Defusing the Population Bomb: Is Security a Rationale for Reducing Global Population Growth?

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Introduction

Demographic and environmental factors have claimed a dominant position in post-Cold War security discourse. According to neo-Malthusians,[1] rapid population growth will lead to per capita scarcity of natural resources such as cropland, freshwater, forests, and fisheries, increasing the risk of violent conflict over scarce resources. In contrast, resource-optimists[2] claim that scarcity of agricultural land, caused by high population density, may drive technological innovation, which could lead to economic development and thus build peace over the long term. Although world population growth is projected to eventually level out, some areas and countries will experience relatively high growth rates for decades to come (Lutz et al., 2004). If these areas are seriously threatened by instability and violent conflict, reducing population growth could be an important concern for the international community.

Building on my recently published empirical analysis of the relationships between population pressure on natural renewable resources and the outbreak of domestic armed conflict,[3] this policy brief examines whether high population pressure is a general, persistent threat to domestic peace over time, and thus deserves the attention of security policymakers. While many empirical studies examine single cases with limited potential for generalization and prediction, this global, cross-country statistical model, which covers a 50-year period, assesses the relationships among several different indicators of population pressure and domestic armed conflict (involving at least 25 battle-related deaths in a year). Prior to this study, little empirical research has systematically examined the role of population pressure in causing domestic armed conflict.[4]

My analysis found that population growth, land scarcity, and urbanization do not greatly influence patterns of war and peace (see Table 1 for a summary). The national-level relationship between population-induced scarcity and conflict identified by several case studies does not seem to represent a strong general trend among countries over time. However, there were a few exceptions: countries experiencing high population growth and density in the 1970s were indeed more likely to suffer an outbreak of domestic armed conflict. In addition, further research may moderate these findings: for example, using local level data—rather than national—might reveal a stronger relationship between population pressure and conflict.

Moderate Neo-Malthusians

Few scholars would argue that resource scarcities never occur or that they are irrelevant to conflict. Natural resources essential to human life and welfare are unevenly distributed between and within states, and local scarcities of certain natural resources may arise and persist, at least temporarily. According to Thomas Homer-Dixon and his Project on Environment, Population, and Security at the University of Toronto—the most influential neo-Malthusian school—population growth is an important

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source of demand-induced scarcity: if a resource base is constant, the availability of resources per person will diminish as an increasing number of persons share it, or as demand per capita rises (Homer-Dixon, 1999, page 48).[5]

Neo-Malthusians are primarily concerned with resources that are essential to food production. Homer-Dixon and Blitt (1998) argue that large populations in many developing countries are highly dependent on four key resources: freshwater, cropland, forests, and fisheries. The availability of these resources determines people's day-to-day well-being, and scarcity of such resources can, under certain conditions, cause violent conflict. Some propose that the resource scarcity and conflict scenario is more pertinent to developing countries due to their lower capacity to address environmental issues and to cope with scarcity (Homer-Dixon, 1999, pages 4–5; Kahl, 2002, page 258). Unlike some strict Malthusians, Homer-Dixon claims that population pressures do not increase the risk of conflict in isolation, but they could in combination with environmental degradation and uneven wealth distribution.

More recent contributions further moderate the neo-Malthusian position. Colin Kahl (2002) criticizes much neo-Malthusian writing for failing to identify the most important intervening variables. While state weakness is often cited as a necessary condition for environment-related conflict, Kahl argues that conflict may also arise under conditions of "state exploitation," when powerful elites exploit rising scarcities and corresponding grievances in order to consolidate power (page 265). Richard Matthew (2002, page 243) criticizes the simple neo-Malthusian thesis for understating the adaptive capacity of many societies and for not adequately addressing the historical and structural dimensions of violence, such as globalization and colonial influence.

