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A Clash of Generations? Youth Bulges and Political Violence

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It has frequently been suggested that exceptionally large youth cohorts, the so-called "youth bulges," make countries more susceptible to political violence. Within two prominent theoretical frameworks in the study of civil war, youth bulges are argued to potentially increase both opportunities and motives for political violence. This claim is empirically tested in a time-series cross-national statistical model for internal armed conflict for the period 1950–2000, and for event data for terrorism and rioting for the years 1984–1995. The expectation that youth bulges should increase the risk of political violence receives robust support for all three forms of violence. The results are consistent both with an expectation that youth bulges provide greater opportunities for violence through the abundant supply of youths with low opportunity costs, and with an expectation that stronger motives for violence may arise as youth bulges are more likely to experience institutional crowding, in particular unemployment. Some contextual factors have been suggested to potentially enhance the effect of youth bulges. In an empirical test of these propositions, the study suggests that youth bulges are particularly associated with an increasing risk of internal armed conflict in starkly autocratic regimes, but a similar effect is also found for highly democratic countries. The interaction of youth bulges with economic decline and expansion in higher education appear to increase the risk of terrorism but not of rioting. Recent studies in economic demography find that when fertility is sharply decreasing, causing lower dependency ratios, large youth cohorts entering the labor market may lead to economic boosts. This study finds some empirical evidence complementing these results, indicating that the effect of youth bulges on political violence may decline along with reduced dependency ratios.

I don't think Islam is any more violent than any other religions [. . .].But the key factor is the demographic factor. Generally speaking, the people who go out and kill other people are males between the ages of 16 and 30. During the 1960s, 70s and 80s there were high birth rates in the Muslim world, and this has given rise to a huge youth bulge. But the bulge will fade. Muslim birth rates are going down; in fact, they have dropped dramatically in some countries. ("So, are civilizations at war?," Interview with Samuel P. Huntington by Michael Steinberger, *The Observer*, Sunday October 21, 2001).

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A leading theorist on the role of youth in political violence, Jack A. Goldstone, argues that youth have played a prominent role in political violence from the English Revolution to the Revolutions of 1848, and that the existence of a "youth bulge" has historically been associated with times of political crisis (Goldstone 1991, 2001). A historian has even linked economic depression hitting the largest German youth cohorts to the rise of Nazism in Germany in the 1930s (Moller 1968: 240–244). Generally, it has been observed that young males are the main protagonists of criminal violence (Neapolitan 1997:92; Neumayer 2003:621) as well as political violence (Mesquida and Wiener 1996; Elbadawi and Sambanis 2000:253). It has been suggested that young men are more aggressive due to high male sex hormone levels (Goldstein 2001; Hudson and den Boer 2004:193–195).

But does the risk of political violence increase with the relative number of possible perpetrators? The purpose of this study is to empirically scrutinize whether youth bulges—defined as large cohorts in the ages 15–24 relative to the total adult population—may increase the risk of three different forms of internal political violence: armed conflict, terrorism and riots. This study will also address contextual factors that may condition such relationship. While the claim that youth bulges may cause political violence has a long history (Moller 1968; Choucri 1974), the issue has received increasing attention over the past decade following the more general debate over security implications of population pressure and resource scarcity. In "The Coming Anarchy," Robert Kaplan argues that anarchy and the crumble away of nation states will be attributed to demographic and environmental factors in the future (Kaplan 1994:46). More recently, youth bulges have become a popular explanation for current political instability in the Arab world and for recruitment to international terrorist networks. In a background article surveying the root causes of the September 11, 2001, terrorist attacks on the United States, *Newsweek* editor Fareed Zakaria argues that youth bulges combined with slow economic and social change has provided a foundation for an Islamic resurgence in the Arab world (Zakaria 2001:24).

Despite strong popular and policy interest, there are few rigorous empirical studies on the relationship between youth bulges and political violence. Two prominent quantitative studies on causes of civil war onset, Fearon and Laitin (2003) and Collier and Hoeffler (2004), initially included measures of youth bulges as one among a high number of variables. Both studies failed to find effects of youth bulges and report the results only in passing. As it will be argued below, the inability of these studies to find a relationship may primarily be due to the use of a flawed youth bulge measure. A third rigorous study including youth bulges among an even higher number of regressors, the State Failure Task Force Report (Esty et al., 1998), finds some effect of youth bulges on ethnic conflict. Neither of these studies discusses in depth the role of youth bulges in political violence.

This study adds to the existing literature in several ways. It discusses how youth bulges may affect the risk of political violence, drawing on two prominent theoretical perspectives concerning opportunity versus motive for civil war, as well as on recent advances in economic demography, to identify a possible causal explanation for why cohort size in itself may influence the propensity for political violence. While previous studies have tested the youth bulge hypothesis for high-intensity civil wars, this article studies new low-intensity conflict data and finds robust support for a relationship. The article further identifies relevant contextual factors believed to interact with youth bulges to increase the risk of political violence and, for the first time, tests these propositions empirically. Finally, the study provides the first empirical results suggesting that youth bulges may also increase the risk of terrorism and more spontaneous forms of political violence like riots, and violent demonstrations. It is suggested that youth bulges may be a better predictor of low-intensity political violence than large-scale wars.

The Theory of Youth Bulges and Political Violence

The literature on youth bulges has focused in particular on spontaneous and low-intensity unrest like nonviolent protest, riots and rebellion. In this study I argue that youth bulges are relevant for explaining the occurrence of more organized forms of political violence like internal armed conflict. I draw on two of the dominant and competing theoretical traditions in the study of civil war, one focusing on opportunity and the other on motive for conflict. This study addresses forms of political violence that require different levels of organization, and I assume that opportunity factors, determining the feasibility of violence, become increasingly important with increasing requirements for organization. Hence, the opportunity perspective is expected to be more important for organized armed conflict, less so for terrorism, and least relevant for violent demonstrations and rioting.

Both the opportunity and the motive perspectives are macro-level theoretical frameworks that attempt to explain events essentially consisting of a series of individual decisions—whether to join a rebel or terrorist organization or not—by focusing on economic, political, and social structural features. Existing literature has not yet successfully linked macro-level theories to microlevel assessments of individual motives and preferences (Sambanis 2002:224). This study does not attempt to bridge this gap, but explores key assumptions about the macro-relationships between youth bulges, contextual factors, and political violence suggested in the literature.

The opportunity literature, often coined the "greed" perspective (e.g., Collier 2000), has its roots in economic theory and focuses on structural conditions that provide opportunities for a rebel group to wage war against a government. These are conditions that provide the rebel group with the financial means to fight,[1] or factors that reduce the cost of rebellion, such as unusually low recruitment costs for rebel soldiers. Collier (2000:94) has suggested that relatively large youth cohorts may be a factor that reduces recruitment costs through the abundant supply of rebel labor with low opportunity cost, increasing the risk of armed conflict. Opportunity for rebellion is also boosted by a weak government with limited capability to inflict losses on the rebels (Fearon and Laitin 2003; Collier and Hoeffler 2004).

Assuming that rebel organizational structures exist exogenously and that recruits join to obtain a private good, the collective action problem in the opportunity perspective is presumed to be negligible. According to the opportunity perspective, rebellion is feasible only when the potential gain from joining is so high and the expected costs so low that rebel recruits will favor joining over alternative income-earning opportunities. Gates (2002:116) argues that this condition can be satisfied either when outside options are poor, or when a rebel group can offer greater rewards through loot-seeking activities. In a review of recent advances in the study of civil war, Sambanis (2002:224) argues that while opportunity may be the most important determinant of civil war, this does not necessarily mean that actors cannot also have strong motives. While maintaining that opportunity provides the best explanation for why civil wars break out, Collier and Hoeffler (2004:563) concede that motives may also play a role.

