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## ANALYSIS

# Resource abundance and internal armed conflict: Types of natural resources and the incidence of ‘new wars’

Heinz Welsch

Department of Economics, University of Oldenburg, 26111 Oldenburg, Germany

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## ABSTRACT

Recent armed domestic conflicts have been described as being related to natural resource abundance and as being characterized by new features not present in earlier internal conflicts (multiplicity of actors, devastation of production structures). The paper develops and tests a framework that captures both the role of natural resource abundance and the stylized facts from the descriptive literature in a simple two-sector model in which violent appropriation of natural resources imposes a negative externality on the production sector. The model predicts that the probability of armed conflict varies directly with the size and value of ‘lootable’ resource endowments and inversely with variables that increase labor productivity. In contrast to mineral resources, abundance of agricultural resources reduces conflict probability, by raising labor productivity. These predictions are supported by cross-country ordered probit estimations. In quantitative terms, the negative effect of agricultural resources on conflict probability is almost twice as large as the positive effect of mineral resources.

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## 1. Introduction

The appropriation and exploitation of natural resources have frequently been mentioned as a cause of civil wars. While several recent pertinent studies both from economics (for instance Collier and Hoeffler, 1998, 2004; De Soysa, 2000) and political science (for instance Kaldor, 1999; Klare, 2001) suggest that natural resource abundance is an important determinant of the occurrence of internal armed conflict, Ross (2004) finds the empirical linkage between natural resources and civil war to be fragile and proposes that the resource–conflict relationship should be differentiated with

respect to both the type of natural resource and the kind of civil conflict.<sup>1</sup>

With respect to the type of natural resource, early studies (starting with Collier and Hoeffler, 1998) have linked the incidence of civil war to the extent of primary commodity exports. More recently, the stock of natural capital, both renewable and

<sup>1</sup> It will become clear below that it is the availability of easily appropriable natural resources which is seen as important for internal conflict. It is the availability aspect which is captured by the term ‘abundance’ in this paper. Through comparative advantage, resource abundance may give rise to resource dependence, that is, dependence of an economy on natural resource based activities or natural resource exports. In this sense, resource abundance refers to a more fundamental notion than resource dependence.

E-mail address: [welsch@uni-oldenburg.de](mailto:welsch@uni-oldenburg.de).

non-renewable, has been suggested to yield a more precise and differentiated measure of abundance (De Soysa, 2000). In addition, several authors emphasize that not only the physical configuration of the resource matters, but also the political and economic environment (Fearon, 2005, Humphreys, 2005, Lujala et al., 2005).<sup>2</sup>

With respect to the type of conflict, writers with a political-science background emphasize that internal conflict in the post cold-war period is often characterized by additional features not present in earlier internal wars (see, e.g., Kaldor, 1999). Especially, the view is taken that

- (a) 'globalization' and new links with international markets have boosted the eruption of internal resource contests,
- (b) internal wars of the 1990s are often characterized by a multiplicity and fragmentation of combatants, lacking a unitary leadership and organization, and involving significant portions of the population,
- (c) internal wars of the 1990s often entail increasing impacts on civilians, the displacement of people, and the destruction of production structures.

These apparently new features of recent civil wars have led some authors to refer to them as 'new wars' (Kaldor, 1999) or 'post-modern' conflict (Duffield, 1998).

The propositions concerning the emergence and characteristics of 'new wars', as formulated by political scientists, are mainly based on case studies and are to a considerable extent lacking theoretical foundation. On the other hand, the economics literature on civil war usually has firm theoretical underpinnings, but largely fails to recognize several aspects of the recent evidence described by political science. This literature (dating back to Grossman, 1995; Hirshleifer, 1987) portrays internal conflict as a struggle over the tax base between the existing government and a well-defined rebel organization that pursues the objective of state capture or secession. In this struggle, natural resources often figure as an element of the tax base (e.g. Collier and Hoeffler, 1998; Olsson, 2003).

