industry.

### **3.1 Choice of Methodology: Business Survey**

It became clear early on that data on the occurrence and severity of trade barriers faced by Norwegian defense companies in the US market was not readily available. Global databases, published reports, and academic papers did not provide sufficient information. For this reason, a business survey was chosen as the most appropriate method for collecting the data needed for analysis. In addition to providing basic data, a business survey captures cultural, informal, and covert barriers, thus providing far more nuance than would have been possible by looking only at trade data and formal rules and regulations.

While business surveys provide useful information, they admittedly have many analytical issues. Firstly, information collected through surveys will in large extent be based on human experiences and therefore be prone to biases, personal agendas or faulty memory. Secondly, surveys rarely see perfect response rates, which is problematic for two reasons; firstly, non-response reduces the amount of information collected, which is naturally undesirable. Secondly, non-response can create a bias problem if respondents are substantially different from non-respondents. For example, if larger companies have a greater tendency to respond than smaller companies, then the results from a survey will mirror to a greater extent the experiences of large companies, and thus misrepresent the experience of the population. Comments on the existence of biased non-responsiveness in this project can be found in 3.3. While the use of surveys can be analytically challenging, it is still the best choice of methodology for this project as it provides access to detailed and nuanced information on the barriers in question.

### **3.2 Creating the Survey**

The first step was to identify the relevant barriers. This was done through qualitative interviews held in January 2013. The interviews covered a total of 13 individuals from the

Norwegian defense industry, Innovation Norway, the Norwegian Ministry of Defense, and the Norwegian Armed Forces. Based on these interviews, 16 relevant trade barriers were identified. A basic overview is given in Box 3.1 below. The survey asked companies to report any barriers that had not been covered by the survey. The fact that very few did so implies that the in-depth interview process did a good job of identifying the relevant barriers.

The next step was deciding on the type of questions to ask. Recall that the theory in Chapter 2 laid out the impact of barriers on prices, exported volume, and firm revenue. It might therefore seem appropriate to ask firms to provide quantitative estimates of for instance monetary loss, unrealized potential, or reduced export volume they have experienced due to trade restrictions. Empirical evidence suggests, however, that such quantitative estimates are likely unobtainable. Fischer hypothesized that since firms are the entities subjected to barriers, it would be reasonable to expect company executives to be able to estimate the monetary loss or reduced export volume experienced due to trade restrictions. (Fischer, 2003). However, it became clear that company executives were not at all able to provide such information. Fisher's results, combined with the expected negative correlation between survey question complexity and response rates, led to the decision not to ask companies for quantitative cost estimates. Instead, the survey consisted of questions firms were more likely able to answer, and was organized so that the results could be studied in a manner analogous to risk analysis. Risk is commonly evaluated as the product of a) the likelihood of an event occurring and b) the impact severity of the event, should it occur (Ayyub, 2003). In line with this, participants were asked two questions per barrier; one that measured frequency, and another that captured severity (question a. and b. in Box 3.2, respectively). Given the unavailability of direct quantitative estimates, measures of frequency and severity appear to me to be the best data currently obtainable. This data allows for a complete ranking of the barriers and can, when combined with economic theory, be a good indicator of potential impact of trade barriers on the Norwegian defense industry and the broader Norwegian economy.



**1. The Buy American Act (BAA)**

The Buy American Act (41USC Sec.8301 to 8305) instructs US government procurement officials to acquire end products from US sources exclusively, unless some exception applies. The BAA includes several provisions; some that completely ban foreign procurement, others that establishes local content requirements, and others still that distorts relative prices in favor of domestic firms.

**2. Product-Specific Domestic Sourcing Restrictions**

Laws that allow US procurement officials to give preference to specific products made in the US. Examples of products include textiles, specialty metals, and foodstuffs.

**3. Usage of ‘no foreign participation’ clauses**

The US operates with a system of markings that can restrict documents from being released to non-US persons. Examples of restricted documents can be bid or contract documents, technical specifications or data packages, calls for tender, etc. Industry days and websites can also be made inaccessible for non-US persons.

**4. Security Clearance Requirements**

Procurement officials can require that companies bidding for a DOD contract hold a certain level security clearance (DPAP, 2011). This can be an issue because requiring participants to hold a US security clearance effectively excludes most non-US companies.

**5. The Committee on Foreign Investment in the United States**

This committee’s approval is needed in order to complete business transactions (typically mergers or acquisitions) that can lead to non-US persons gaining control of a US company.

**6. Traditional trade barriers: tariffs and quotas**

Taxes levied on imported products or restrictions on the amount of products that can be brought into the US.

**7. Export Control 1: Re-exportability**

US government approval is required in advance of any transfer of defense-articles out of the US, even in cases where the product or technology is of non-US origin and the transfer is back to the originating country. Non-US products and technology can therefore become ‘trapped’ in the US after being brought into the country.

**8. Export Control 2: Licenses to export information and technical data**

The US Export Control Regime considers any cross-border transfer of military technology or technical data to be an export of defense material, implying that one would need approval from the US government to do so. Denied or restricted access to technical data needed to compete for a contract will complicate the bid process for Norwegian companies. Furthermore, export license requirements make Norwegian companies less attractive business partners for US industry because government authorization must be in place in advance of any technical discussions.

**9. Export Control 3: Obtaining products and supplies**

Problems of obtaining US products and supplies are commonly referred to as releasability-issues, and will typically occur when a Norwegian company wishes to test, adapt, or do integration work on US products at a Norwegian facility, or when the inclusion of certain US parts is a contract requirement.

**10. Export Control 4: Third party transfers and third country nationals**

The export control regime prohibits re-selling products of US origin or with US parts. This limits the potential market for Norwegian products with integrated US parts, and hinders Norwegian companies from including Dual Nationals (DN) or Third Country Nationals (TCN) in projects that involve ITAR-restricted articles.

**11. Set-asides**

A considerable amount of government procurement contracts are awarded exclusively to certain types of companies. The DOD implements multiple set-aside programs, most of which set specific requirements to the nationality of owners and managers (DAU, 2013)

**12. Lack of will or knowledge**

Given the complex and ever-changing nature of the US procurement process, it is not impossible that procurement professionals (whether in a governmental agency or in a private company) will not have sufficient knowledge about the possibility of procuring defense related articles from non-US sources. Some procurement officials might also lack the willingness to look abroad for procurement alternatives.

**13. Lack of certainty and clarity**

The US laws and regulations pertaining to trade in defense articles are complex and vast. There are a large number of different acquisition regulations pertaining to different levels of government. Furthermore, the regulatory system creates uncertainty when rules themselves are vague, open for interpretation, or conflicting. Navigating the regulatory landscape can therefore be challenging, time-consuming, and costly.

#### **14. US defense industry 1: Positioning and leveraging**

It is naturally the case that US defense companies will have incentives to try to limit international competition in order to improve their own standing in the marketplace.

#### **15. US defense industry 2: Excessive caution related to foreign entities**

The US's strict export control regime leads US defense companies to be excessively cautious in dealing with foreign entities.

#### **16. The US Congress**

The influence of Members of the US Congress on the market for defense products is three-fold; firstly, Congressional authorization is needed to start, continue, expand, or terminate any DOD activity, including procurement programs. Secondly, funding for these activities is authorized through the Congressional appropriation process. Lastly, Congress is responsible for creating procurement policies and the rules and regulations that govern trade in defense articles (Heniff, 2008). Through these three channels, Congress determines the framework the defense industry must operate within.

#### Box 3.2. Example from the survey: The Buy American Act

##### **Barrier 1/16. Domestic Sourcing Restriction: Buy American Act**

The Buy American Act allows US procurement officials to give preference to goods and services produced within the United States. (41 United States Code §10a – 10d)

- a. Has your company encountered the Buy American Act when looking to do business on the US market? If 'No' or 'Do not know', please check 'Not applicable' in question b,**
- Yes
  - No
  - Do not know
- b. What was the final outcome of the process? Please check all that apply. Note; if you have encountered this barrier on multiple occasions, please consider the most recent case.**
- Issue was solved on its own/with time
  - Issue was solved with limited additional paperwork
  - Issue was solved with considerable additional paperwork, legal support, and/or direct negotiations with customer or US government entity
  - Issue was solved with support from a US entity (e.g. US industry, Department of Defense, (including OCT or Military Services), Congress)
  - Issue was solved with Norwegian Gov't support (e.g. the Armed Forces, Ministry of Defense, Innovation Norway, or Norwegian Embassy)
  - Issue was brought to court
  - Issue remains unsolved
  - Project was terminated
  - Other
  - Not applicable

The business survey consisted of three parts; Part I covered general business characteristics. Part II asked questions about each of the 16 identified barriers. Part III concluded the survey by asking a few more open-ended questions. The complete survey can be found in Appendix 1.

The survey was assembled using the University of Oslo's online questionnaire ('Nettskjema') and was distributed to a total of 95 Norwegian defense companies. In line with other academic publications<sup>7</sup>, the population of Norwegian defense companies was defined as companies holding memberships in the Norwegian Defense and Security Industries Association<sup>8</sup> (NDSIA), of which there are 119 in total (NDSIA, 2012). A small number of firms were removed from the population because they were not producers of defense articles. This decision is consistent with recent academic publications on the Norwegian defense industry<sup>9</sup>. Some companies were also removed to avoid double counting, as they were subsidiaries of larger companies.

A letter encouraging members to complete the survey was sent out from NDSIA leadership in advance of the distribution of the survey itself. The survey was sent out on February 6<sup>th</sup> 2013. Reminders were sent out via email February 15<sup>th</sup> 2013. The form was closed for submissions on March 15<sup>th</sup> 2013.