The motive-oriented tradition, or "grievance" perspective, has its origins in relative deprivation theory and tends to see the eruption of political violence as a rational means to redress economic or political grievances (Gurr 1970; Sambanis 2002:223). Motives for committing political violence can be economic—like poverty, economic recession or inequality—or political—like lack of democracy, absence of minority representation or self-governance. Most of the literature on youth bulges and political violence arguably fits into this tradition. It focuses on

[1] In particular valuable and "lootable" natural resources like diamonds, gemstones and drugs (e.g. LeBillon, 2001; Lujala, Gleditsch and Gilmore, 2005).

how large youth cohorts facing institutional bottlenecks and unemployment, lack of political openness, and crowding in urban centers may be aggrieved, increasing the risk of political violence (e.g., Choucri 1974; Braungart 1984; Goldstone 1991, 2001). But as redressing grievances is essentially a collective good, it is more difficult to overcome collective action problems (Sambanis 2002:223). In its simplest form, the motive perspective overpredicts political violence (Kahl 1998:83); the existence of serious grievances is not sufficient for collective violent action to erupt. The likelihood that motives are redressed through political violence increases when opportunity arises from availability of financial means, low costs or a weak state.

While it is useful to identify competing explanations for why youth bulges may affect the risk of political violence, the differences between the two perspectives should not be exaggerated. What one scholar sees as a factor that increases the opportunity for violence, another regards as a motive. Hence, while the two perspectives represent different ways of interpreting the same phenomena, they may yield similar empirical predictions. This study will attempt to identify contextual factors that may interact with youth bulges to increase the risk of political violence. The factors discussed below have all featured prominently in the literature on youth bulges and political violence. Available time-series data now make it possible to test these propositions empirically. To the extent possible, I will discuss whether the suggested interactions are primarily associated with opportunity or with motive.

The Mere Size of Youth Cohorts

Collier (2000:94) argues that the mere existence of an extraordinary large pool of youth is a factor that lowers the cost of recruitment as the opportunity cost for a young person generally is low. This is an assumption that hinges on the extent of alternative income-earning opportunities. If young people are left with no alternative but unemployment and poverty, they are increasingly likely to join a rebellion as an alternative way of generating an income. Collier (2000) further argues that higher levels of education among men act to reduce the risk of political violence, resulting from the higher opportunity cost of rebellion for educated men. As educated men have better income-earning opportunities than the uneducated, they would have more to lose and hence be less likely to join a rebellion. From interviews with young soldiers, Brett and Specht (2004) have found strong micro-level support for the expectation that poverty, lack of schooling and low alternative income opportunities are important reasons for joining a rebel group.

The expectation that exceptionally large youth cohorts increase the supply of cheap rebel labor is further supported by recent studies in economic demography, which suggest that the alternative cost of individuals belonging to larger youth cohorts are generally lower compared with members of smaller cohorts. According to the "cohort size" hypothesis, "other things being constant, the economic and social fortunes of a cohort (those born in a given year) tend to vary inversely with its relative size" (Easterlin 1987, quoted in Machunovich 2000:236). The expectation is that increases in relative cohort size results in a reduction in male relative income. Such a direct relationship has been found in several studies using wage data for smaller samples of countries (reviewed in Machunovich 2000:238). In a cross-national time-series analysis using the same population data as this analysis, Machunovich (2000) finds that an increase in relative cohort size is associated with a reduction in fertility, arguably resulting from the depression of male wages. In a related analysis of 15 industrialized countries over a period of more than 20 years, Korenman and Neumark (1997) find that large youth cohorts are associated with a significant increase in youth unemployment rates. So not only do youth bulges provide an unusually high supply of individuals with low opportunity cost, as anticipated by Collier (2000), but an individual belonging to a relatively large youth

cohort generally also has a lower opportunity cost relative to a young person born into a smaller cohort.

The influence of the size of youth cohorts on unemployment is emphasized in the motive-oriented literature on civil violence (Moller 1968; Choucri 1974; Braungart 1984; Goldstone 1991, 2001; Cincotta, Engelman and Anastasion 2003). If the labor market cannot absorb a sudden surplus of young job-seekers, a large pool of unemployed youths will generate strong frustration. While labor markets differ substantially with regard to flexibility, empirical evidence does suggest that on average, large youth cohorts are substantially more likely to experience higher unemployment rates (Korenman and Neumark 1997). In extreme cases, the challenge to employ large youth cohorts can appear overwhelming. In Saudi Arabia, approximately four million people will add to the labor force over the current decade, equaling two-thirds of the current Saudi national work force (Winckler 2002:621). Lia (2005:141) claims that the socioeconomic problems associated with "youth bulges" may provide fertile ground for recruitment to terrorist organizations.

Hence, the opportunity and motive perspectives yield an identical prediction with regard to the relationship between youth bulges and political violence:

Hypothesis 1: *Countries that experience youth bulges are more likely to experience political violence than countries that do not.*

Demographic Dividend

Results from recent studies in economic demography suggest that the relationship between large youth cohorts and political violence may be muted if youth bulges precede significantly smaller cohorts. Economists and demographers have long discussed the allegedly negative impact of population growth rates on economic growth (Kelley 2001). Recently, this debate has been advanced by the investigation of the impact of growth in different age segments. While high growth rates in the nonworking, or dependent, age groups are associated with lower economic growth, increases in the working-age population are positively associated with economic growth (Kelley and Schmidt 2001; Williamson 2001). Thus, in areas where the demographic transition is well underway with sharply declining fertility rates, countries may experience a window of opportunity for economic development, often coined a "demographic dividend," largely flowing from increased savings as the relative number of dependents decreases.

The rapid growth of East Asian economies since 1975 has been partially explained by a dividend from a lowered dependency burden. According to Williamson (2001:119), changes in age structure account for as much as one-third of the Asian "tiger economies." While decreasing dependency ratios represent a potential for economic growth, the realization of this potential largely depends on the social, economic, and political environment (Williamson 2001:108). Taking the study of age composition and economic growth further, Kögel (2005) shows that high dependency ratios inhibit economic growth by exerting a negative impact on total factor productivity growth.

From the literature on economic and population growth, we expect that when countries experience declining dependency ratios that increase the potential for economic growth, the relationship between youth bulges and political violence will generally weaken. The expectation is consistent with the opportunity as well as the motive perspective. In countries with a lower dependency burden, the alternative cost of rebel labor will be higher. On the motive side of the coin, a reduction in dependency burden implies greater employment and income prospects, reducing grievances. Hence, we may expect countries with large youth cohorts and continued high fertility to experience a higher risk of political violence than states with similar youth cohorts and declining fertility.

Hypothesis 2: *The higher the dependency burden, the stronger the effect of youth bulges on political violence.*

Economic Growth

Low economic growth has been identified as a particularly robust predictor of civil war onset (Sambanis 2002:229; Collier et al., 2003), and it may also affect the relationship between youth bulges and political violence. The overall economic performance of a society is an important factor determining the income forgone by joining a rebel movement, and thus the opportunity for rebellion. Economic growth over a longer period may act as a proxy for new income opportunities (Collier and Hoeffler 2004:569). For large youth cohorts, the economic climate at the time they enter into the labor market is particularly crucial. To the degree that income opportunities are determined by general economic performance, we would expect that when economic conditions generally deteriorate, large youth cohorts will be rendered particularly susceptible to lower income opportunities, reducing the income they forego by signing up as a rebel.