An Empirical Analysis of Neo-Malthusian Claims

If the basic neo-Malthusian scheme is correct, the risk of armed conflict for countries experiencing high levels of population pressure should be greater, all other factors being equal. This article investigates the likelihood that the following forms of population pressure affect the risk of armed conflict:

- Population growth;
- Population density relative to productive land area;
- Continued population growth when productive land is already scarce; and
- Urbanization.

My study encompasses statistical surveys of all sovereign states in the international system and all politically dependent areas (colonies, occupied territories, and dependencies) for the 1950–2000 period, including data on domestic armed conflict[6] drawn from the PRIO–Uppsala dataset (Gleditsch et al., 2002), and data on population growth and size, urbanization, and scarcity of productive land from the United Nations and other sources.[7] Since economic and political conditions may influence both demography and conflict, potentially confounding the relationships of interest, I used multivariate modeling. The study controls for poverty, governance, size of the country, economic growth, and length of time since the end of a previous conflict.[8] The population data I used are assumed to be among the most reliable and comparable available. However, data on

Table 1: Population and Risk of Conflict Summary

	Basic Model	Expanded Model	1970s	Post-Cold War
Population growth	Not significant	Not significant	Not significant	Not significant
Population density	Lower risk (weak)	Not significant	Not significant	Not significant
Growth*density	Not significant	Not significant	Higher risk (medium)	Not significant
Urban growth		Not significant		Lower risk (medium)

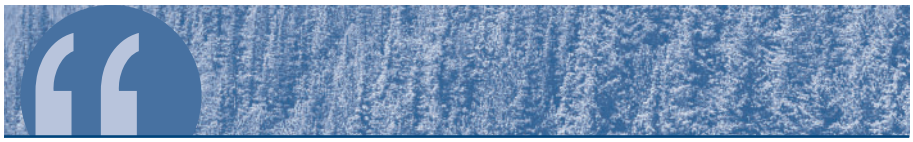
Note: This chart summarizes the direction and statistical significance (in parentheses) of the association between the main explanatory variables and the risk of conflict. For the actual values, please see Table 2.

international migration flows are generally inadequate, and for many less developed countries and regions where population data are inferior or less available, the UN Population Division employs demographic techniques to arrive at reasonable estimates (UN, 2000).[9] Since the data are aggregated at the national level, the results do not reflect differences between regions of individual countries.

According to my results (see Table 2), high population growth—by itself—is not associated with armed conflict. In addition, scarcity of productive land is associated with less conflict, contrary to neo-Malthusian expectations. This is not a strong and robust statistical relationship, suggesting that population density is not an important predictor of peace *or* of war.[10] Land scarcity combined with continued high population growth is positively associated with conflict, but for the most part this relationship is neither strong nor robust, indicating that conflict is not more likely to break out in countries presumably experiencing "Malthusian traps." Under certain specifications, however, the relationship turns significant.[11]

Furthermore, poor countries experiencing high levels of population pressure are not more susceptible to armed conflict, which counters the proposition that developing countries are more vulnerable to violence generated by population pressure and resource scarcity. Urbanization does not appear to be a risk factor, and the interaction between urbanization and economic growth was not statistically significant, failing to lend empirical support to the theory that high urban growth rates may lead to violence when combined with economic crises.

Interestingly, the neo-Malthusian conflict scenario *was* supported when I considered the post-World War II decades separately. In the 1970s, countries experiencing high population growth and density were indeed more likely to see the outbreak of a domestic armed conflict. (This relationship is quite robust, but it disappears when the sample is restricted to sovereign states.) The rise of environmental security literature in this decade could reflect the greater significance of neo-Malthusian factors in this period. From 1965–80, less developed regions experienced their highest levels of population growth since World War II, particularly in parts of Asia where population density was already high. During this time, the superpowers were heavily involved in armed conflicts around the globe (Harbom & Wallensteen, 2005). The attention garnered by demographic and environmental changes may have influenced the superpowers' choice of military engagements.



The national-level relationship between population-induced scarcity and conflict identified by several case studies does not seem to represent a strong general trend among countries over time.