### **3.3 Gathering and analyzing the results**

The survey was distributed to a total of 95 Norwegian defense companies. 33 companies responded to the survey, which corresponds to a response rate of 35 percent. Response rates of this level are not uncommon for business surveys. Provided that any biased non-responsiveness is adjusted for, a survey with a 35 percent response rate can be used to draw conclusions valid for a broader population (Groves, 2006).

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<sup>7</sup> See for instance (Castellacci & Fevolden, 2012) and (Blom, Castellacci, & Fevolden, 2013)

<sup>8</sup> In Norwegian; Forsvars- og Sikkerhetsindustriens forening, FSi

<sup>9</sup> See for instance (NDRE, 2011)

### 3.3.1 Adjusting for biased non-responsiveness

Biased non-responsiveness can, as explained in 3.1, be a considerable challenge when working with surveys. The data collected through the survey showed moderate differences in response rates across subgroups, and thus post-survey adjustment became necessary. Table 3.1 provides details on response rates across three company characteristics; size, main product group, and export propensity.

Table 3.1. Response rates across subgroups

Characteristic / subgroup	Response Rate
<b>Size</b>	
Small (1 – 19 employees)	29.3 %
Medium (20 – 99 employees)	40.7 %
Large ( ≥100 employees)	37.0 %
<b>Main Product Classification</b>	
C – Manufacturing	40.9%
M – Professional, scientific and technical activities	45.5%
G – Wholesale, retail trade; repair of vehicles, motorcycles	21.1%
J – Information and communication	33.3%
N – Administrative and support service activities	0.0%
Q – Human health and social work activities	0.0%
<b>Export Activity</b>	
Exporters	42.4 %
Non-exporters	30.6 %

Sources: Survey results, proff.no, Brønnøysund Register Center, Ministry of Foreign Affairs annual report on export of Norwegian defense articles (*Eksport av forsvarsmateriell fra Norge*).

From the table above we can see that small companies, companies with main product classification G, J, N and Q, as well as non-exporters were moderately underrepresented among respondents. Note that the 0 percent response rate for product categories N and Q is not as critical as it might appear, as these two product groups only account for a total of 5 companies. Since bias nonresponse can yield bias estimations, post-survey adjustments were required. A frequently used adjustment technique is weighting based on auxiliary

information<sup>10</sup>. The specific weighting technique used in this thesis is stratification, a method where the population is divided into different non-overlapping strata, all of which are assigned a weight according to their degree of over- or under-representation (Bethlehem, Cobben, & Schouten, 2011). One strata would for instance be companies who are small, with main product classification M, and are non-exporters. Another covers companies who are small, fall within the main product classification M, but are exporters, etc. Respondents in underrepresented groups are given a weight greater than 1 and respondents in overrepresented group are given a weight smaller than 1.

### 3.3.2 Further adjustments

In a few (3) instances, respondents answered that they had not met a barrier, but subsequently went on to describe actions taken to resolve the issue. In order to increase the consistency of the data, I have chosen to assign the value “yes” to any respondent who reports taking action(s) to resolve a barrier. Again, this only pertains to a very modest number of instances.

## 3.4 Creating measures of frequency, severity, and overall impact

Chapter 4 will report results along two dimensions; frequency and severity. The details of computing a frequency measure, severity measure, and overall impact is described in the following paragraphs.

### The frequency measure:

A measure of frequency was computed for each barrier in the following manner:

$$f_k = \frac{\sum_{i=1}^{33} \theta_i a_{i,k}}{\sum_{i=1}^{33} \theta_i}$$

Where  $k = 1, 2, \dots, 16$  denotes the 16 barriers, and  $i = 1, 2, \dots, 33$  denotes the respondents.  $\theta_i$  represents the weight given to company  $i$  through the stratification process.  $a_{i,k}$ , will take the value 1 if company  $i$  encountered barrier  $k$  and 0 otherwise. The denominator scales the

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<sup>10</sup> Auxiliary information here means information that is available for both respondents and non-respondents. In this thesis firm size, main product classification, and export activity is used as auxiliary variables.

results such that the frequency  $f_k$  becomes unity if all companies have encountered barrier  $k$  ( $a_{i,k} = 1$  for all  $i$ ).

**The severity measure:**

Since frequency alone is not necessarily a good indicator of overall impact, it was important to incorporate some measure of severity. This was done by using data from the second question on each barrier; see Question b in Box 3.2. For each barrier encountered, firms were asked to check all boxes describing actions taken to resolve the issue. The actions were ranked according to severity and given a corresponding numerical score. Table 3.2 below gives the details on this severity scale.

Table 3.2. Possible actions to resolve barrier ranked by severity

Severity score ( $y$ )	Action ( $j$ )
1 point	Issue was solved on its own/with time
2 points	Issue was solved with limited additional paperwork
3 points	Issue was solved with considerable additional paperwork, legal support, and/or direct negotiations with customer or US government entity
4 points	Issue was solved with support from a US entity (e.g. US industry, Department of Defense, (including CTO or Military Services), Congress)
5 points	Issue was solved with Norwegian government support (e.g. the Armed Forces, Ministry of Defense, Innovation Norway, or the Norwegian Embassy in Washington, DC)
6 points	Issue was brought to court
7 points	Issue remains unsolved
8 points	Project was terminated

The measure of severity was computed in the following manner:

$$s_k = \frac{\sum_{i=1}^{33} [\theta_i a_{i,k} (\sum_{j=1}^8 x_{i,j,k} y_j)]}{\sum_{i=1}^{33} [\theta_i a_{i,k} \sum_{j=1}^8 y_j]}$$

Where, again,  $k = 1, 2, \dots, 16$  denotes the 16 barriers;  $i = 1, 2, \dots, 33$  denotes the respondents, and  $\theta_i$  represents the weight given to company  $i$ ;  $j = 1, 2, \dots, 8$  represents the 8 different actions listed in Table 3.2.  $x_{i,j,k}$  will take the value 1 if company  $i$  took action  $j$  when encountering barrier  $k$  and 0 otherwise.  $y_j$  refers to the severity point system. In this thesis  $y_j = j$  for all  $j$ , but other choices are of course possible, a point to which I will return below. The denominator scales the results such that the severity  $s_k$  becomes unity if all companies that encounter barrier  $k$  takes all (8) actions.

### **A measure of overall impact: the Final Score**

Finally,  $f_k$  and  $s_k$  were combined to produce a one-dimensional measure of overall impact, the Final Score ( $FS$ ). This score is calculated by multiplying the frequency measure and the severity measure:

$$FS_k = f_k * s_k$$

The construction of the severity measure is worth dwelling on, as choices made clearly influence the results. Subjectivity enters the severity measure described above in two ways: 1) through the choice of ranking of the actions and 2) by the assigning of points to each action. The ranking of the actions was done based on information collected in the pre-survey in-depth interviews, and thereby reflects the experience of individuals who are familiar with the usual progression and escalation in this market. Therefore, the results suggest that the ranking of actions given above mirrors real-world experiences reasonably well.

Assuming that the ranking of the actions is accurate, tests were performed to determine whether or not the constructed  $FS$ -ranking was sensitive to the choice of severity points. This testing revealed that changing the point system had a very limited effect on the overall  $FS$ -ranking. Assigning ‘project was terminated’ 12 points instead of 8, for instance, left 10 of the 16 barriers with an unchanged ranking. The remaining 6 shifted no more than 1 place. Similar results were found when assigning ‘issue remains unresolved’ less influence, or ‘support from US entity’ and ‘support for Norwegian government’ a higher score. This implies that the results found in this project are robust and not sensitive to minor methodological changes.



# 4 Results

Data from the survey was quantified and aggregated to provide estimates of the overall impact of each individual barrier. This chapter presents these results. Subchapter 4.1 provides a complete ranking of the barriers according to overall impact, as well as an analysis on whether or not impact differs across sub-groups according to companies' current degree of involvement in the US market. Subchapter 4.2 ties the survey results to the theoretical and empirical discussion in Chapter 2 by looking at likely effects barriers have on the Norwegian defense industry and the Norwegian economy.

## 4.1 Aggregate Survey Results

### 4.1.1 Barriers ranked by overall impact

The survey contained questions on the barriers along two dimensions; frequency and severity. From this information it was possible to assign three basic data point to each barrier; a severity measure  $s_k$ , a frequency measure  $f_k$ , and a Final Score,  $FS_k$ . The Final Score is the product of the severity measure and the frequency measure, and can, as explained in Chapter 3, be seen as analogous to calculations of risk. For further details on calculating  $s_k$  and  $f_k$ , see chapter 3. Table 4.1 below lists the barriers by their Final Score.