The expectation that economic decline strengthens the relationship between youth bulges and political violence is shared by the motive-oriented literature. Youth belonging to large cohorts will be especially vulnerable to unemployment if their entry into the labor force coincides with periods of serious economic decline.[2] Choucri (1974:73) argues that such coincidences generate despair among young people that moves them toward the use of violence.

Hypothesis 3: *The lower the economic growth, the stronger the effect of youth bulges on political violence.*

Rapid Expansion in Higher Education

A tool that countries can exploit in order to respond to youth bulges is the expansion of higher education. Can this serve as a strategy to reduce the risk of political violence? As argued above, education is generally expected to increase the opportunity cost of rebel labor. This implies that rebel recruitment is more costly and rebellion less likely the higher the level of education in a society (Collier and Hoeffler 2004). High enrollment rates at all levels of education are expected to be associated with a reduced risk of conflict. This is not inconsistent with the motive-oriented literature. However, it has been suggested that when countries respond to large youth cohorts by expanding tertiary education, this may produce a much larger group of highly educated youths than can be accommodated in the normal economy. Unless the government is able and willing to absorb a surplus of university graduates into the public sector, as was done by the government of Egypt (Winckler 2002:630), prevailing unemployment among highly educated youth segments may cause frustration and grievances that could motivate political violence. It has been argued that high unemployment among educated youth is one of the most destabilizing and potentially violent sociopolitical phenomena in any regime (Choucri 1974:73; Braungart 1984:16; Winckler, 2002:635), and Goldstone (2001:95) notes that a rapid increase in the number of educated youths has preceded historical episodes of political upheaval. Lia (2005:145–146) argues that the expansion of higher education in many countries in the Middle East, producing large classes of educated youth that the labor market cannot absorb, has had a radicalizing effect and provided new recruits to militant organizations in the area. Further anecdotal evidence includes episodes of instability and violence in Kenya

[2] While we unfortunately do not have data allowing us to investigate whether economic deterioration affects specific age groups more than others, we assume that economic recession generally is associated with rising unemployment also among the younger cohorts.

(Kahl 1998:103), Thailand (Xenos 2004:28), and Sri Lanka (Braungart 1984:14–15). If an expansion of higher education interacts with youth bulges to increase the risk of political violence, this would lend credibility to the motive perspective.

Hypothesis 4: *The greater the expansion of higher education, the stronger the effect of youth bulges on political violence.*

Lack of Democracy

When being used to assess the role of democracy, the opportunity and motive perspectives yield opposite predictions. The opportunity literature suggests that the opportunity for political violence is greater the less autocratic a state is, while the motive-oriented literature argues that the greater the political oppression and the lack of political rights, the greater the motive for political violence. Several empirical studies of regime type and civil conflict (e.g., Hegre et al., 2001) have found a curvilinear "inverted U" relationship between democracy and conflict, suggesting that starkly autocratic regimes and highly democratic societies are the most peaceful. This relationship is assumed to arise as a result of both opportunity and motive, as semidemocratic regimes may have greater openings for conflict compared with autocratic states. At the same time, lack of political rights may also constitute a motive for conflict. It has been suggested by proponents of the motive perspective that when large youth groups aspiring to political positions are excluded from participation in the political processes, they may engage in violent conflict behavior in an attempt to force democratic reform (e.g., Goldstone 2001). The potential for radical mobilization for terrorist organizations is argued to be greater when large educated youth cohorts are barred from social mobility by autocratic and patriarchic forms of governance (Lia 2005:147). According to the motive-oriented literature, we should thus expect to see that youth bulges have a greater effect on political violence the more autocratic the regime.

Hypothesis 5: *The more autocratic a country, the stronger the effect of youth bulges on political violence.*

Urbanization

While institutional crowding has been the major focus, geographic crowding has also been argued to generate motives for political violence (Brennan-Galvin 2002). Lia (2005:141) argues that as terrorism is essentially an urban phenomenon, we should expect to see that states undergoing rapid urbanization would be particularly likely to experience increased risks of terrorism. If youth are abundant in a relatively small geographical area, this may increase the likelihood that grievances caused by crowding in the labor market or educational institutions arise. Goldstone (1991, 2002) observes that historically, the coincidence of youth bulges with rapid urbanization, especially in the context of unemployment and poverty, has been an important contributor to political violence. Youth often constitute a disproportionately large part of rural-to-urban migrants (e.g., Xenos 2004); hence, we would expect that in the face of large youth cohorts, strong urbanization is likely to lead to an extraordinary crowding of youth in urban centers. To the extent that high urban growth rates may be accompanied by unemployment and economic marginalization, causing higher levels of frustration and dissent, we expect to see that the interaction with exceptionally large youth cohorts is associated with increasing levels of political violence. Empirical support for such a relationship would be consistent with the motive perspective.

Hypothesis 6: *The higher the urbanization rates, the stronger the effect of youth bulges on political violence.*

Research Design

This study provides a large-*N* quantitative survey using the country-year as the unit of analysis. The data set covers all sovereign states in the international system and all politically dependent areas (colonies, occupied territories and other dependencies) for the 1950–2000 period.[3] Only dependent areas with an estimated total population of at least 150,000 in 1995 are included. Population data for less populous dependencies are not available. The temporal restrictions follow from low validity of demographic estimates before 1950 and lack of earlier political violence data. I study three different types of political violence, requiring two different methodological approaches.

A logistic regression model is used to study domestic armed conflict onset, measured by a dichotomous variable (onset or not). When analyzing terrorism and riots/violent demonstrations, both event count measures, I use negative binomial regression due to the skewed distribution of events. Neither logistic regression nor the negative binomial model may generate implausible negative predictions.

Political Violence Variables

Data on *domestic armed conflict onset* is drawn from the Uppsala/PRIO data set (Gleditsch et al., 2002). This project has published annual conflict updates in the *Journal of Peace Research* since 1993, but has only recently extended its range back to the end of World War II. Several earlier studies have used this data set to assess different links between population, environment and conflict (Hauge and Ellingsen 1998; de Soysa 2002; Cincotta, Engelman, and Anastasion 2003; Urdal 2005). In this study, conflict refers to domestic conflict *onset* unless specified otherwise. Colonial wars involving armed groups fighting for independence against colonial powers are for the purpose of this study defined as domestic conflicts.

The Uppsala/PRIO data set sets a relatively low violence threshold for conflict, and distinguishes between minor armed conflict (a minimum of 25 battle-related deaths per year), and war (at least 1,000 battle-related deaths per year). In this analysis, I primarily focus on all conflicts, but I have also run separate tests limited to the larger conflicts. An armed conflict is defined as a contested incompatibility concerning government and/or territory, between at least two parties, of which one is the government of a state, using armed force (Harbom and Wallensteen 2005:634). A total of 193 conflict onsets from a state of peace were identified in the 1950–2000 period.[4]

The *terrorism* and the *riots and violent demonstrations* event count data were collected as part of the U.S State Failure Task Force (SFTF) project, and originate from the Protocol for the Assessment of Nonviolent Direct Action (PANDA) at Harvard University. The full SFTF data set has later been published by King and Zeng (2001). The PANDA data are generated by automated text searches from the headline segments of the Reuters News Wire Reports. This study distinguishes between sub-lethal and lethal terrorist assaults on one side and riots and violent demonstrations on the other. The data cover a 12-year period from 1984 to 1995.[5]

[3] For comparison, I will also analyze a restricted sample of countries that qualify as members of the interstate system as defined by Small and Singer (1982).