By setting up a game between two well-defined parties, the economics of rebellion disregards the multiplicity and fragmentation of combatants and the lack of unitary leadership and organization described in political-science literature. In addition, the involvement of and implications for the civilian population and the production sector ('externalities') are hardly captured, and the alleged role of 'globalization' is not addressed.<sup>3</sup> Given its focus on the government and a rival organization being engaged in armed conflict, the economics of rebellion is concerned with 'top-down' violence, that is, violence which is mobilized by

political leaders and entrepreneurs and which may create large-scale conflict.

The present paper takes another perspective. Assuming a reduced role for integrative leadership and organization and an increased involvement of the population in their role as combatants and civil victims, the paper adopts a 'bottom-up' approach to internal conflict according to which violence is actively embraced by ordinary people in a contest for resource rents (see Keen, 2000 for the typology used). The aim of the paper is to capture both, the role of natural resource abundance, and the stylized facts from the descriptive literature (multiplicity of actors, devastation of production structures, role of globalization) in a unified bottom-up framework of internal conflict.

To accomplish this purpose, the paper develops and estimates a simple two-sector model (resource sector and production sector). Subject to the degree of property rights enforcement, people are mobile between the two sectors and will engage in predation when resource rents rise (due to 'globalization', say). The resulting armed conflict imposes a negative externality on the production sector. The size of the externality varies directly with the share of the combatants in the population. Since the externality reduces the remuneration rate in the production sector (marginal labor productivity), an increase in the share of combatants may be self-energizing. The main prediction from this set-up is that the probability of the number of casualties exceeding a given threshold varies directly with the amount and value of lootable mineral resources and inversely with variables that increase labor productivity, especially agricultural resources and other sorts of production capital.

The model's predictions are supported by cross-sectional econometric evidence involving 54 countries, 1989–2002. Major findings are that (a) abundance of mineral assets significantly raises the probability of internal armed conflict – defined as the probability that there are at least 25 casualties – whereas the productivity of 'normal' production and the quality of governance reduce the conflict probability, (b) the relevant productivity variables in this relationship are agricultural and human capital, rather than manufactured capital. Importantly, it is not natural resource abundance in general, but the abundance in non-renewable resources which breeds conflict. Availability of agricultural resources (pastureland, cropland and forest) reduces the incidence of armed conflict by raising labor productivity in 'normal' production. In quantitative terms, the negative effect of agricultural resources on conflict probability is almost twice as large as the positive effect of mineral resources. An important conclusion for policy is that not only the quality of governance but also schooling reduces the propensity for armed resource conflict. Both need to have a sufficient level to make predation unattractive as an alternative to production.

In relating the model and results to earlier studies, it may be noted that much of the recent literature is framed in terms of a 'greed vs. grievance' dichotomy. Whereas the grievance hypothesis (see, e.g., Homer-Dixon, 1995, 1999) regards internal war as originating from poverty and scarcity, the greed-based explanation (Collier, 2000; Collier and Hoeffler, 1998, 2004) emphasizes voracity as a cause of conflict. The present paper reconciles these opposing views by taking an opportunity cost perspective, focusing on the relative rather than the absolute payoffs to be gained from production and resource appropriation. In this view, income that can be gained in the

<sup>2</sup> The importance of institutions, especially 'due process' and civil rights, is acknowledged by Collier and Hoeffler (2005), who suggest that institutional considerations produce a 'filter' through which civil war can be linked to resource abundance.

<sup>3</sup> Another strand of economics literature that should be mentioned deals with the 'curse of natural resources', that is, the phenomenon that resource-rich countries tend to show low economic performance (e.g. Sachs and Warner, 1995; Gylfason et al., 1999; Welsch, in press). One possible reason for the 'curse' is rent-seeking, perhaps culminating in armed conflict (see, e.g., Gylfason and Zoega, 2002). This literature also disregards the features of the 'new wars' mentioned above.

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