Table 4.1. Barriers ranked according to Final Score

Rank	Barrier
1	The Buy American Act
2	Export Control 3: Obtaining products and supplies
3	Lack of will or knowledge
4	Export Control 2: Licenses to export information and technical data
5	US Industry 1: Positioning and leveraging
6	US industry 2: Excessive caution related to foreign entities
7	Lack of certainty and clarity
8	Product-specific domestic sourcing restrictions
9	Usage of 'no foreign participation' clauses

10	Set-asides
11	Export Control 4: Third Party Transfers and Third Country Nationals
12	Security clearance requirements
13	Export Control 1: Re-exportability
14	The US Congress
15	The Committee on Foreign Investment in the United States (CFIUS)
16	Traditional trade barriers: tariffs and quotas

A few general observations can be made at this point:

- **Theory and practice is not always aligned: The Buy American Act (BAA) is still a major obstacle**

The BAA is designed to protect and promote domestic industry by restricting US Federal procurement to US-origin articles only. The BAA includes measures such as complete bans of foreign procurement, local content requirements, as well as price distorting measures. The BAA should, however, not be applied to defense related end products from Norway. The reason for this is the existence of a reciprocal defense procurement memorandum of understanding (MoU) between the Norwegian and United States governments in which both countries agree to remove barriers to trade in defense supplies or services. This is clearly stated in US law; section 225.872-1 of the Defense Federal Acquisition Regulations Supplement (DFARS):

*“225.872-1 General.(a)*

*As a result of memoranda of understanding and other international agreements, DoD has determined it inconsistent with the public interest to apply restrictions of the Buy American statute or the Balance of Payments Program to the acquisition of qualifying country end products from the following qualifying countries:*

*Australia, Belgium, Canada, Czech Republic, Denmark, Egypt, Federal Republic of Germany, Finland, France, Greece, Israel, Italy, Luxembourg, Netherlands,*

*Norway, Poland, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom of Great Britain and Northern Ireland.”*

Given the existence of the MoU, Norwegian companies should in theory not encounter this barrier very often. It is therefore surprising that the BAA is ranked number one according to overall impact. There are several plausible explanations to this; firstly, it might be the case that companies consider any regulation favoring US-origin products as a part of the BAA, thereby overestimating the frequency with which the barrier occurs. Secondly, and perhaps more worrisome, lack of familiarity with the MoU may lead US procurement officials to apply the BAA inappropriately, and can leave Norwegian companies unable to argue their case when faced with the BAA.

- **Restrictions on US exports impact US imports**

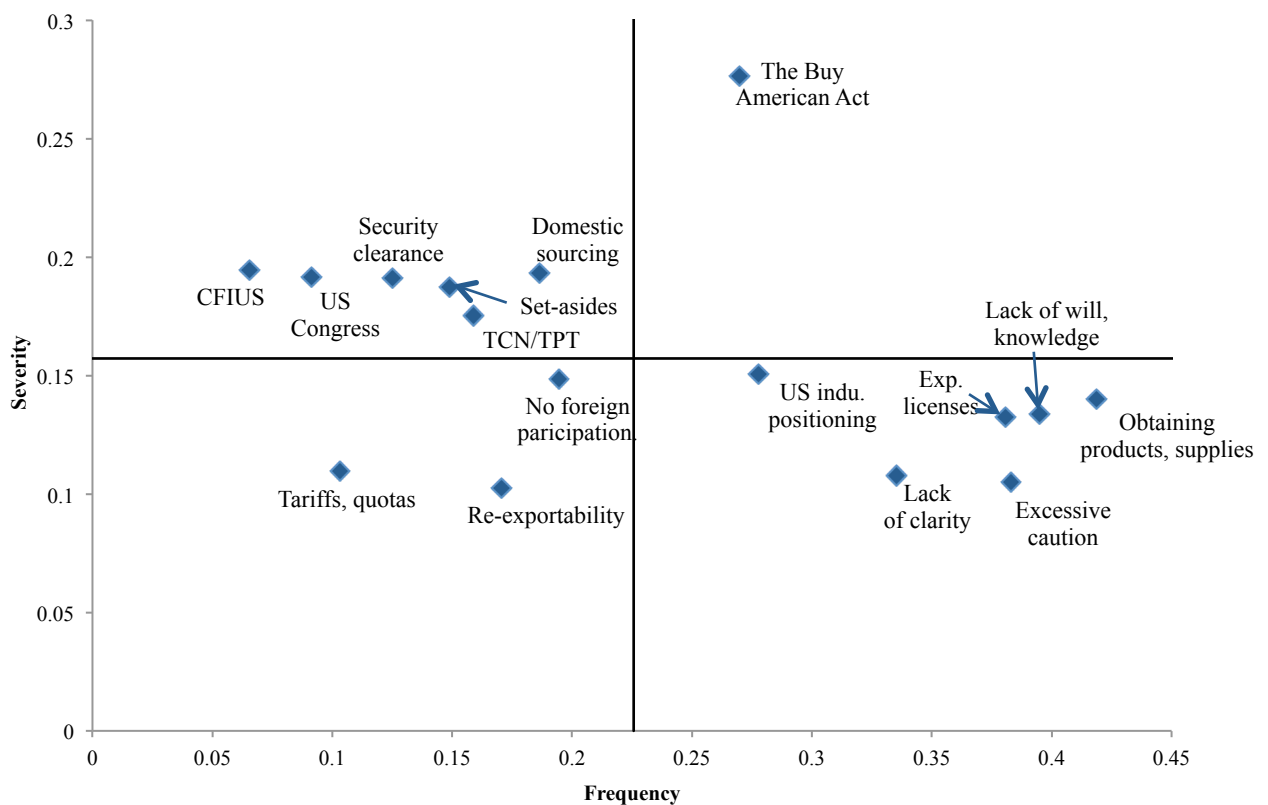
Norwegian industry frequently cite the US export control regime to be one of the most challenging barriers they encounter. This is reflected in the ranking above, where barriers related to US export control occupy 2 of the top 5 spots. Since it is not apparent how restrictions on products leaving the US impact those bringing products into the US, a brief explanation is appropriate. Problems related to the US export control regime arise in large part from the US definition of ‘defense exports’. Under US law, cross-border movement of any defense or aerospace related article (from highly sensitive military products, to nuts and bolts, as well as technical details and data) counts as an export of defense material. Certain such exports are prohibited; others require licenses or other official approval from the US government. Typically, this causes problems for non-US companies who need US-origin defense articles for testing or integration, or in cases where the inclusion of US-origin parts is a contract requirement (see barrier ranked number 2 above). The export control regime also complicates cross-border collaboration by regarding any transfer of technical details as an export (see barrier ranked number 6 above). This implies that US Government approval needs to be present in advance of any technical discussions between private entities. The process of obtaining defense export permissions is costly, time consuming, and can significantly weaken the competitiveness of Norwegian defense companies in the US market.

- **Informal barriers have high relative impact**

A final point of interest is the fact that 4 of the top 10 barriers are informal. Of particular interest is the fact that 2 of the top 6 barriers are related to actions taken by the US defense industry. The very real impact of informal barriers on trade has been proven time and again in economic literature (Cheptea & Huchet-Bourdon, 2007; Gehrt, Lotz, Shim, Sakano, & Onzo, 2005; Khan, Yusuf, Bokhari, & Aziz, 2005; Samiee & Mayo, 1990; Vakulchuk, Irnazarov, & Libman, 2011).

An alternative illustration that highlights the contributions of frequency and severity to the individual barrier's final score is provided in Figure 4.1. Each marker represents a barrier, where frequency is measured along the x-axis and severity is measured along the y-axis. The horizontal and vertical lines represent average severity and frequency, respectively.

Figure 4.1. Barrier scatter plot: frequency and severity



The mapping of barriers provided above contains valuable information on the perception of overall severity of barriers among all respondents. However, it is likely that different subgroups of respondents will rank barriers differently, both in terms of severity and

frequency. The next subchapter explores whether or not companies with varying involvement in the US market experience barriers differently.

#### **4.1.2 Subgroup analysis**

Different companies have vastly different experiences on the US market. This is exemplified by the span between the company who reported encountering the most barriers (14 barriers total) and the companies who reported facing the least amount of barriers (0 barriers). In this subchapter I explore whether or not current level of involvement in the US market plays a deciding factor in the ranking of barriers. That is, I consider whether frequency and severity scores differ between the following three subgroups: 1) companies who operate own production lines in the US, either through green-field investments or acquisitions, 2) companies that service the US market remotely through exports or a licensing agreement, and 3) companies who are exploring the possibility of entering the US market. It might appear counterintuitive to include Subgroup 3, as it can seem implausible that companies not currently active in the market have encountered trade barriers. However, in the defense market, it is common for companies to face trade barriers even during an initial exploratory phase. The occurrence of early phase barrier encounters is evident from the survey data; companies in Subgroup 3 did report meeting multiple barriers on average.

A brief comment on the expectations we might have as to which companies face barriers more often, and which find them most severe, is appropriate. One would expect companies with a higher degree of involvement to face barriers more frequently due to their closeness to the market. Expectations about which companies will assign barriers the highest severity-score is less straightforward. One could for instance hypothesize that companies with less direct involvement will assign higher severity scores because these companies lack the experience and organizational structures to effectively circumvent barriers. Alternatively, it might be the more involved firms that report higher severity-scores. If the latter is the case, one can ask whether the higher level of resources committed (recall that the survey asked firms about actions taken, which could reflect both the severity of a barrier, and resources available to deal with barriers) is due to a) that these companies find barriers more challenging to deal with or b) that these companies are on average larger, and may have more resources available.

Before we turn to the results from the subgroup analysis, it is useful to note a few characteristics about each subgroup.

**Subgroup 1 - Respondents with production in the US:** This group comprises 8 companies, or 24 percent of respondents. Companies in this group are relatively large on average; 5 out of 8 are large companies (companies with  $\geq 100$  employees), while 3 out of 8 are small companies (1 – 19 employees). 6 of 8 companies fall within the main product group ‘industry’, the remaining two fall under ‘wholesale and retail trade; repair of motor vehicles, motorcycles’.

**Subgroup 2 - Respondents that service the US market remotely:** This group comprises 9 companies, or 27 percent of respondents. Subgroup 2 is more diverse than Subgroup 1; 2 out of 9 companies are large (companies with  $\geq 100$  employees), 4 are medium-sized (20 – 99 employees), while 3 are small companies (1 – 19 employees). 6 of the 9 companies belong to the main product group ‘industry’, while ‘wholesale and retail trade; repair of motor vehicles, motorcycles’, ‘Professional, scientific and technical activities’, and ‘Information and communication’ each account for one company.