In the post-Cold War era, by contrast, there is no support for neo-Malthusian claims; instead, high rates of urbanization correlate with *less* conflict.

Policy Recommendations and Future Research

According to basic neo-Malthusian theory, societies experiencing scarcity related to population growth should have a greater risk of domestic armed conflict. My empirical test does not render much support for this scenario, nor for the optimistic perspective. Factors like population growth, land scarcity, and urbanization simply do not appear to greatly influence patterns of war and peace.

Claims that the world has entered a "new age of insecurity" since the end of the Cold War appear to be unfounded (see de Soysa, 2002a, page 3). Rather, the post-Cold War era is notable for the strong statistical significance of conventional explanations of conflict, such as level of development and regime type. Although often portrayed as an emerging challenge to security, countries with high levels of urban growth were significantly less prone to armed conflict during this period. While Population Action International's report, *The Security Demographic* (Cincotta et al., 2003), finds a bivariate relationship between high levels of urbanization and conflict, I find that this relationship disappears when controlling for important and relevant variables such as the level of development.[12]

According to my results, using security as a rationale for reducing global population growth is unwarranted. It may even be counterproductive, potentially overshadowing more important rationales for reducing population growth. These may include human—rather than conventional—security issues like sustainable development; economic performance; and female education, empowerment, and reproductive health.

But the potential for further research is substantial, especially for exploring the relationships between population and other factors. For example, in related analyses, de Soysa (2002a, 2002b) finds that population density is positively associated with armed conflict when controlling for the level of international trade. Potentially, when a country trades fewer goods, land scarcity is more pertinent and may instigate armed conflict. Thus, a bad macroeconomic environment may exacerbate the relationship between armed conflict and scarcity of productive land.

The aggregated, national-level data I used to test the population pressure hypotheses may fail to reflect the effects of *local* population pressure, which presents important challenges for future research.[13] My study indicates that the national-level relationship between population-induced scarcity and conflict identified by several case studies does not seem to represent a strong general trend among countries over time. Geographically organized data and statistical tools could assess whether scale may account for the absence of empirical support for the neo-Malthusian paradigm. Studying subnational data from arguably vulnerable countries might reveal the possibly conflict-conducive effects of local population pressures.

Finally, researchers should more thoroughly assess the often-neglected relationship between migration—both international and domestic—and conflict. This study, which incorporated a very crude measure of large refugee populations, did not support the claim that such pop-

Table 2: Population and Risk of Armed Conflict

	Model 1 Basic *ß* *st. error*	**Model 2 Expanded** *ß* *st. error*	**Model 3 1970s** *ß* *st. error*	**Model 4 Post-Cold War** *ß* *st. error*
MAIN EXPLANATORY VARIABLES				
Population growth	-0.009 (0.062)	-0.013 (0.071)	-0.024 (0.099)	-0.126 (0.086)
Population density	-0.088* (0.053)	-0.068 (0.060)	-0.080 (0.115)	0.064 (0.106)
Growth*density	0.042 (0.039)	0.014 (0.045)	0.129** (0.057)	0.040 (0.075)
Urban growth		-0.025 (0.041)		-0.112** (0.046)
CONTROL VARIABLES				
Country size (total population)	0.269*** (0.047)	0.289*** (0.055)	0.344*** (0.103)	0.228** (0.106)
Development (infant mortality rate)	0.006*** (0.001)	0.010*** (0.002)	0.011*** (0.003)	0.021*** (0.005)
Democracy	0.006 (0.014)	0.015 (0.015)	0.028 (0.029)	0.0001 (0.027)
Democracy, squared	-0.014*** (0.003)	-0.014*** (0.003)	-0.005 (0.007)	0.022*** (0.006)
Economic growth		-0.054** (0.024)		
Time since last conflict	1.819*** (0.275)	1.691*** (0.304)	1.101 (0.714)	1.716*** (0.467)
Constant	-6.078*** (0.488)	-6.302*** (0.599)	-7.433*** (1.143)	-5.691*** (1.087)
N Log likelihood Pseudo R^2	7,752 -793.33 0.107	5,851 -631.85 0.113	1,519 -165.94 0.103	1,680 -194.43 0.197
Asterisks signify the level of statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.				