[4] Several conflicts in the data set are inactive for periods and then start again. A crucial issue is then to define when a recurring conflict may be coded as a new onset. The dependent variable used for this study requires at least two years of inactivity before a new onset is coded. Alternative coding rules have been applied by changing the requirement to 1 year and 5 years of inactivity, with only marginal impacts on the results.

[5] The PANDA data are much less well defined than the Uppsala/PRIO conflict data. Furthermore, the data appear to be skewed toward areas that are high on the Western media agenda, in particular to large and wealthy countries. Sub-Saharan African countries appear to be generally underrepresented. The PANDA data also covers a very short time span of only 12 years. These deficiencies call for cautious interpretations of the results from the terrorism and riot/violent demonstration models. The data, as well as a short description, are available from the

Youth Bulges

The literature suggests several ways to operationalize *youth bulges*. Some of these operationalizations contain serious flaws that could easily jeopardize the possibilities of revealing effects of youth bulges on political violence. The most serious flaw, adopted by such prominent scholars as Huntington (1996), Goldstone (2001), Fearon and Laitin (2003), and Collier and Hoeffler (2004), is to measure the size of youth cohorts or young male cohorts (youth defined as 15–24 or 15–29-year-olds) relative to the total population rather than to the total adult population (15 years and above).

This definition is highly questionable both from a theoretical and a practical perspective. Most theories about youth revolt assume that violence arises from competition between younger and older cohorts, or because youth cohorts run into institutional "bottlenecks" due to their size. With the use of this measure, youth bulges in countries with continued high fertility will be underestimated because of large under-15 populations that deflate the youth bulge indicator. At the same time, countries with declining fertility and relatively smaller under-15 populations—potentially experiencing a demographic dividend—are "weighted" upwards. In this article youth bulges are measured as 15–24-year-olds relative to the total adult population (15 years and above). Data on age distribution are drawn from the *World Population Prospects* (UN 1999), and from the *Demographic Yearbook* (UN annual) for small states. In order to investigate whether previous failures to detect significant relationships is due to the use of flawed measurements, I will also measure youth bulges relative to total population, and add a control for high dependency ratios. Huntington (1996:259–261) argues that societies are particularly war prone when the number of young people aged fifteen to twenty-four reaches a "critical level" of 20% of the overall population in a country. A squared term will be applied to investigate a possible nonlinear effect of youth bulges.

Intervening Variables

Economic growth is estimated as the average annual change in GDP per capita over the five-year period before the year of observation. The measure is based on data from the *Penn World Tables* of GDP per capita adjusted for purchasing power parities (PPP) (Heston, Summers, and Aten 2002). *Dependency ratio* is defined as the number of 0–14-year-olds relative to the number of 15–24-year-olds in a population. Low values on this indicator imply declining fertility and thus dependency, a situation associated with the demographic transition and a potential for a demographic dividend.[6] Data originate from the *World Population Prospects* (UN 1999), and from the *Demographic Yearbook* (UN annual). *Expansion in higher education* is measured by average annual growth in tertiary enrollment. The data were collected by UNESCO for the 1970–1995 period and have been published by USAID (2003). Estimates are categorized by 5-year periods, and the variable has been lagged by one period, allowing for cohorts to complete tertiary education and enter into the labor force. Data on *political regime* type are collected from the Polity IV data set (Marshall and Jaggers 2000), ranging from -10 (most autocratic) to 10 (most democratic). Data on *urbanization* covering the 1960–2000 period have been collected from the *World Development Indicators* (World Bank 2003), and they measure the annual increase in urban populations.

original SFTF data set published at Gary King's homepage: http://gking.harvard.edu/data.shtml. Neumayer (2004) has previously analyzed and described the PANDA data.

[6] Conventionally, "dependency ratio" refers to the ratio between all dependents over total working-age population, including dependents at older ages. The conventional measure is invalid as a proxy for the onset of the fertility transition.

Control Variables

Level of development has been identified by quantitative studies as one of the most important determinants of domestic armed conflict (e.g., Collier and Hoeffler 1998; Hegre et al., 2001; Sambanis 2002). "Development" conveys a wide range of phenomena, and there are many competing theoretical explanations for how and why societies grow more peaceful as they develop. Indra de Soysa (2002:406) focuses on the role of higher state revenues, following from higher income, which enable states to pacify, or crush opposition. Wealthy countries can also more easily redistribute resources in order to dampen dissatisfaction (Henderson and Singer 2000:281). At the individual level, increasing income means that the opportunity cost of potential rebels increases following from their possible earnings in the regular economy (de Soysa 2002:406).

Different aspects of development also strongly affect the level of fertility and thus the age structure, making level of development a possible confounder of the relationship between youth bulges and political violence. While the level of economic development has only a modest impact on fertility decline (e.g., Heuveline 2001), aspects of social development like female education and autonomy are major determinants of fertility (e.g., Kravdal 2002). In this study I apply as a proxy for development the infant mortality rate (IMR), which compared with such widely used economic measures as GDP or energy consumption per capita, better captures the diverse aspects of development.[7] Sen (1998) has argued that mortality is a good indicator of a country's level of development. The level of infant mortality depends on the material living standard, as well as the level of education, gender inequality and the health care system. In addition to capturing noneconomic aspects, IMR is not nearly as flawed by distributional effects. Another advantage is that IMR estimates are available for a much larger set of country-years than GDP. The IMR is defined as the fraction of live-born children who die before the age of one. IMR data have been collected from the *World Population Prospects* (UN 1999) and the *Demographic Yearbook* (UN annual). For the sake of comparison, I will also apply a log-transformed measurement for PPP adjusted GDP per capita collected from the Penn World Tables (Heston et al., 2002).

A second control variable is *regime* type. The relationship between regime type and armed domestic conflict has been found to take an inverted U-shaped form, meaning that stark autocracies and fully developed democracies are both less likely to experience conflict than intermediary regimes (Hegre et al., 2001). Political factors may also be argued to be a possible confounder of the youth bulge-political violence nexus. Feng, Kugler, and Zak (2000) argue that both political stability and political capacity strongly influence fertility rates, and hence also does the age composition of the population. The study uses the Polity IV data (Marshall and Jaggers 2000) to measure regime type, and the variable ranges from -10 (most autocratic) to 10 (most democratic).[8] I also include a squared term in order to capture the assumed inverted U-shaped effect of regime on armed conflict.

To account for differences in political violence propensity flowing from the comparison of states of vastly different sizes, a variable measuring *total population* size is included. While this variable is less likely to be a potential confounder of the main

[7] The infant mortality rate may be strongly influenced by severe armed conflict. Because of the censoring of consecutive years of domestic armed conflict, such endogeneity is not a major concern to this study.

[8] Polity scores are missing for many units in my sample. The major reason for lack of Polity scores is that the data set extends to dependent areas and small states that are not covered by Polity. To avoid losing more than 25% of the sample, I have imputed the mean value in the sample (0) and created a dummy variable taking the value 1 for units with imputed Polity scores. Using the Polity 2 variable in the Polity IV data set, where "standardized authority codes" (-66, -77, and -88) have been converted to conventional Polity scores, produces virtually identical results when controlling for imputed values. The problem of losing observations is negligible in the terrorism and riot/demonstration models, and here the models are run only on units with original Polity scores. A similar procedure was followed for units with missing information for economic growth.

explanatory model, it is employed as a control in authoritative studies on civil war that have assessed the role of youth bulges (Fearon and Laitin 2003; Collier and Hoeffler 2004). Data are drawn from the *World Population Prospects* (UN 1999), and from the *Demographic Yearbook* (UN annual) for small states. The variable is log transformed, as I assume a diminishing effect of population size on political violence.