**Subgroup 3 - Respondents exploring the possibility of entering the US market:** This group comprises 10 companies, or 30 percent of respondents. 2 out of 9 are large companies (companies with  $\geq 100$  employees), 5 are medium-sized (20 – 99 employees), while 3 are small companies (1 – 19 employees). 6 of the 10 companies belong to the main product group ‘industry’, while ‘wholesale and retail trade; repair of motor vehicles, motorcycles’, ‘public administration and defense; compulsory social security’, and ‘Information and communication’ each account for one company.

Table 4.2 summarizes differences across subgroups.

Table 4.2. Summary statistics, subgroup analysis

	<b>Full Respondent Group</b>	<b>Subgroup 1: Production in the US</b>	<b>Subgroup 2: Servicing the US market remotely</b>	<b>Subgroup 3: Considering entering the US market</b>
Average frequency score across barriers	0.23	0.47	0.28	0.17
Average severity score across barriers	0.16	0.20	0.10	0.08
Average Final Score across barriers	0.03	0.09	0.04	0.02

The subgroup analysis confirms the expectation that companies with greater involvement in the US market encounter trade barriers more frequently than companies with lower degrees of involvement; for 11 of the 16 barriers Subgroup 1 report the highest frequency score. Table 4.2 also shows that the highest severity-scores are in fact given by the highly involved companies; Subgroup 1 reports the highest severity score for 13 of the 16 barriers. Thus, the data thus does not seem to support the hypothesis that firms with fewer investments in the US find barriers more difficult to deal with due to lack of experience. Do companies in Subgroup 1 report higher severity scores because their encounters are in fact more challenging, or simply because they are able to devote more resources to solving these issues? If the latter was the case, and companies in the different subgroups found barriers equally difficult to circumvent, we would expect to see companies in Subgroups 2 and 3 to be forced to ‘give up’ more often than companies in Subgroup 1 due to lack of resources. That is, we would expect a higher frequency of project terminations in Subgroups 2 and 3 than in Subgroup 1. There is however, no support for this in the data. In fact, compared to the total number of barriers met, companies in Subgroups 2 and 3 reported a lower proportion of project terminations than the companies in Subgroup 1. Thus, the data seems to suggest that companies with higher degrees of involvement in the US market not only encounter barriers more frequently, but that barrier issues are more costly to deal with for this group than others.

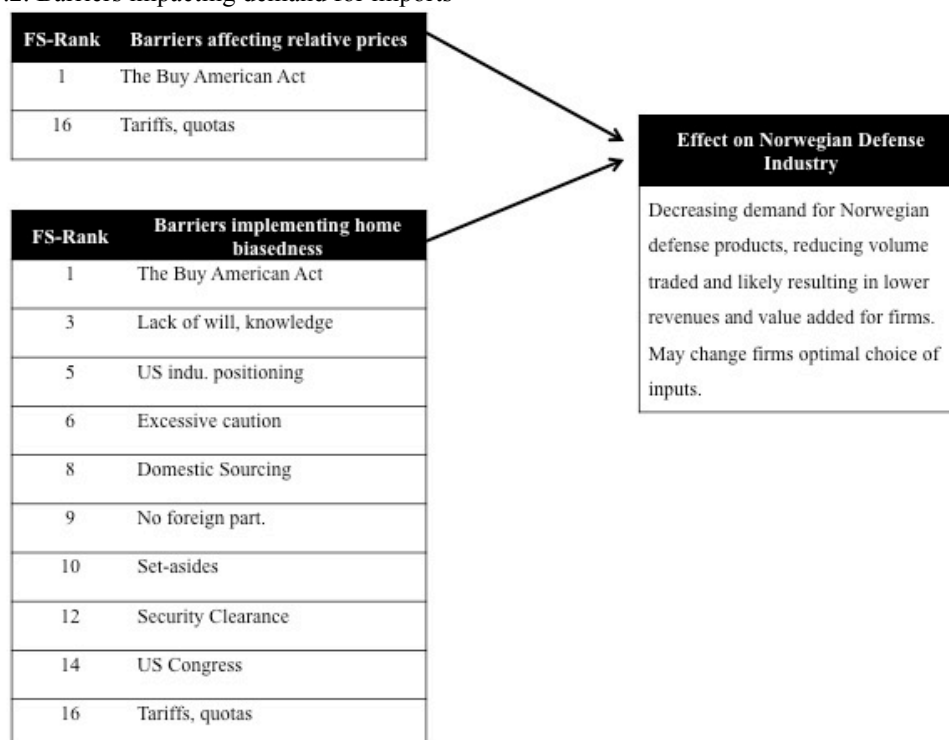
## 4.2 Economic effects of barriers to trade in the defense market

Chapter 2 discussed theory and empirical evidence related to the impact of trade barriers on the defense industry and the broader economy. The chapter covered three broad topics; 1) trade barrier effects on revenue, value added, and input use, 2) trade barrier implications the efficient use of resources, and 3) trade barrier effects on industry’s localization decisions. I now return to these three effects, and assess their likely impact on the Norwegian defense industry based on the data collected in the survey and analyzed in 4.1.

### 4.2.1 Likely effects on revenue, value added, and input use

Chapter 2.5.1 referenced recent theory from defense economics showing that higher relative prices and increased home-biasedness reduces the demand for imported defense articles. Figure 4.2 shows which barriers have the potential to decrease volume traded through the price-effect and the home-biasedness-effect.

Figure 4.2. Barriers impacting demand for imports



Empirical evidence shows that demand for defense articles is relatively price sensitive (Smith & Tasiran, 2005), implying that any barrier that impacts relative prices will have substantial



effects on the volume of imports demanded. Of the 16 barriers included in this survey, two are aimed at changing relative prices; tariffs (which works as a markup on prices), and the Buy American Act (which directs the DOD to add 50 percent to the price of all non-US products) (EC, 2008). The results from the survey show that tariffs are rarely encountered. Their severity is also low, and they place last out of all 16 barriers in the Final Score ranking. This implies that tariffs will have a very limited effect on prices, and likewise on demand and revenue. The Buy American Act (BAA) is at the other end of the spectrum; it is ranked first according to Final Score. The data thus implies that the BAA does lower the demand for Norwegian defense articles. However, as discussed in chapter 4.1.1, the BAAs high ranking might be due to a misconception among survey respondents that the BAA includes all domestic sourcing regulations. It is also the case that the BAA generally should not apply to Norwegian defense articles due to the existence of a reciprocal Memorandum of Understanding on defense procurements (see p. 33). These considerations are worth noting, but the data nonetheless suggests that the BAA is a high-impact barrier. I conclude that the impact of barriers on import demand and revenue through the price-effect is likely to be significant, but that this happens primarily through the BAA, and not through tariffs. It is important to keep in mind; however, that defense article pricing is a complex process, meaning that any conclusions on the impact of barriers on prices must be drawn with caution.

Home-biasedness appears in a majority of the barriers investigated in this thesis; 10 out of 16 total. We can look at the relevant barriers in subgroupings:

i. Barriers that explicitly allows for home bias in order to protect and promote domestic production:

These barriers include the Buy American Act (BAA), product-specific domestic sourcing restrictions, tariffs and quotas, and set-asides. Of these, the BAA placed number 1 in the overall ranking. The remaining barriers ranked 8<sup>th</sup>, 16<sup>th</sup>, and 10<sup>th</sup>, respectively. Thus, any effect from explicit home-bias barriers are likely to arise largely from the BAA, and to a somewhat lesser extent from other product-specific domestic sourcing restrictions and set-asides. Any significant effect from tariffs or quotas is unlikely.

ii. Barriers that are put in place for national security reasons:

These barriers include the usage of ‘no foreign participation’ clauses and security

clearance requirements, which rank 9<sup>th</sup> and 12<sup>th</sup>, respectively. Any reduction in demand arising from these barriers is therefore likely to be fairly moderate.

iii. Informal barriers:

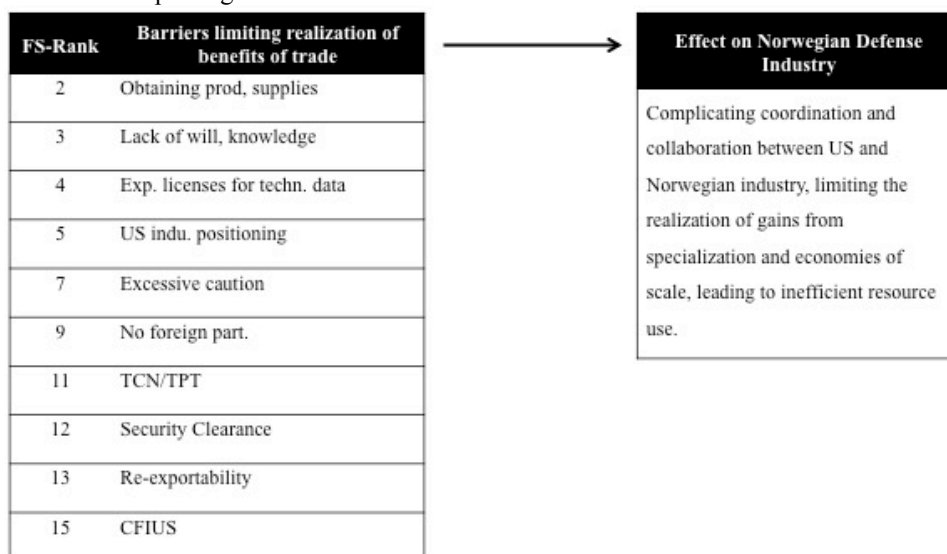
These include excessive caution in dealing with non-US entities, a lack of will or knowledge on behalf of procurement officials, positioning and leveraging by the US defense industry, and actions taken by the US Congress. These barriers are ranked 6<sup>th</sup>, 3<sup>rd</sup>, 5<sup>th</sup>. And 14<sup>th</sup>, respectively. Thus, with the exception of the US Congress, the data implies that informal barriers are likely to have considerable impact on demand for imports through the home-bias channel.

