Journal of International Economics 95 (2015) 305–318

Contents lists available at ScienceDirect

Journal of International Economics

journal homepage: www.elsevier.com/locate/jie

Trade costs, conflicts, and defense spending ☆

Michael Seitz [a], Alexander Tarasov [b], Roman Zakharenko [c,*]

[a] Boston Consulting Group, Germany
[b] University of Munich, Germany
[c] Higher School of Economics, Russia

ARTICLE INFO

Article history:
Received 1 July 2013
Received in revised form 18 November 2014
Accepted 26 November 2014
Available online 6 December 2014

JEL classification:
C5
C6
F13
F51
H56

Keywords:
General equilibrium
Gains from trade
Defense spending

ABSTRACT

This paper develops a quantitative model of trade, military conflicts, and defense spending. Lowering trade costs between two countries reduces probability of an armed conflict between them, causing both to cut defense spending. This in turn causes a domino effect on defense spending by other countries. As a result, both countries and the rest of the world are better off. We estimate the model using data on trade, conflicts, and military spending. We find that, after reduction of costs of trade between a pair of hostile countries, the welfare effect of worldwide defense spending cuts is comparable in magnitude to the direct welfare gains from trade.

1. Introduction

The traditional trade literature formulates a number of channels through which a country can gain from trade: the comparative advantage and love for variety effects, the redistribution of production factors towards more productive firms, the lower markups set by firms are some of them.[1] In this paper, we quantitatively explore a new potential source of gains from trade. Recent empirical studies showed that a rise in trade between two countries reduces the probability of an armed conflict between them (e.g. Martin et al., 2008; Hegre et al., 2010). Our reasoning is the following: if trade brings about peace, it should also bring about defense spending cuts across the world, which in turn will bring about even more peace. Fig. 1 testifies in favor of this hypothesis: trade volumes have been increasing over the last few decades, whereas the size of defense spending (proxied by share of military personnel in the population) has been decreasing during the same period. While in the modern world military conflicts are quite rare, countries' defense spending is still substantial and, therefore, this additional effect of trade openness may have considerable welfare implications. In particular, we address the following questions in the paper. What is the magnitude of welfare gains due to reduced conflict probability and defense spending cuts? Are they comparable to the "traditional" gains from trade?

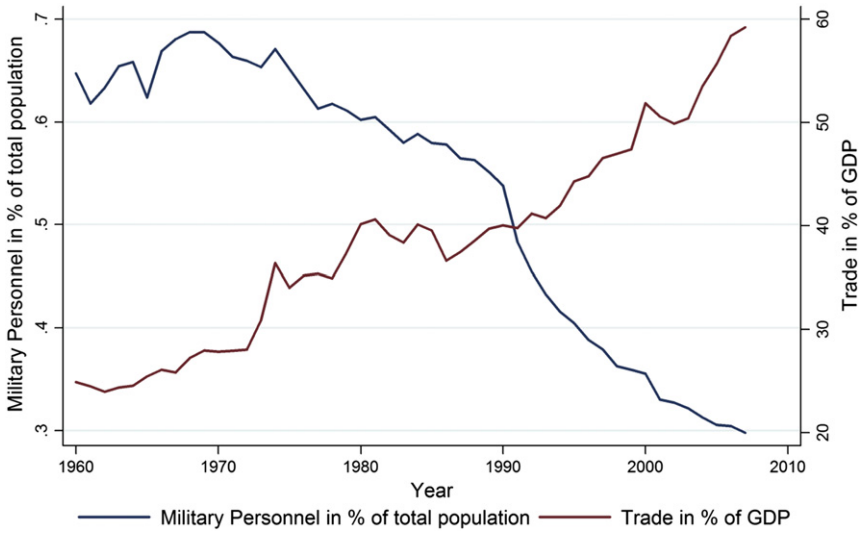
The quantitative model we develop is based on the following key assumptions. First, bilateral trade volumes are reduced in case of a military conflict with a certain country, leading to welfare losses. As a result, countries are less likely to be engaged in a conflict when they are connected to each other by stronger trade links. Second, the probability of having a conflict with each of potential opponents affects a country's decision on how much to spend on defense. Indeed, for years 1993–2001 (our main dataset), a cross-country measure of involvement into conflicts has a 32% correlation with the average (over the years) share of the defense spending in the GDP, with a high level of statistical significance. Finally, the size of defense spending in turn has an impact on the probability of conflict with all other countries. The model thus features both causal links between trade and conflicts (conflicts reduce trade, trade prevents conflicts), as well as both causal links between conflicts and defense spending (anticipation of conflicts causes more defense spending, more defense spending makes conflicts more likely).

☆ We are thankful to Francesco Caselli, Sergey Izmalkov, Dalia Marin, Thierry Mayer, Igor Muraviev, and Dmitry Pervushin for the useful discussions. We also thank the two anonymous referees for the suggestions that substantially improved the paper. Denis Deryushkin and Sergei Motin provided helpful research assistance. Alexander Tarasov gratefully acknowledges financial support from the Deutsche Forschungsgemeinschaft through SFB/TR 15.