Controls for Statistical Dependency

An important assumption for a logistic regression—independence across all observations—is not easily defended in this case. There is likely to be dependence in time and possibly in space. An example of spatial dependency is provided by an armed conflict in one country that spreads into a neighboring country (Buhaug and Gleditsch 2005). Time dependency is illustrated by the higher conflict probability of countries that have experienced conflict before, compared with countries with no conflict history (Raknerud and Hegre 1997). More obviously, a country that experiences conflict over several years will find subsequent years of conflict to be heavily dependent on the first year. This latter problem is usually handled by focusing on the onset of conflict and by omission of all subsequent observations of the same conflict.

Omitting consecutive years of war does not solve the problem of time dependency entirely because the same statistical dependency prevails for consecutive years of peace. To account for temporal dependence, I will apply a control variable for time dependency, which specifies the estimated likelihood of conflict that accrues from the number of years in peace as the previous conflict. This variable is termed *brevity of peace*. It is generally assumed that the risk of experiencing a new conflict is high immediately after an armed conflict, and that this risk diminishes as time passes and wounds heal. I follow Hegre et al. (2001) and assume that the effect of a previous conflict is decaying over time according to the formula $\exp\{(-\text{years in peace})/X\}$.[9] In the formula, "years in peace" is the number of years a country experienced an armed conflict, while the value on X decides at what rate the effect of a previous armed conflict on conflict proneness diminishes over time. Following Toset, Gleditsch, and Hegre (2000), X is set to 4, implying that the risk of conflict is halved approximately every 3 years. The brevity of peace variable takes on values close to 1 immediately after the end of a conflict and goes toward 0 over time. Countries that have not experienced armed conflict up to a certain point in time have the value 0.[10] In the event count models on terrorism, I include a lagged event measure to control for number of previous events.

Empirical Results

Models 1 and 2 in Table 1 provide the results for the general civil armed conflict model, both for a restricted sample of independent states and for all states and dependent areas in the international system.[11] The results clearly support the main hypothesis (H1) that large youth bulges increase the risk of armed conflict. An increase of one percentage point in youth bulges is associated with an increased likelihood of conflict of more than 4%, and countries experiencing youth bulges of 35% run a risk of armed conflict which is 150% higher than countries with an age

[9] This is a variation of the grouped duration-analysis method developed by Beck et al. (1998). I prefer this approach as it is more directly interpretable. To assess whether differences in design may alter the results provided in this study, I have also run all logit models with the controls suggested by Beck, Katz and Tucker (1998).

[10] Since information on domestic armed conflict prior to 1945 is not available, the effect of the variable is systematically underestimated.

[11] The results are similar but generally somewhat stronger if the restricted sample for Models 1 through 11 is used. For all later models, the full sample is studied.

TABLE 1. Risk of Armed Conflict 1950–2000

	Restricted Sample:	*Full Sample*				
	Model 1	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*
Explanatory variables						
Youth bulges	0.047* (0.019)	0.043* (0.017)	0.044* (0.019)	0.046** (0.017)		
Youth bulges, squared				0.004 (0.002)		
Youth bulges, Collier's measurement					0.045 (0.043)	0.116* (0.051)
Youth bulges × dependency ratio						0.321** (0.121)
Control variables						
Infant mortality rate	0.005** (0.0018)	0.006*** (0.0015)		0.006*** (0.0016)	0.007*** (0.0014)	0.004** (0.0017)
GDP/cap, PPP (ln)			− 0.262* (0.114)			
Regime type	0.012 (0.014)	0.011 (0.014)	0.008 (0.014)	0.009 (0.014)	0.006 (0.014)	0.009 (0.014)
Regime type squared	− 0.011*** (0.003)	− 0.012*** (0.003)	− 0.011*** (0.003)	− 0.012*** (0.003)	− 0.013*** (0.003)	− 0.013*** (0.003)
Total population (ln)	0.204*** (0.057)	0.271*** (0.047)	0.229*** (0.050)	0.278*** (0.047)	0.256*** (0.046)	0.284*** (0.049)
Dependency ratio						0.734** (0.277)
Missing regime data		− 0.621* (0.256)	− 0.382 (0.313)	− 0.626* (0.256)	− 0.696** (0.254)	− 0.573* (0.255)
Brevity of peace	1.920*** (0.296)	1.887*** (0.268)	1.808*** (0.260)	1.855*** (0.269)	1.948*** (0.266)	1.825*** (0.268)
Constant	− 6.870*** (0.874)	− 7.409*** (0.759)	− 4.484** (1.483)	− 6.370*** (0.513)	− 6.832*** (0.935)	− 6.200*** (0.499)
N	5,331	7,640	6,252	7,640	7,640	7,518
Log likelihood	− 646.99	− 809.25	− 724.32	− 807.96	− 811.86	− 804.99
Pseudo-R^2	0.086	0.101	0.097	0.103	0.098	0.103

*$p<.05$, **$p<.01$, ***$p<.005$. Standard errors in parentheses.

structure equal to the year 2000 median for developed countries, all other variables at mean (Model 2).[12] As illustrated in Model 3, the substitution of IMR for a more conventional development indicator, a log-transformed[13] measure of PPP adjusted GDP per capita, has only a marginal impact on the results and reduces the sample by close to 20%.

There is no support for Huntington's expectation that there is a threshold level for youth bulges to generate domestic armed conflict.[14] The squared term for youth bulges in Model 4 is not significant, indicating that the effect of youth bulges on conflict is monotonic. There is, on the contrary, strong support for the suspicion that previous studies by Fearon and Laitin (2003) and Collier and Hoeffler (2004) may have failed to find significant effects due to a flawed youth bulge measure. If their measurement[15] is applied to the model, youth bulges appear to be unrelated to conflict (Model 5). However, when introducing the dependency ratio and an interaction term between youth bulges and the dependency ratio into the equation (Model 6), the youth bulge measure becomes clearly significant, as do both of the other terms. Youth bulges in the context of continued high fertility and high dependency make countries increasingly likely to experience armed conflict (consistent with H2), while countries that are well underway in their demographic transitions are likely to experience a "peace dividend." The measurement employed by Fearon and Laitin (2003) and Collier and Hoeffler (2004) appears to conceal these diametrically opposite effects of age structure.

The control variables generally behave as expected. Higher levels of development, whether measured by IMR or GDP per capita, significantly reduce the risk of armed conflict. Political regime type appears to be associated with armed conflict in a fashion consistent with previous findings (e.g., Hegre et al., 2001). The statistically significant squared regime term suggests that there is indeed an inverse U-shaped relationship between regime type and conflict, meaning intermediary regimes are more conflict prone than democracies and autocracies. Democracies and autocracies do not have a significantly different risk of conflict. Total population size is clearly associated with conflict propensity. This effect may primarily be interpreted as a proxy for country size. The larger the country, the greater is the geographical area that a state has to keep together, and possibly also the greater ethnic and religious heterogeneity.[16] Fearon and Laitin (2003:81) argue that a large population makes it more difficult for regimes to keep tight control, and that it also increases the number of potential rebel recruits. They find that population size matters even when controlling for ethnic diversity (2003:85). The missing regime data indicator is negative and statistically significant in several models, suggesting that units of analysis with imputed mean value (0) exhibit a significantly lower risk of conflict than units that originally have the mean value. This is not surprising as 0 is also the value for "perfect semi-democracies," the regimes that experience the greatest risk of conflict. Many of the countries that have been assigned this value are likely to be either more democratic or more autocratic, and hence be less prone to conflict than "true" semi-democracies. Finally, as confirmed by several previous studies, recent conflict history appears to be an important predictor of a new conflict onset.