While the overall impact of the 10 home-bias related barrier differ, their sheer number imply that home-biasedness can be expected to be an important factor in determining traded volume. One can also speculate that home-biasedness will increase in the coming months and years, as the US government faces steep defense budget cuts and increased pressure to protect the domestic industrial base.

#### **4.2.2 Likely implications for the efficient use of resources**

Chapter 2.5.2 showed how barriers render industry unable to reap the benefits of trade by denying them the opportunity to realize efficiency gains from specialization and economies of scale. Hitch and McKean have estimated that such gains from trade will be bigger in defense markets than in other industries due to the fact that defense production is characterized by large up-front investments and considerable economies of scale and learning (Hitch & McKean, 1960). Any trade barrier that hinders coordination and cooperation between American and Norwegian defense companies will decrease the likelihood of these potential benefits being realized. Of the barriers examined in this paper, 10 have the potential of making cross-border coordination difficult. These are shown in Figure 4.3 below.

Figure 4.3. Barriers impacting realization of benefits of trade



It is helpful to look at the impact of the 10 relevant barriers in subgroups:

i. Barriers that restrict cross-border movements of data and information:

These barriers include usage of ‘no foreign participation’ clauses, security clearance requirements, difficulty obtaining licenses to export information and technical data, and restrictions related to third party transfers and third country nationals. The survey data suggests that issues related to obtaining export licenses for technical information and data has a relatively large impact; this barrier placed 4<sup>th</sup> on the Final Score ranking. The remaining three barriers placed 9<sup>th</sup>, 12<sup>th</sup>, and 11<sup>th</sup>, respectively, suggesting moderate to low relative impact.

ii. Barriers that restrict cross-border movements of products:

These barriers include issues of re-exportability and obtaining products and supplies. Shipping products across borders to allow for testing, integration, or adaptations is common when collaborating with US defense companies. Issues with obtaining products and supplies from US entities (releaseability-issues) can delay development or production, substantially increase costs and reduce competitiveness. These barriers ranked 13<sup>th</sup> and 2<sup>nd</sup>, respectively. Thus, the data suggests that any efficiency cost arising from product movement issues, is likely to arise from difficulties obtaining

products and supplies, and not from problems related to re-exportability.

iii. A barrier directly impacting cross-border industrial coordination:

CFIUS (The Committee on Foreign Investment in the United States) stands out as potentially being a considerable impediment to cross-border collaboration. CFIUS is tasked with reviewing foreign ownership and control of sensitive US industry. Cross-border mergers and acquisitions cannot be completed without approval from CFIUS. While we would expect CFIUS to have significant impact due to its direct applicability, the data does not support such a hypothesis. CFIUS scored very low on measures of both severity and frequency, and placed number 15<sup>th</sup> on the Final Score ranking. I therefore conclude that this barrier is unlikely to cause a significant efficiency loss through denying companies access to benefits of specialization and economies of scale.

iv. Informal barriers:

The three barriers in this category include a lack of will or knowledge to consider non-US procurement, excessive caution in dealing with non-US entities, and US industry positioning and leveraging. These barriers all place in the top half of the Final Score ranking (3<sup>rd</sup>, 6<sup>th</sup> and 5<sup>th</sup>, to be precise), implying moderate to high impact.

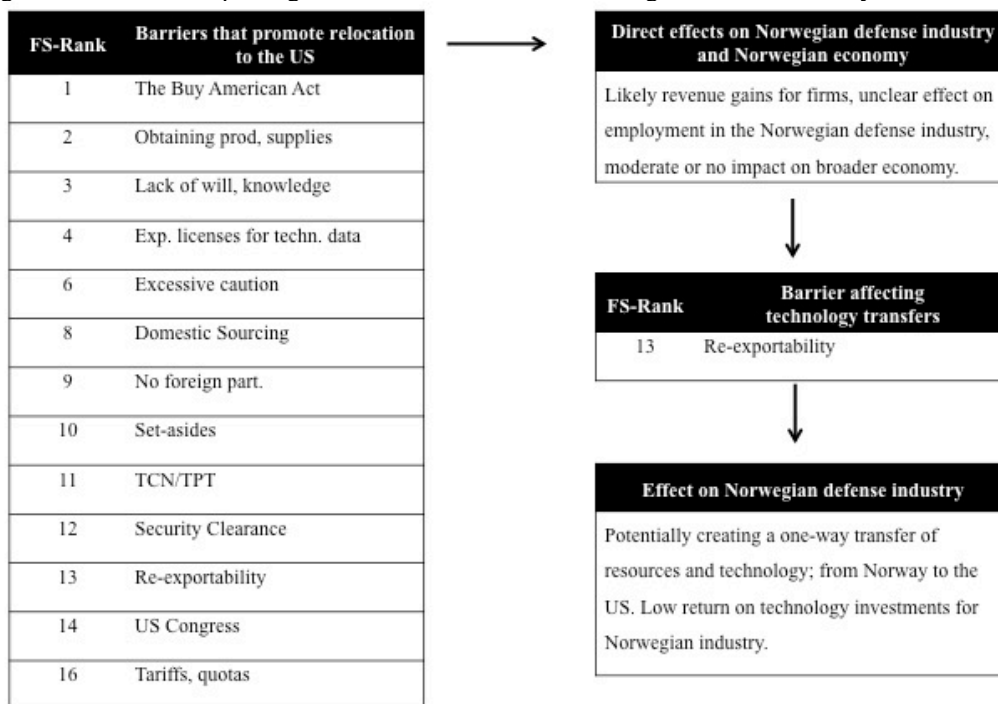
Free trade allows resources to be used where they are best suited, yielding improved efficiency in production, which again reduces scarcity of inputs (because we can produce the same with less) and/or outputs (because we can produce more with the same). It is clear that producers could benefit greatly from specialization and economies of scale, but the extent to which such benefits will be transferred to the broader economy will depend on several factors, including the size of the industry that is experiencing efficiency gains. In the case of the Norwegian defense sector, the relatively small size of the industry implies that broader economic effects are likely to be modest.

### **4.2.3 Likely effects on industry's localization decisions**

Chapter 2.5.3 discussed how firms who encounter trade barriers will be more likely to prefer establishing operations in the protected market, and referenced empirical work confirming that this is a likely result of US defense trade barriers. Relocating operations to the US is

promoted through the fact that companies can avoid the cost of certain barriers by operating from within the US. This holds true for as many as 12 of the 16 barriers analyzed in this thesis. Relocation will have additional implications if technology becomes ‘trapped’ by the US export control regime, as described in 2.5.3. The barriers likely to influence location decisions, and those that create a ‘one-way’ transfer of technology, are outlined in Figure 4.4 below.

Figure 4.4. Barriers impacting localization decisions of Norwegian defense industry



Due to the fact that as many as 12 of 16 barriers promote the relocation effect, I conclude that considerable pressure is placed on Norwegian industry to establish production lines in the US. Avoiding the costs associated with these 12 barriers would be of considerable benefit to firms willing to relocate operations (provided that their products are able to compete once they are introduced in the US market). As pointed out earlier, there is however no guarantee that increases in firm revenue will spill over into benefits for the broader Norwegian economy.

In addition to implications for sales and profit, Chapter 2.5.3 referenced the effect FDI and relocation can have on home country employment. It seems unlikely that relocation of defense operations will have substantial effects on the broader Norwegian economy in terms of employment. There are several reasons for this; firstly, empirical evidence suggests that

while there very well might be a reduction in jobs in the home country when firms move operations abroad, this can be offset if the foreign investment leads to a substantial growth in sales (Kokko, 2006). This is certainly the case for Norway's two largest defense companies, who both have operations in the US. Both Kongsberg Defense Systems and the Nammo Group have seen their US subsidiaries win very large contracts in the US (DOD, 2008, 2009a, 2009b, 2009c, 2009d, 2010). Secondly, as we saw in Chapter 1, the Norwegian defense industry as a whole accounts for a very modest proportion of overall employment in Norway. Thus, any job loss within the defense industry is likely to have small or negligible effects on the state of national employment. The fact that the Norwegian defense industry is highly centralized around a few industrial hubs (NDRE, 2007), suggests however, that effects may be more noticeable in local communities. Lastly, it is less likely that any job loss resulting from relocation of operations feed into long-term unemployment, as the unemployment rate in Norway is currently low (OECD, 2013), and that the demand for skilled labor (especially for engineers) is expected to stay high for some time (Gjefsen, Gjelsvik, Roksvaag, & Stølen, 2012).

