

Non-Technical Summary

This research proposal builds on the ESRC financed programme on the arms trade by Levine, Sen and Smith that produced over 20 papers, established a network of defence economists through which Dunne and Garcia-Alonso made a considerable input and worked with Dunne in establishing a very successful series of annual conferences at Middlesex. In the ESRC's final evaluation, the research project was graded as 'Outstanding' by all three referees. The proposal also draws on the successful Leverhulme grant to Dunne on the military in the South African economy. These projects have contributed to the recognition of the UK as a major centre of excellence in defence economics.

The end of the Cold War has resulted in a number of profound but poorly understood changes in the international security environment. This project aims to undertake a set of tightly linked theoretical and empirical studies of the determinants of military expenditure (which has fallen rapidly since the peak of the mid 1980s) and its effect on economic growth, of procurement and the regulation of the arms trade (both of which have become increasingly competitive), and of arms production (where the industry is being massively restructured).

The research will be organised into two specific areas. The first has a macroeconomic focus and links together the determinants of military expenditure and its consequences for economic growth. This will draw upon two large but rather separate literatures on the demand for military expenditure and the supply-side effects of military expenditure. Demand for military expenditure is made a function of other countries military expenditure (which have a positive effect for antagonists involved in an arms race and a negative effect for allies), GDP, and a range other economic, political and military variables. The supply-side effects of military expenditure are measured in terms of the impact of military expenditure on GDP, through utilisation, investment, technology, etc. Our approach will be to estimate small simultaneous systems of demand and supply, using a panel consisting of annual data across different groups of countries. By explaining output, investment and military expenditure for panels of countries we will in a position to see if the economic effects of the large changes in the share of military expenditure since the end of the Cold War can be estimated consistently. The presence of a large exogenous change in the threat, which produced the reduction in the share of military expenditure during a period of relative economic stability, should help identify the impact on investment and output. Of course, there is the danger that the regime change with the end of the cold war caused structural change in the relationships and that this will obscure the effects. This would certainly be the case in the former Soviet Union where both economic and security structures have been transformed. Smith, Sola and Spagnolo (2000) suggest a way of handling such regime changes.

Regime change it may not be such a large problem in the OECD countries and newly industrialising countries on which we will focus. For these countries there is fairly good data from 1960 on economic variables from the OECD and World Bank and for military

variables from SIPRI. The panel structure will allow us to see how different groups (e.g. NATO versus non-NATO) have differed. The research would draw on the applicants previous work on the demand for military expenditure, Smith (1995), Smith et al. (1999), Dunne et al. (2000); the economic effects of military expenditure, Gleditsch et al. (1996); estimation of growth models, Lee et al. (1997); and heterogeneous panel data estimators, Pesaran et al. (1999).

The second component of the research project has a microeconomic focus and examines the interactions between procurement, the arms trade and the restructuring process in the defence sector. The aim of this component of the project is to gain a better understanding of the restructuring process and how the interactions between military firms and governments in this new Post-Cold War context affect procurement policies and exports controls of the major arms exporter countries. An empirical part of this component will examine the evolution of industry structure. Since the end of the Cold War the global defence industry has seen massive restructuring in the US and Europe. In addition, defence production capability has proliferated, partly in response to export controls, introducing new competitors. This is analysed in Levine et al. (2000) and Levine and Smith (2000b).

Although the restructuring of the industry has attracted much academic, media and policy attention, there has been no quantitative analysis of this process as far as we are aware. This is despite the availability of annual data from SIPRI on the 100 largest arms producing companies for over a decade, which also provides information on mergers and takeovers, e.g. chapter 10 SIPRI (1999). Dunne has close contacts with SIPRI and would examine the patterns of growth and survival in the defence firms using the same sort of approach that was used in Dunne and Hughes (1994) for UK companies. The SIPRI data would permit an analysis of the survival and growth of the large defence companies as a function of nationality, sector, defence dependence and productivity. This would supplement the largely qualitative analysis that has predominated in this area.

In the theoretical part of this microeconomic component, we will analyse how, in the light of the restructuring process, government procurement and subsidy decisions affect the strategic interaction between competing exporters and the quality and quantity of weapons, which are exported. Central to our research into government policy will be consideration of the private information of firms regarding their cost and demand conditions. An important development in the arms trade is that it is becoming increasingly difficult to define the concept of military-related technology. Technology spillovers have in the past typically gone from military technology to civil technology. Now there are many instances of civil products with military applications, the so-called dual-use products. Concerns have risen regarding the destabilising effects that exports of state-of-the-art military and dual-use products, in particular, might cause on regions in conflict. Following this concern, export control systems for dual-use goods have been developed by most of the main exporters of dual-use equipment. The implementation of such controls is increasingly difficult due to two major reasons: Firstly, economic concerns, such as competition for the export market with rival countries, clash with security concerns. Secondly, the growing importance of dual-use products adds to the

difficulty, already noted, of monitoring and regulating exports. Given all these developments, firms increasingly have private information about their own cost and exports demand characteristics.

In essence the theoretical problem to be studied can be summarised as follows: governments in the major arms exporting countries demands its defence procurement from the domestic firm that also competes in an oligopolistic exports market with other national champions. In increasingly liberalized markets, there exists at very least the threat that the government may purchase from an overseas producer. Large R&D and other fixed costs, together with lower domestic demand in the post Cold War environment, make the successful participation in the international market crucial for the military sector's commercial viability. However a further distinctive feature of this sector is the existence of a negative externality in that arms exports from any individual country can exacerbate regional conflicts and have negative security effects for all arms exporters.

To analyse this problem we will draw upon and develop two areas of literature. The first is the procurement and 'new regulation' that designs incentive contracts to force firms to reveal their private information. However, the existence of external or unregulated markets, like export markets, has been relatively neglected throughout this literature. The second strand of literature on the arms trade, to which the applicants have contributed in their earlier ESRC-financed project, does analyse the links between defence procurement, arms exports and export controls (see, in particular, Garcia-Alonso (1999) and Levine and Smith (2000a)). However, in this literature, military firms possess no private information and there is no need for information-revealing incentive contracts. The objectives of this part of the project are then twofold: first to develop the incentive regulation literature to take into account an external market of an oligopolistic nature. Secondly, to further develop our understanding of arms export controls by introducing the different sources of firms' private information arising particularly from the changing character of arms production and the arms trade.

The intention is to retain the valuable network built up on the previous project and draw on valuable inputs from the following colleagues at the cost to the ESRC of only travel and subsistence. Ron Smith will continue his involvement and very successful research collaboration with Paul Levine and Paul Dunne, as part of his normal research. Colleagues of Paul Dunne at Middlesex University, Alvin Birdi and Eftychia Nikolaidou will continue their fruitful collaboration with him and Ron Smith. These are the six UK network members for which travel and subsistence is being requested. However, as before, we envisage other researchers to be drawn into the network. The 4 international researchers, all of whom have an international reputation in defence and peace economics, are Todd Sandler and Jurgen Brauer from the US, and Jacques Fontanel and Sylvie Mattely from France.