[12] In year 2000, the age groups of 15–24 made up 17% or less of the total adult population in almost all developed countries, the median being 15%. The same year, 44 developing countries experienced youth bulges of 35% or above.

[13] If the term is not log-transformed, the results are virtually unchanged.

[14] Neither is there such a threshold effect for the other two forms of political violence.

[15] Fearon and Laitin (2003) and Collier and Hoeffler (2004) measure the male youth population over total population. Including both sexes, as applied here, produces only a marginally different measure.

[16] The effect is clearly diminishing with greater size. If the term is not log-transformed it is consistently insignificant.

The Contextual Factors of the Youth-Conflict Nexus

If youth bulges increase the likelihood of armed conflict, how and why do they matter? Table 2 presents the five different interactions between youth bulges and contextual factors suggested above. Among the hypothesized interactions, only H5 appears to be supported. The expectation that youth bulges interacting with economic hardships would increase the likelihood of conflict does not hold for this sample. Youth bulges and inverted long-term per capita economic growth are insignificantly related to conflict, and the term is surprisingly negative (Model 7).[17] The interaction between youth bulges and dependency ratios points in the other, expected direction (Model 8), but is marginally insignificant. The results from Models 7 and 8 do not indicate that youth bulges increase the risk for armed conflict during periods of economic decline in particular. However, the two variables employed here are rather crude measures of what I aim to capture, and an indicator more directly related to the economic hardship of youth bulges, such as youth unemployment rates, might have fared better. While the interaction between youth bulges and regime type (Model 9) is insignificant, the interaction with the squared regime term proposes an interesting relationship. The effect of youth bulges appears to be greater in the most autocratic regimes, but also in the most democratic regimes. Neither of the interactions with expansions in tertiary education or urban growth are statistically significant, but both are positive, and the interaction between youth bulges and urban growth is borderline insignificant.[18] The single term for low per capita economic growth is strongly associated with an increased risk of conflict, while expansions in tertiary education and urban growth are associated with a reduced conflict propensity.

Youth Bulges, Terrorism, and Riots

Although the terrorism and the riots/demonstrations models have to be interpreted carefully, the general picture from Table 3 is that the results largely support the youth bulge hypothesis (H1). Youth bulges interacting with negative long-term per capita economic growth[19] and with expansion in tertiary education are strongly associated with increased risks of terrorism, supporting H3 and H4. Regime type, dependency ratios, and urbanization do not seem to be important contextual factors for the relationship between youth bulges and terrorism. But as for armed conflict, the interaction between youth bulges and urbanization is borderline insignificant. Among the control variables, it is most noteworthy that a high level of development is strongly associated with both terrorism and riot events. This may partly reflect that data are skewed toward countries with better news reporting of terrorist events, among them presumably most developed countries. It could potentially also reflect a diverging terminology, where activities defined as terrorism in developed countries are considered part of armed, organized conflict in developing countries. To the extent that this finding has a substantive basis, terrorism may be considered as the preferred strategy of violent opposition groups in rich countries. Developed states generally have a greater capacity to crush conventional forms of violent political conflict.

Youth bulges also appear to increase the risk of rioting and violent demonstrations, but few of the interactions are statistically significant. Neither economic

[17] An interaction between youth bulges and short-time economic growth rates provides a similar negative, insignificant result.

[18] An interaction term between youth bulges, urban growth and per capita economic decline, as suggested by Goldstone (1991), was not significantly related to domestic armed conflict or to the other two forms of political violence.

[19] Short-term economic growth is a highly significant predictor of terrorism events, but the interaction between short-term growth and youth bulges is not statistically significant.

TABLE 2. Risk of Armed Conflict 1950–2000 (Full Sample)

	Model 7	*Model 8*	*Model 9*	*Model 10*	*Model 11*
Explanatory variables					
Youth bulges	0.042* (0.018)	0.045* (0.020)	− 0.012 (0.026)	0.076 (0.043)	0.047* (0.020)
Youth bulges × GDP/cap growth (inverted, 5 years average)	− 0.002 (0.004)				
Youth bulges × dependency ratio		0.077 (0.041)			
Youth bulges × regime type			− 0.002 (0.003)		
Youth bulges × regime type, squared			0.0013** (0.0005)		
Youth bulges × tertiary education growth				0.006 (0.004)	
Youth bulges × urban growth					0.011 (0.006)
Control variables					
Infant mortality rate	0.005*** (0.0015)	0.005*** (0.0017)	0.005*** (0.0014)	0.012** (0.004)	0.010*** (0.002)
Regime type	0.011 (0.014)	0.011 (0.014)	0.082 (0.085)	0.017 (0.025)	0.017 (0.015)
Regime type squared	− 0.012*** (0.003)	− 0.013*** (0.003)	− 0.052*** (0.016)	− 0.005 (0.006)	− 0.013*** (0.003)
Total population (ln)	0.283*** (0.047)	0.283*** (0.048)	0.282*** (0.047)	0.303*** (0.103)	0.278*** (0.054)
GDP/cap growth (inverted, 5 years average)	0.070*** (0.023)				
Dependency ratio		0.269 (0.291)			
Tertiary education growth				− 0.057* (0.025)	
Urban growth					− 0.066* (0.031)
Missing regime data	− 0.613* (0.275)	− 0.588* (0.255)	− 0.590* (0.257)	0.027 (0.724)	− 0.521 (0.311)
Missing GDP growth data	0.061 (0.205)				
Brevity of peace	1.806*** (0.250)	1.840*** (0.269)	1.840*** (0.268)	1.323* (0.612)	1.762*** (0.301)
Constant	− 6.278*** (0.499)	− 6.310*** (0.508)	− 6.096*** (0.486)	− 7.287*** (1.144)	− 6.477*** (0.574)
N	7,640	7,518	7,640	1,926	5,744
Log likelihood	− 804.81	− 806.26	− 805.73	− 202.96	− 633.19
Pseudo-R^2	0.106	0.102	0.105	0.111	0.107

*$p<.05$, **$p<.01$, ***$p<.005$. Standard errors in parentheses.