Chapter 2.5.3 also described how benefits of relocation in terms of technology transfers are limited within the defense industry due to restrictions on cross-border transfers of technology. This is particularly true in the US, where the export control system covers any article that is "specifically designed, developed, configured, adapted, or modified for a military application" (CFR, 2013), implying that technology that undergoes even minor modifications after being brought to the US from Norway cannot be brought out of the US without explicit permission from the US Government. The combination of relocating Norwegian industry to the US and the American export control regime could result in a one-way transfer of technology; moving technologies and resources from Norway to the US, but not in the other direction. Whether or not such a one-way transfer structure would materialize depends on the severity of barriers to re-export. The total respondent group did not assign much relative importance to the barrier of re-export; it placed 13<sup>th</sup> on Final Score ranking. However, this outlook changes somewhat when one considers companies who have operations in the US (Subgroup 1 from chapter 4.1.2). While Subgroup 2 and 3 gave re-exportability-issues a severity score of 0.06 and 0.00, respectively, Subgroup 1 assigned it 0.12. This is compared to Subgroups 2 and 3, but still below Subgroup 1's own average severity score, which was 0.20. Should more companies move into Subgroup 1 through relocation of production, it is reasonable to expect that the overall score of re-exportability will increase, however this

increase might only be moderate. It is therefore difficult to predict whether or not a one-way technology transfer structure would materialize and how detrimental it would be. However, it is clear that even small restrictions on technology transfers would be a disadvantage to Norwegian firms, and would also limit the potential benefits of technology spillover to the broader economy.

## 5 Concluding Remarks

The goal of this thesis was to investigate the extent to which Norwegian companies encounter trade barriers on foreign markets, looking specifically at the case of the Norwegian defense industry and the US market. Relevant barriers were identified through in-depth interviews, and quantitative data was collected through a survey of Norwegian defense companies. Data was analyzed along two parameters; frequency and severity, and the product of the two was used to rank the barriers according to their overall impact, or Final Score.

The survey data allowed for a ranking of the barriers by overall impact. This ranking revealed three findings:

1. There seems to be a discrepancy between regulations and reality:

While the Buy American Act (BAA) should not apply to Norwegian end products, companies reported that encounters were both frequent and difficult to deal with. This result may be partly attributable to a misconception among survey respondents that any domestic sourcing restriction is part of the BAA, however it seems unlikely that such a misconception can explain every instance. This discrepancy once again illustrates the value of collecting detailed information directly from the individuals who deal with these issues, rather than relying on written regulations.

2. High-impact barriers are often a bi-product of (more or less) unrelated regulations:

As the data shows, the US export control regime is considered a major obstacle for Norwegian defense companies looking to sell goods and technology on the US market. This is especially true when it comes to bringing products, supplies, and technical data from the US to Norway. While these externalities of the US export control regime may be unintended, their effects are nonetheless very real.

3. Informal barriers are important:

The companies placed informal barriers in 4 of the top 10 spots in the Final Score ranking. Of particular interest is it that the two barriers related to informal actions taken by the US defense industry both ranked among the top 6.



The analysis of the survey data also revealed considerable variation between subgroups of different involvement levels in the US. I concluded that it is companies with the most direct involvement in the US that assign barriers both the highest frequency and the highest severity. The data does not seem to support the hypothesis that the limited resources and experience of smaller, less involved companies, makes barriers more difficult to deal with, compared to their larger, more involved counterparts.

Next, three further effects of trade barriers were analyzed:

1. Effects of barriers on revenue, value added, and input use:

Theory suggests that revenue of firms will be negatively impacted by trade barriers, as they can lower both prices received and the amount of goods sold. The data suggested that any downward pressure on demand for Norwegian goods through the price-effect is likely to happen through the Buy American Act. Reduced demand due to home-biasedness is likely, as it appears in as many as 10 of the 16 barriers. Reduced revenue implies that companies see their own budget constraints change, likely impacting internal decisions on employment, R&D activity, production, etc. While such changes have the potential to impact the broader Norwegian economy, the magnitude of any such effect is likely moderate, due to the relatively small size of the defense industry. The high level of centralization of the defense industry does, however, imply that there would be more noticeable effects in the local communities in which the defense hubs are situated.

2. Effects of trade barriers on the efficient use of resources:

Theory showed how production efficiency is improved under trade due to specialization and economies of scale. This of course, means that there are efficiency costs from restricting trade. Empirical evidence suggests that such costs would be particularly large in the defense industry. A large number (10) of the barriers analyzed in this thesis have such efficiency costs effects; and informal barriers and issues with exports of products and supplies, as well as technical information and data, was found to be of particular importance. The relatively small size of the industry implies that broader economic effects are likely to be

modest.

3. Effects on localization decisions:

The survey results suggest that there exists considerable pressure on Norwegian defense companies to relocate operations to the US. Relocation is likely to be very beneficial for companies, as they could circumvent a large number of barriers. It is not guaranteed; however, that such benefits would have spillover effects for the Norwegian economy, and thus benefits for the broader economy are difficult to estimate. Relocation, combined with the US export control regime, could also result in a one-way transfer of technology, implying that return on technology investment would be severely limited.

This thesis has revealed that trade barriers are still very much present in the case of the Norwegian defense industry vis-à-vis the US market. Applying the methodology used in this thesis to other markets and other Norwegian industries could certainly be an interesting topic for future research.

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# Appendix 1. The Business Survey

## Business Survey - Trade Barriers Faced by the Norwegian Defense Industry

### Part I. Introduction and General Information

This part of the survey consists of 7 questions related to your company profile and international business.

Question 1. Please indicate your main defense-related product line

- C4ISR, Radars, Sensors, Electro-optics, Other Electronic Equipment.
- Camp infrastructure and field rations (shelter, camouflage, tents, food, clothing, medical facilities and equipment, decontamination etc.)
- Consulting, Research and Development, and other services
- Ground, Air, Surface, and Underwater Vehicles, and other platform-related equipment and parts
- Logistics and Logistics support
- Simulation, Education, Training, Testing, Test Equipment and Test Facilities
- Software, Electronic Warfare Systems or Equipment, Data Protection and Security,
- Multiprocessing Systems, Identification and Tracking
- Systems Integration and Architecture
- Weapons and Weapon systems, Accessories & Ammunition, Missile technology,
- Explosives and Propellants
- Other

Question 2. Please indicate your company's number of employees

- 1 – 19 employees
- 20 – 99 employees
- 100 employees or more

Question 3. Please note the approximate percentage of your company's sales that derive from each of the following countries/regions.

	0%	1% - 10%	11% - 20%	21% - 30%	31% - 40%	41% - 50%	51% - 60%	61% - 70%	71% - 80%	81% - 90%	91% - 100%
Norway	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other Nordic Countries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Europe	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The United States	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Canada	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Asia	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Latin- and South America	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Africa	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Australia and New Zealand	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question 4. There are several types of barriers to trade, including formal (e.g. domestic content restrictions or quotas), informal (e.g. a lack of knowledge among contracting officers or unclear regulations) or cultural (e.g. language problems or differing business cultures). If



all barriers to trade were to disappear, how would you expect the distribution listed in the previous question to look?

	0%	1% - 10%	11% - 20%	21% - 30%	31% - 40%	41% - 50%	51% - 60%	61% - 70%	71% - 80%	81% - 90%	91% - 100%
Norway	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other Nordic Countries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Europe	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The United States	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Canada	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Asia	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Latin- and South America	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Africa	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Australia and New Zealand	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question 5. What was your company's defense-related revenue in 2012? Please make sure to note which currency you are using (e.g. NOK, USD, EUR etc.). Approximate numbers are sufficient.

Question 6. What would you expect your annual defense-related revenue to be if all barriers to trade were to disappear? Please make sure to note which currency you are using (e.g. NOK, USD, EUR etc.). Approximate numbers are sufficient.

Question 7. What is the extent of your business activities on the United States market? Please check all that apply.

- My company has established production facilities in the US
- My company has bought a US company or established a new company incorporated in the US
- My company has licensing agreement or similar arrangement with a US company, allowing for production of our products within the US
- My company has a sales office or other non-production related representation in the US
- My company exports from Norwegian (or other non-US) production facilities to the United States
- My company has considered/is looking into the possibility of doing business with a US entity
- My company does not, and does not intend to do business with a US entity
- None of the above

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## Part II. Barriers to Trade - Formal and Informal

In this part you will be asked questions about 11 formal and 5 informal barriers to trade. A formal barrier to trade is one that is based on laws and regulations. An informal barrier is one that is not based on law or regulation, but rather on intangibles such as culture, knowledge, will etc. Please note that the focus of Part II (and the remainder of this survey) will be on doing defense-related business with United States entities. Therefore, please refrain from answering based on experience in non-defense markets or with strictly non-US entities. If you do not currently do business in the US market directly I still urge you to complete the survey, as there might be useful information in your answers nonetheless. Your company

may for instance be a sub-supplier for another Norwegian firm that deals directly with US entities and your input will therefore be valuable for this project.

### **Barrier 1/16. Domestic Sourcing Restriction: Buy American Act**

The Buy American Act allows US procurement officials to give preference to goods and services produced within the United States. (41 United States Code §10a – 10d).