* Corresponding author at: Office 3433, Shabolovka 26, Moscow 119049 Russia.
E-mail address: r.zakharenko@gmail.com (R. Zakharenko).

[1] See, for instance, Eaton and Kortum (2002), Krugman (1980), Melitz (2003), and Melitz and Ottaviano (2008), respectively.

http://dx.doi.org/10.1016/j.jinteco.2014.11.013
0022-1996/



Sources: WorldBank Development Indicators, National Material Capabilities dataset.

Fig. 1. Military spending and trade.
Sources: WorldBank Development Indicators, National Material Capabilities dataset.

An important corollary of the above assumptions is that increased trade between a pair of countries will have a multiplicative effect on the global defense spending: it will cut the defense spending of not only the two trading partners, but also of other countries. Furthermore, the reduction of defense spending of other countries will have a further downward effect on the defense spending of the two trading partners. For example, increased trade between Russia and the United States should induce a reduction of defense spending of not only Russia and the United States, but also the defense spending of other potential opponents of Russia (e.g. China or Eastern European countries) and of the United States (e.g. China or Venezuela); the reduction of China's defense spending would reduce the defense spending of other China's potential opponents (e.g. India), as well as further decrease of defense spending in Russia and the United States.

To assess the welfare gains of diminished conflict frequency and defense spending cuts, we need first to clarify the theoretical foundations of such welfare gains. Indeed, in a "perfect" world of full information, zero transaction costs and fully rational players, all players make decisions in such a way that aggregate welfare is maximized. Then, according to the envelope theorem, the overall marginal welfare effects of diminished trade costs are equal to the direct marginal effect, while the indirect marginal effects (via fewer conflicts and less defense spending) are zero. At the same time, there is a widespread belief that in a decentralized equilibrium, there are too many conflicts and too much defense spending and an effort to reduce both is desirable; such a belief is at the core of peace studies.[2] To formalize this idea, one has to relax one or more "perfect world" assumptions. Martin et al. (2008), for example, take the asymmetric information approach: every pair of countries bargains over a joint "peace surplus" where the outside options (i.e. welfare in case of disagreement and conflict escalation) are private information. In such a setting, suboptimal conflicts may take place.

In this paper, we take another, perhaps more extreme, approach (primarily due to mathematical tractability concerns). We assume prohibitively high transaction costs of negotiation between governments and, as a result, impossibility of welfare transfers among countries. In this setting, country A may attack country B even if the welfare gains of the former are smaller than the welfare losses of the latter, rendering such an attack socially suboptimal. In this case, strengthened trade links cause A to become more peaceful towards B and, therefore, benefit B (while the additional welfare effect of reduced hostility is zero for A due to the envelope theorem). Moreover, the reduced hostility causes global defense spending cuts, which further improves the welfare of all countries including A.

To assess the magnitude of these additional gains from trade, we estimate the model applying what we call the *constrained maximum likelihood* estimation (i.e. the maximum likelihood estimator with constraints on the parameter space) and perform a counterfactual analysis. The empirical identification of the interdependencies between trade, military conflicts, and defense spending comes from the structural and functional assumptions in the model. Focusing on some of the most hostile country pairs, we quantitatively examine how unilateral trade liberalization between the two countries affects the exporter, importer, and the global welfare. We find that in all experiments both the exporter and the importer gain from unilateral trade liberalization. Moreover, since more peaceful relations between the countries launch a worldwide wave of defense spending cuts, the rest of the world gains as well.[3] For instance, a reduction in the cost of exporting from South Korea to North Korea that leads to one dollar rise in the value of exports raises the welfare of North Korea by $0.1678 (in terms of the compensating variation of income) and the welfare of South Korea by $0.0551. At the same time, the global welfare gains are $0.7361, including a gain of the United States of $0.2711, and a gain of Japan of $0.1209. These numbers suggest that the world gains from trade due to defense spending cuts can be substantial, especially when the two countries that increase trade have a history of hostility.

To the best of our knowledge, this paper is the first one that studies the interplay between trade, conflicts, and defense spending. At the same time, there exist studies of an interplay of any two of these three. Substantial research, by both economists and political scientists, has been devoted to the analysis of interrelationship between trade and military conflicts. Polachek (1980) argues that mutual dependence between trading partners reduces the probability of a conflict between them. He finds that this hypothesis is consistent with the data. Gowa and Mansfield (1993) show in a game-theoretic model that free trade is more likely within, rather than across, political-military coalitions.

[2] For example, the Peace Research Institute Oslo, a half-century-old think tank, defines its purpose as "to engage in research concerning the conditions for peaceful relations between nations, groups and individuals."

[3] In the paper, we assume away the general equilibrium effects of trade liberalization that work through the adjustment of the cost of labor across countries. As a result, the only effects of unilateral trade liberalization on the rest of the world are due to reduced hostility and associated defense spending cuts.