TABLE 3. Terrorism, Rioting and Violent Demonstrations 1984–1995

	Terrorism				*Rioting and Violent Demonstrations*	
	Model 1	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*
Explanatory variables						
Youth bulges	0.012 (0.009)	0.038* (0.017)	0.035*** (0.011)	0.022* (0.011)	0.063** (0.023)	0.046* (0.023)
Youth bulges × GDP/cap growth (inverted, 5 years average)	0.005*** (0.001)					
Youth bulges × dependency ratio					0.070* (0.034)	
Youth bulges × regime type		− 0.0004 (0.001)				
Youth bulges × regime type, squared		− 0.0003 (0.0002)				
Youth bulges × tertiary education growth			0.003** (0.001)			0.0008 (0.002)
Youth bulges × urban growth				0.006 (0.003)		
Control variables						
Infant mortality rate	− 0.009*** (0.002)	− 0.009*** (0.002)	− 0.009*** (0.002)	− 0.009*** (0.002)	− 0.014*** (0.004)	− 0.011*** (0.004)
Regime type	− 0.005 (0.006)	0.010 (0.026)	0.009 (0.007)	0.0003 (0.006)	0.020 (0.012)	0.046*** (0.015)
Regime type, squared	0.0004 (0.001)	0.009 (0.007)	− 0.0007 (0.002)	− 0.0005 (0.001)	0.003 (0.003)	− 0.0005 (0.004)
Total population (ln)	0.356*** (0.033)	0.364*** (0.032)	0.358*** (0.041)	0.344*** (0.032)	0.520*** (0.058)	0.508*** (0.073)
GDP/cap growth (inverted, 5 years average)	0.021* (0.009)					
Dependency ratio					0.331 (0.332)	
Tertiary education growth			− 0.001 (0.005)			0.009 (0.011)
Urban growth				− 0.008 (0.013)		
Number of violent events previous year	0.006*** (0.0005)	0.007*** (0.0005)	0.005*** (0.0006)	0.007*** (0.0005)	0.030*** (0.008)	0.039* (0.016)
Constant	− 2.626*** (0.336)	− 2.778*** (0.343)	− 2.278*** (0.427)	− 2.655*** (0.349)	− 5.559*** (0.608)	− 5.067*** (0.779)
N	1,384	1,470	868	1,440	1,470	868
Number of countries	152	158	99	153	158	99
Log likelihood	− 3,887.44	− 4,111.36	− 2,572.35	− 4,028.17	− 1,267.30	− 801.61

*$p<0.05$, **$p<0.01$, ***$p<0.005$. Standard errors in parentheses.

growth rates, regime type, expansions in tertiary education or urbanization appear to interact with youth bulges to increase the risk of riots and violent demonstrations. The interaction between youth bulges and the dependency ratio (H2) is significant and positive, indicating that the risk of such low-intensity violence may decrease when countries experience declining fertility rates.

Robustness of the Models

The findings above are robust over a wide variety of model specifications. Several operationalizations of the dependent conflict onset variable have been attempted. Allowing for longer (5 years) or shorter (1 year) spells of peace before coding a new onset of the same conflict produces virtually identical results.[20] When restricting the armed conflict models to only include onsets of civil wars with at least 1,000 battle-related deaths per year, excluding low-intensity conflict, the youth bulge measure loses statistical significance in the basic model.[21] This may be yet another reason why Fearon and Laitin (2003) and Collier and Hoeffler (2004), both employing higher-intensity conflict data than this study, do not find any effect of youth bulges.[22]

Two central design decisions significantly moderate the estimated effect of youth bulges on armed conflict, underscoring the robustness of the results. When using a different control for time dependency in the armed conflict models by substituting the decaying function for time as previous conflict with a peace-year count and cubic splines as suggested by Beck, Katz, and Tucker (1998), the statistical effect of youth bulges becomes increasingly significant in virtually all models. Similarly, the effect of youth bulges is estimated to be stronger and more significant if following the conventional approach in the field is followed and the sample is restricted to only larger independent states, excluding political dependencies and small states. If either of these design decisions were to be altered, the interactions between youth bulges and dependency ratio and urban growth would become significant in Models 8 and 11, respectively. A control for country-specific fixed effects rendered the youth bulge term statistically significant despite the loss of approximately half of the sample due to lack of variation on the dependent variable.[23]

Summary

Identifying the structural causes of political violence potentially enables us to reduce the risk factors. This study has found that relatively large youth cohorts are associated with a significantly increased risk of domestic armed conflict, terrorism and riots/violent demonstrations. While factors like level of development and regime type are found to be more important explanations of violence, the effect of youth bulges is not negligible and appears too robust for different forms of violence as well as for model specifications.

Previous literature on youth bulges and political violence has focused both on the potential opportunities for violence represented by large cohorts, as well as on potential motives for violence caused by institutional crowding of youth. The general empirical relationship between youth bulges and political violence identified by this study (H1) is coherent with both perspectives and does not enable us to

[20] Some of the borderline insignificant interactions become statistically significant when a one-year spell of peace is chosen.

[21] However, in the splines model the term is still statistically significant.

[22] Collier and Hoeffler (2004) analyze only civil wars with at least 1,000 battle-related deaths per year, while Fearon and Laitin (2003) include conflicts with at least 1,000 killed over the course of the conflict, with a yearly average of at least 100, and at least 100 killed on each of the fighting sides.

[23] For a critique of the imposition of fixed effect controls on IR models with a binary dependent variable, see Beck and Katz (2001).

empirically distinguish between opportunity and motive. If the motive perspective were the dominant explanation for political violence, we should see a greater effect of youth bulges the lower the requirement for organization. While it is difficult to compare the effect between the models, youth bulges generally seem to increase the risk of all three forms of violence, with no apparent differences.

For the interaction effects involving economic performance (H2 and H3), the opportunity and motive perspectives yield similar predictions. Differences in performance for different levels of political violence may thus shed some light on the relative importance of the two perspectives. The interaction between youth bulges and low economic growth is clearly not affecting the risk of armed conflict, while it significantly increases the risk of terrorism (supporting H3). The interaction between youth bulges and high dependency burden is only significant for riots and violent demonstrations, supporting H2.[24] The greater relevance for low-intensity and more spontaneous violence may indicate that economic hardship is primarily important as a motivation for youth to engage in political violence. The remaining interactions are argued to primarily be indicators of motive. As expected in H4, strongly autocratic states are associated with a greater risk of conflict when they face a youth bulge. More surprisingly, large youth bulges seem to increase the risk of conflict also in highly democratic societies, possibly representing an extraordinary opportunity for conflict. The interaction between youth bulges and expansion in higher education (H5) is associated with a significantly increased risk of terrorism, also primarily speaking to the motive perspective, while urbanization (H6) appears to be less important.[25]

While youth bulges may be a current concern of governments, the relative risk of violence importance is expected to fade. The global youth share peaked in 1985 (Xenos and Kabamalan 2005:59), and has been declining since. But for the states that will experience high youth shares for years to come, especially in the Middle East, Africa, and parts of Asia, age composition may still warrant some caution. Rapidly declining fertility may provide opportunities for economic bonuses, possibly also contributing to pacifying large youth cohorts, but whether these opportunities are realized is determined by economic structural factors.

Although Huntington is right that fertility is dropping even in the Muslim world, many Muslim countries will continue to be plagued by the combination of high youth and dependency ratios for quite some time. The *Arab Human Development Report* (UNDP 2002) voices concern over the widespread economic stagnation in the Arab world, and the consequences for the large youth groups. Along with recent expansions in higher education in many Arab countries, this may provide conditions for high levels of terrorist activity. Thus, a policy recommendation of a recent report on development cooperation as a means to fight terrorism appears to hold much relevance: "Anti-terrorist development cooperation programming would be well advised to target the people who are most vulnerable to terrorist agitation, i.e., well-educated young men who are frustrated about the lack of opportunities in the developing world" (Kivimäki 2003:xv).

A factor that partly determines the violent potential of youth bulges is the access to emigration. Emigration works as a safety valve, and may mute the negative effects of large youth cohorts (Ware 2005). Moller (1968:242) argues that the large-scale migration from Europe to the U.S in the nineteenth century helped to prevent youth-generated violence in Europe in this period. While few if any countries today experience emigration rates similar to nineteenth century Europe, migration opportunities are likely to have prevented youth discontent and thus reduced the

[24] Although it is borderline insignificant for armed conflict in Model 8, and significant when using Collier's (2000) youth Bulge measure in Model 6.