- a. Has your company encountered the Buy American Act when looking to do business on the US market? If 'No' or 'Do not know', please check 'Not applicable' in question b.
- Yes
  - No
  - Do not know
- b. What was the final outcome of the process? Please check all that apply. Note; if you have encountered this barrier on multiple occasions, please consider the most recent case.
- Issue was solved on its own/with time
  - Issue was solved with limited additional paperwork
  - Issue was solved with considerable additional paperwork, legal support, and/or direct negotiations with customer or US government entity
  - Issue was solved with support from a US entity (e.g. US industry, Department of Defense, (including OCT or Military Services), Congress)
  - Issue was solved with Norwegian Gov't support (e.g. the Armed Forces, Ministry of Defense, Innovation Norway, or Norwegian Embassy)
  - Issue was brought to court
  - Issue remains unsolved
  - Project was terminated
  - Other
  - Not applicable

### **Barrier 2/16. Product-Specific Domestic Sourcing Restrictions**

While the Buy American Act covers a multitude of goods and services, other domestic sourcing restrictions are more specific. Examples of specific domestic sourcing restrictions include for instance:

- The Berry Amendment – gives preference to US companies when the DOD procures textiles and certain food products
  - Specialty Metals - gives preference to US companies when the DOD procures certain metals and alloys
  - Restriction on 'Miscellaneous Goods' (10 USC Sec 2534) - gives preference to US companies when the DOD procures buses, components for naval vessels, bearings, valves and machine tools
  - US Department of Agriculture restriction on import of food products
- a. Has your company encountered any such product-specific domestic sourcing restrictions when looking to sell your products to a US entity? If 'No' or 'Do not know', please check 'Not applicable' in question b.
- Yes
  - No
  - Do not know

- b. What was the final outcome of the process? Please check all that apply. Note; if you have encountered this barrier on multiple occasions, please consider the most recent case.
- Issue was solved on its own/with time
  - Issue was solved with limited additional paperwork
  - Issue was solved with considerable additional paperwork, legal support, and/or direct negotiations with customer or US government entity
  - Issue was solved with support from a US entity (e.g. US industry, Department of Defense, (including OCT or Military Services), Congress)
  - Issue was solved with Norwegian Gov't support (e.g. the Armed Forces, Ministry of Defense, Innovation Norway, or Norwegian Embassy)
  - Issue was brought to court
  - Issue remains unsolved
  - Project was terminated
  - Other
  - Not applicable

**Barrier 3/16. Usage of ‘no foreign participation’ clauses**

The US has a system of markings that can restrict a document from being released to foreign entities. Examples of markings can be ‘NOFORN’ or ‘NF’. Examples of restricted documents can be bid or contract documents, technical specifications or calls for tender, etc. Industry days are also sometimes closed to foreign participation.

- a. Has your company encountered any problems obtaining documents or attending events due to the usage of such markings when looking to sell your products to a US entity? If 'No' or 'Do not know', please check 'Not applicable' in question b.
- Yes
  - No
  - Do not know
- b. What was the final outcome of the process? Please check all that apply. Note; if you have encountered this barrier on multiple occasions, please consider the most recent case.
- Issue was solved on its own/with time
  - Issue was solved with limited additional paperwork
  - Issue was solved with considerable additional paperwork, legal support, and/or direct negotiations with customer or US government entity
  - Issue was solved with support from a US entity (e.g. US industry, Department of Defense, (including OCT or Military Services), Congress)
  - Issue was solved with Norwegian Gov't support (e.g. the Armed Forces, Ministry of Defense, Innovation Norway, or Norwegian Embassy)
  - Issue was brought to court
  - Issue remains unsolved
  - Project was terminated
  - Other
  - Not applicable

**Barrier 4/16. Security Clearance Requirements**

Some contracts or competitions may require that production facilities and/or personnel working on the project have certain types of security clearances that are difficult or impossible for foreign companies to obtain.

- a. Has your company encountered such security clearance restrictions when looking to sell your products to a US entity? If 'No' or 'Do not know', please check 'Not applicable' in question b.
- Yes
  - No
  - Do not know
- b. What was the final outcome of the process? Please check all that apply. Note; if you have encountered this barrier on multiple occasions, please consider the most recent case.
- Issue was solved on its own/with time
  - Issue was solved with limited additional paperwork
  - Issue was solved with considerable additional paperwork, legal support, and/or direct negotiations with customer or US government entity
  - Issue was solved with support from a US entity (e.g. US industry, Department of Defense, (including OCT or Military Services), Congress)
  - Issue was solved with Norwegian Gov't support (e.g. the Armed Forces, Ministry of Defense, Innovation Norway, or Norwegian Embassy)
  - Issue was brought to court
  - Issue remains unsolved
  - Project was terminated
  - Other
  - Not applicable

**Barrier 5/16. Committee on Foreign Investments in the United States (CFIUS)**

The Committee on Foreign Investments in the United States (CFIUS) reviews transactions that can lead to a non-US person controlling a US company (typically through mergers and acquisitions).

- a. Has your company encountered the CFIUS when looking to do business in the United States? If 'No' or 'Do not know', please check 'Not applicable' in question b.
- Yes
  - No
  - Do not know
- b. What was the final outcome of the process? Please check all that apply. Note; if you have encountered this barrier on multiple occasions, please consider the most recent case.
- Issue was solved on its own/with time
  - Issue was solved with limited additional paperwork
  - Issue was solved with considerable additional paperwork, legal support, and/or direct negotiations with customer or US government entity
  - Issue was solved with support from a US entity (e.g. US industry, Department of Defense, (including OCT or Military Services), Congress)
  - Issue was solved with Norwegian Gov't support (e.g. the Armed Forces, Ministry of Defense, Innovation Norway, or Norwegian Embassy)
  - Issue was brought to court
  - Issue remains unsolved
  - Project was terminated
  - Other
  - Not applicable

**Barrier 6/16. Traditional barriers to trade – tariffs and quotas**

Tariffs are simply put taxes levied on imports, thereby raising the cost of foreign-made products. Import quotas are volume restrictions that limit the amount of a good that can be brought into the US.

- a. Has your company encountered tariffs, import quotas, and/or a mix of the two when looking to sell your products to a US entity? If 'No' or 'Do not know', please check 'Not applicable' in question b.
- Yes
  - No
  - Do not know
- b. What was the final outcome of the process? Please check all that apply. Note; if you have encountered this barrier on multiple occasions, please consider the most recent case.
- Issue was solved on its own/with time
  - Issue was solved with limited additional paperwork
  - Issue was solved with considerable additional paperwork, legal support, and/or direct negotiations with customer or US government entity
  - Issue was solved with support from a US entity (e.g. US industry, Department of Defense, (including OCT or Military Services), Congress)
  - Issue was solved with Norwegian Gov't support (e.g. the Armed Forces, Ministry of Defense, Innovation Norway, or Norwegian Embassy)
  - Issue was brought to court
  - Issue remains unsolved
  - Project was terminated
  - Other
  - Not applicable

**Barrier 7/16. ITAR & Export Control 1: Re-exportability**

The United States Export Control Regime lays down strict rules for the export of defense-related products, services, and technology. Foreign technology or products that are brought to the US and that are modified, adapted, or in any way changed while in the US will be under the jurisdiction of US law. This creates a potential problem for foreign companies who want to bring their products or technology back out of the US, even if they simply want to bring it home to the originating country.

- a. Has your company encountered such problems with re-exportability when looking to do business on the US defense market? If 'No' or 'Do not know', please check 'Not applicable' in question b.
- Yes
  - No
  - Do not know
- b. What was the final outcome of the process? Please check all that apply. Note; if you have encountered this barrier on multiple occasions, please consider the most recent case.
- Issue was solved on its own/with time
  - Issue was solved with limited additional paperwork
  - Issue was solved with considerable additional paperwork, legal support, and/or direct negotiations with customer or US government entity

- Issue was solved with support from a US entity (e.g. US industry, Department of Defense, (including OCT or Military Services), Congress)
- Issue was solved with Norwegian Gov't support (e.g. the Armed Forces, Ministry of Defense, Innovation Norway, or Norwegian Embassy)
- Issue was brought to court
- Issue remains unsolved
- Project was terminated
- Other
- Not applicable

**Barrier 8/16. ITAR & Export Control 2: Licenses to export information and technical data**

The United States Export Control Regime considers any transfer of technology or technical details as an export. This implies that a US and a foreign company that wish to collaborate will need approval from the State Department before technical discussions can begin. This is normally obtained through a TAA (Technical Assistance Agreement), a MLA (Manufacturing License Agreement) or a DSP-5 (license for permanent export of unclassified defense articles and related technical data).

- a. Has your company encountered problems with obtaining a TAA, MLA or DSP-5 or found that the process of obtaining such a license is time-consuming, confusing, or difficult? If 'No' or 'Do not know', please check 'Not applicable' in question b.
  - Yes
  - No
  - Do not know
  
- b. What was the final outcome of the process? Please check all that apply. Note; if you have encountered this barrier on multiple occasions, please consider the most recent case.
  - Issue was solved on its own/with time
  - Issue was solved with limited additional paperwork
  - Issue was solved with considerable additional paperwork, legal support, and/or direct negotiations with customer or US government entity
  - Issue was solved with support from a US entity (e.g. US industry, Department of Defense, (including OCT or Military Services), Congress)
  - Issue was solved with Norwegian Gov't support (e.g. the Armed Forces, Ministry of Defense, Innovation Norway, or Norwegian Embassy)
  - Issue was brought to court
  - Issue remains unsolved
  - Project was terminated
  - Other
  - Not applicable

**Barrier 9/16. ITAR & Export Control 3: Attaining products and supplies**

The United States Export Control Regime lays down strict rules for the export of products, services, and technology related to defense. This may cause difficulty in obtaining products or technology from US suppliers, partners, or affiliates. Examples of when this might be an issue can be when a company wishes to test, adapt, or do integration work on US products at a Norwegian facility, or when the inclusion of US parts is a contract requirement.