Note: Not all results are displayed in this table; for all results, see Urdal (2005).

ulations represent a security threat. However, more empirical work in this area may shed important light on this central aspect of neo-Malthusian theory.

In the 1970s, countries experiencing high population growth and density were indeed more likely to see the outbreak of a domestic armed conflict.

Notes

1. Thomas Malthus (1803/1992) asserted that food production would grow arithmetically, while human population would grow exponentially—which, at some point, would cause serious food shortages and human misery. At the end of the 1960s and the beginning of the 1970s, a wave of neo-Malthusian literature predicted that the rapidly growing world population would soon exceed the resource base and lead to serious environmental destruction, widespread hunger, and violent conflicts. Neo-Malthusian concern over security became even more pronounced in the 1990s.

2. Also known as "cornucopians," resource-optimists believe that the world is continuously improving by both human and environmental standards. They offer three main challenges to the neo-Malthusian paradigm: first, they claim that most natural resources are not really scarce in a global context. Second, even if some resources are getting scarcer, humankind is able to adapt to these challenges. Third, they argue that *abundance* of valuable natural resources leads to violent conflict, not scarcity.

3. This policy brief is based on my article "People vs. Malthus: Population Pressure, Environmental Degradation, and Armed Conflict Revisited," published in the *Journal of Peace Research* in July 2005.

4. Studying shorter time series, Hauge and Ellingsen (2001) and de Soysa (2002b) find that high population density slightly increases the risk of domestic armed conflict and civil war. Collier and Hoeffler (1998) find no significant effects of population growth or density on civil war (defined as producing more than 1,000 battle-related deaths in a year). In bivariate models, Cincotta et al. (2003) find a relationship between high urbanization rates and the risk of civil armed conflict onset.

5. Gleditsch and Urdal (2002) provide a review of Homer-Dixon's work on population, environment, and conflict.

6. A domestic armed conflict is defined as a conflict confined to one country, fought between at least two organized parties of which at least one has to be a government, resulting in at least 25 battle-related deaths within a calendar year. Here, civil wars are defined as domestic armed conflicts with at least 1,000 battle-related deaths per calendar year.

7. Sources include the United Nations' *World Population Prospects* (1999), the UN's annual *Demographic Yearbook*, the *Statistical Abstract of the World* (Reddy, 1994), the *CIA World Factbook* (CIA, 2001), and the World Bank's *World Development Indicators* (2003). The data in the UN's *World Population Prospects* cover all states and political dependencies with more than 150,000 inhabitants.

8. For full references and data descriptions, see Urdal (2005).

9. The UN's population division uses a number of different sources to assess consistency. For some extreme cases, where information is outdated or non-existent, the UN derives estimates by inferring levels and trends from those experienced by countries in the same region with similar socio-economic profiles (UN, 2000).

10. These results are virtually unchanged when using a conventional density measure.

11. The relationship is statistically significant when the model requires a longer period of peace (five years or more) between hostilities to determine whether a conflict is "new." However, it becomes insignificant when the sample is restricted to sovereign states.

12. Since the level of development—which is assumed to capture aspects of poverty and state weakness—is also a strong predictor of conflict, we have to control for development to assess the effect of urbanization. Cincotta et al. (2003) are thus rightfully cautious not to draw strong conclusions from the statistical relationships they find. In my own model, I find a similar statistically significant bivariate relationship between urbanization and conflict outbreak, but this relationship disappears when controlling for level of development.

13. Similar criticism could also be directed at previous case study literature in the field, including Homer-Dixon and Blitt (1998).

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