- a. Has your company encountered problems with gaining access to products from a US supplier, partner, affiliate etc? If 'No' or 'Do not know', please check 'Not applicable' in question b.
- Yes
  - No
  - Do not know
- b. What was the final outcome of the process? Please check all that apply. Note; if you have encountered this barrier on multiple occasions, please consider the most recent case.
- Issue was solved on its own/with time
  - Issue was solved with limited additional paperwork
  - Issue was solved with considerable additional paperwork, legal support, and/or direct negotiations with customer or US government entity
  - Issue was solved with support from a US entity (e.g. US industry, Department of Defense, (including OCT or Military Services), Congress)
  - Issue was solved with Norwegian Gov't support (e.g. the Armed Forces, Ministry of Defense, Innovation Norway, or Norwegian Embassy)
  - Issue was brought to court
  - Issue remains unsolved
  - Project was terminated
  - Other
  - Not applicable

**Barrier 10/16. ITAR & Export Control 4: Third Party Transfers and Third Country Nationals**

The United States Export Control Regime lays down strict rules to prevent military products and technology from spreading further than the intended end-user. This can become a problem for companies that for instance wish to sell products with integrated US parts to other countries. The US government may require a special clearance such as a DSP-83 or some sort of guarantee from the Norwegian Government. An additional problem arises because sharing technical information with an individual counts as an export to the country of which this individual is a citizen. This can be an issue for Norwegian companies that wish to bring someone who is not a US and not a Norwegian citizen onto a program where restricted data is shared.

- a. Has your company encountered problems with Third Party Transfers or Third Country Nationals? If 'No' or 'Do not know', please check 'Not applicable' in question b.
- Yes
  - No
  - Do not know
- b. What was the final outcome of the process? Please check all that apply. Note; if you have encountered this barrier on multiple occasions, please consider the most recent case.
- Issue was solved on its own/with time
  - Issue was solved with limited additional paperwork
  - Issue was solved with considerable additional paperwork, legal support, and/or direct negotiations with customer or US government entity
  - Issue was solved with support from a US entity (e.g. US industry, Department of Defense, (including OCT or Military Services), Congress)

- Issue was solved with Norwegian Gov't support (e.g. the Armed Forces, Ministry of Defense, Innovation Norway, or Norwegian Embassy)
- Issue was brought to court
- Issue remains unsolved
- Project was terminated
- Other
- Not applicable

**Barrier 11/16. Set-asides**

In some cases programs or projects are only awarded to certain types of businesses. One example of such a set-aside is a contract that is only open to small US companies (Small Business Preference Programs).

- a. Has your company encountered problems with set-asides when looking to do business on the US defense market? If 'No' or 'Do not know', please check 'Not applicable' in question b.
  - Yes
  - No
  - Do not know
  
- b. What was the final outcome of the process? Please check all that apply. Note; if you have encountered this barrier on multiple occasions, please consider the most recent case.
  - Issue was solved on its own/with time
  - Issue was solved with limited additional paperwork
  - Issue was solved with considerable additional paperwork, legal support, and/or direct negotiations with customer or US government entity
  - Issue was solved with support from a US entity (e.g. US industry, Department of Defense, (including OCT or Military Services), Congress)
  - Issue was solved with Norwegian Gov't support (e.g. the Armed Forces, Ministry of Defense, Innovation Norway, or Norwegian Embassy)
  - Issue was brought to court
  - Issue remains unsolved
  - Project was terminated
  - Other
  - Not applicable

**Barrier 12/16. Lack of will or knowledge**

US procurement officials and program managers (whether in a US governmental agency or in a private US company) may not have sufficient knowledge about the possibility of procuring defense-related articles from non-US sources. Some might also lack the willingness to look abroad for procurement alternatives.

- a. Has your company encountered such lack of will or knowledge when trying to do business with a US entity? If 'No' or 'Do not know', please check 'Not applicable' in question b.
  - Yes
  - No
  - Do not know
  
- b. What was the final outcome of the process? Please check all that apply. Note; if you have encountered this barrier on multiple occasions, please consider the most recent case.



- Issue was solved on its own/with time
- Issue was solved with limited additional paperwork
- Issue was solved with considerable additional paperwork, legal support, and/or direct negotiations with customer or US government entity
- Issue was solved with support from a US entity (e.g. US industry, Department of Defense, (including OCT or Military Services), Congress)
- Issue was solved with Norwegian Gov't support (e.g. the Armed Forces, Ministry of Defense, Innovation Norway, or Norwegian Embassy)
- Issue was brought to court
- Issue remains unsolved
- Project was terminated
- Other
- Not applicable

**Barrier 13/16. Lack of certainty and clarity**

US laws and regulations pertaining to trade in defense-related goods, services, and technology are complex and vast. Navigating and understanding the rules can be time-consuming and difficult. In certain cases there is additional uncertainty when the rules and regulations themselves are vague or open for interpretation.

- a. Has your company encountered such a lack of clarity and/or certainty, or found that identifying and navigating the relevant laws and regulations has been a considerable barrier? If 'No' or 'Do not know', please check 'Not applicable' in question b.
  - Yes
  - No
  - Do not know
  
- b. What was the final outcome of the process? Please check all that apply. Note; if you have encountered this barrier on multiple occasions, please consider the most recent case.
  - Issue was solved on its own/with time
  - Issue was solved with limited additional paperwork
  - Issue was solved with considerable additional paperwork, legal support, and/or direct negotiations with customer or US government entity
  - Issue was solved with support from a US entity (e.g. US industry, Department of Defense, (including OCT or Military Services), Congress)
  - Issue was solved with Norwegian Gov't support (e.g. the Armed Forces, Ministry of Defense, Innovation Norway, or Norwegian Embassy)
  - Issue was brought to court
  - Issue remains unsolved
  - Project was terminated
  - Other
  - Not applicable

**Barrier 14/16. US industry 1: Positioning and leveraging**

In certain instances US industry might have incentives to try to limit the access foreign companies have to defense-programs and the market. Here, US industry includes companies that are competitors to Norwegian firms, as well as suppliers, affiliates, partners, dealers or vendors.

- a. Has your company experienced that US industry (competitors, suppliers, affiliates, partners, dealers, vendors etc.) actively try to limit your access to competitions, bids,

and/or the market in general? If 'No' or 'Do not know', please check 'Not applicable' in question b.

- Yes
- No
- Do not know

b. What was the final outcome of the process? Please check all that apply. Note; if you have encountered this barrier on multiple occasions, please consider the most recent case.

- Issue was solved on its own/with time
- Issue was solved with limited additional paperwork
- Issue was solved with considerable additional paperwork, legal support, and/or direct negotiations with customer or US government entity
- Issue was solved with support from a US entity (e.g. US industry, Department of Defense, (including OCT or Military Services), Congress)
- Issue was solved with Norwegian Gov't support (e.g. the Armed Forces, Ministry of Defense, Innovation Norway, or Norwegian Embassy)
- Issue was brought to court
- Issue remains unsolved
- Project was terminated
- Other
- Not applicable

#### **Barrier 15/16. US industry 2: Excessive caution related to foreign entities**

A strict and complex export control regime coupled with severe consequences for non-compliance may lead some US companies to be overly cautious and take on a 'better safe than sorry' approach when it comes to dealing with foreign entities.

a. Has your company experienced that US industry acts overly cautious when it comes to dealing with foreign entities? If 'No' or 'Do not know', please check 'Not applicable' in question b.

- Yes
- No
- Do not know

b. What was the final outcome of the process? Please check all that apply. Note; if you have encountered this barrier on multiple occasions, please consider the most recent case.

- Issue was solved on its own/with time
- Issue was solved with limited additional paperwork
- Issue was solved with considerable additional paperwork, legal support, and/or direct negotiations with customer or US government entity
- Issue was solved with support from a US entity (e.g. US industry, Department of Defense, (including OCT or Military Services), Congress)
- Issue was solved with Norwegian Gov't support (e.g. the Armed Forces, Ministry of Defense, Innovation Norway, or Norwegian Embassy)
- Issue was brought to court
- Issue remains unsolved
- Project was terminated
- Other
- Not applicable

### **Barrier 16/16. The US Congress**

Having support from Members of Congress can be of the utmost importance for any firm looking to be successful on the US defense market, especially since Congress ultimately decides whether or not a program will be funded. Congress can also create pressure to procure only US-made products, services, and technology.

- a. Has your company experienced that there has been a lack of support from the US Congress, and/or the presence of pressure to limit procurement to US sources? If 'No' or 'Do not know', please check 'Not applicable' in question b.
- Yes
  - No
  - Do not know
- b. What was the final outcome of the process? Please check all that apply. Note; if you have encountered this barrier on multiple occasions, please consider the most recent case.
- Issue was solved on its own/with time
  - Issue was solved with limited additional paperwork
  - Issue was solved with considerable additional paperwork, legal support, and/or direct negotiations with customer or US government entity
  - Issue was solved with support from a US entity (e.g. US industry, Department of Defense, (including OCT or Military Services), Congress)
  - Issue was solved with Norwegian Gov't support (e.g. the Armed Forces, Ministry of Defense, Innovation Norway, or Norwegian Embassy)
  - Issue was brought to court
  - Issue remains unsolved
  - Project was terminated
  - Other
  - Not applicable
- 

### **Part III. Overall View**

While the impact of one single barrier might be small, the aggregated impact may be substantial. I would therefore like to ask three additional questions about your company's overall experience with trade barriers in the US defense market.

Question 8. Considering the barriers discussed above, as well as any barriers you have experienced but that has not been covered by this survey, please check the box that best describes the experience your company has had with barriers to trade on the US market.

- Problems were negligible
- Easily manageable
- Manageable
- A considerable challenge
- Severely time-consuming and costly
- Troublesome to the point where the US market is no longer considered to be a viable business opportunity
- Not applicable, company has done no business with US entities

Question 9. Has your company encountered any significant barriers to trade that have not been covered in this survey?

Question 10. What types of issues do you think the Norwegian Government could do more to help resolve? Do you have any other recommendations?