[25] However, this relationship is borderline insignificant for both armed conflict and terrorism, suggesting that there may indeed be something to that claim.

risk of political violence in many developing countries. In a recent survey, almost half of all Arab youth expressed a desire to emigrate resulting from concerns over job opportunities and education (UNDP 2002). If migration opportunities are substantially restricted, developing countries that previously relied on exporting surplus youth may experience increased pressures from youth bulges accompanied by a higher risk of political violence.

Appendix A

TABLE A1. Descriptive Statistics

Variables	*N*	*Mean*	*SD*	*Minimum*	*Maximum*
Dependent variables					
Domestic armed conflict onset	9,183	0.02	0.14	0	1
Domestic armed conflict incidence	9,183	0.12	0.33	0	1
Terrorism events	2,058	12.75	31.20	0	390
Riot and violent demonstration events	2,058	0.54	2.21	0	66
Youth bulge variables					
Youth bulges, adult population	8,723	29.80	6.29	9.6	45
Youth bulges, total population	8,723	18.13	2.25	6.8	30
Control variables					
Total population (ln)	9,183	8.01	2.20	1.79	14.06
Infant mortality rate	8,797	79.61	58.53	2	264
GDP/cap, PPP (ln)	7,317	8.22	1.02	5.62	10.74
Regime type	6,317	− 0.36	7.70	− 10	10
Economic growth per capita, 5 years average	6,014	2.07	3.97	− 23	50
Urban growth	6,776	3.67	2.75	− 44.16	23.42
Dependency ratio	8,472	2.05	0.42	0.97	3.53
Growth in enrollment in tertiary education	2,209	8.67	10.47	− 13.6	122.9
Missing regime data	9,183	0.31	0.46	0	1
Missing GDP data	9,183	0.35	0.48	0	1
Brevity of peace	9,183	0.15	0.33	0	1

Appendix B

TABLE B1. Correlation Matrix for Explanatory Variables, Pearson's *r*

	Youth Bulges	*Total Population*	*IMR*	*GDP/ cap*	*Regime*	*Brevity of Peace*	*Dep. Ratio*	*Growth Tertiary Education*	*Urban Growth*	*Economic pc Growth*	*Missing Regime Data*	*Missing Economic Data*	*Dom. Conflict Incidence*	*Terrorism Events*
Total population	− 0.11													
IMR	0.52	− 0.02												
GDP/cap	− 0.58	− 0.25	− 0.58											
Regime	− 0.40	0.02	− 0.40	0.44										
Brevity of peace	0.22	0.27	0.18	− 0.26	− 0.05									
Dependency ratio	0.63	− 0.19	0.62	− 0.55	− 0.40	0.14								
Growth Te. education	0.23	− 0.14	0.27	− 0.13	− 0.27	0.00	0.32							
Urban growth	0.47	− 0.08	0.52	− 0.35	− 0.37	0.06	0.55	0.40						
Economic pc growth	− 0.09	0.01	− 0.08	0.15	0.06	− 0.10	− 0.12	0.08	− 0.04					
Missing regime	0.14	− 0.66	0.10	0.21	0.03	− 0.06	0.14	0.03	0.00	0.01				
Missing economic	0.08	− 0.36	0.15	0.11	− 0.07	− 0.04	0.07	0.00	0.01	− 0.01	0.55			
Domestic conflict In.	0.19	0.22	0.17	− 0.21	− 0.03	0.82	0.11	− 0.05	0.05	− 0.09	− 0.02	− 0.02		
Terrorism events	− 0.05	0.34	− 0.08	0.07	0.17	0.37	− 0.14	− 0.05	− 0.08	0.07	− 0.07	− 0.01	0.37	
Riot events	− 0.05	0.24	− 0.05	0.04	0.08	0.13	− 0.10	− 0.07	− 0.06	0.01	− 0.09	− 0.04	0.13	0.46

References

BECK, NATHANIEL, AND JONATHAN N. KATZ. (2001) Throwing Out the Baby with the Bath Water: A Comment on Green, Kim, and Yoon. *International Organization* 55:487–495.

BECK, NATHANIEL, JONATHAN N. KATZ, AND RICHARD TUCKER. (1998) Taking Time Seriously: Time-Series-Cross-Section Analysis with a Binary Dependent Variable. *American Journal of Political Science* 42:1260–1288.

BRAUNGART, RICHARD G. (1984) Historical and Generational Patterns of Youth Movements: A Global Perspective. *Comparative Social Research* 7:3–62.

BRENNAN-GALVIN, ELLEN. (2002) Crime and Violence in an Urbanizing World. *Journal of International Affairs* 56:123–146.

BRETT, RACHEL, AND IRMA SPECHT. (2004) *Young Soldiers: Why They Choose to Fight*. Boulder: Lynne Rienner.

BUHAUG, HALVARD, AND KRISTIAN S. GLEDITSCH. (2005) The Origin of Conflict Clusters: Contagion or Bad Neighborhoods? Paper presented at the Third European Consortium for Political Research General Conference, Budapest 8–10 September.

CHOUCRI, NAZLI. (1974) *Population Dynamics and International Violence: Propositions, Insights and Evidence*. Lexington: Lexington.

CINCOTTA, RICHARD P, ROBERT ENGELMAN, AND DANIELE ANASTASION. (2003) *The Security Demographic: Population and Civil Conflict After the Cold War*. Washington: Population Action International.

COLLIER, PAUL. (2000) Doing Well Out of War: An Economic Perspective. In *Greed & Grievance: Economic Agendas in Civil Wars*, edited by Mats Berdal and David M. Malone. Boulder: Lynne Rienner.

COLLIER, PAUL, LANI ELLIOTT, HÅVARD HEGRE, ANKE HOEFFLER, MARTA REYNAL-QUEROL, AND NICHOLAS SAMBANIS. (2003) *Breaking the Conflict Trap: Civil War and Development Policy*. Oxford: Oxford University Press.

COLLIER, PAUL, AND ANKE HOEFFLER. (1998) On Economic Causes of Civil War. *Oxford Economic Papers* 50:563–573.

COLLIER, PAUL, AND ANKE HOEFFLER. (2004) Greed and Grievance in Civil War. *Oxford Economic Papers* 56:563–595.

EASTERLIN, RICHARD A. (1987) Easterlin Hypothesis. In *The New Palgrave: A Dictionary of Economics*, Vol. 2, edited by John Eatwell, Murray Millgate and Peter Newman. New York: Stockton.

ELBADAWI, IBRAHIM, AND NICHOLAS SAMBANIS. (2000) Why Are There So Many Civil Wars in Africa? Understanding and Preventing Violent Conflict. *Journal of African Economies* 9:244–269.

ESTY, DANIEL C., JACK A. GOLDSTONE, TED ROBERT GURR, BARBARA HARFF, MARC LEVY, GEOFFREY D. DABELKO, PAMELA SURKO, AND ALAN N. UNGER. (1998) *State Failure Task Force Report: Phase II Findings*. McLean: Science Applications International.

FEARON, JAMES D., AND DAVID D. LAITIN. (2003) Ethnicity, Insurgency, and Civil War. *American Political Science Review* 97:75–90.

FENG, YI, JACEK KUGLER, AND PAUL J. ZAK. (2000) The Politics of Fertility and Economic Development. *International Studies Quarterly* 44:667–693.

GATES, SCOTT. (2002) Recruitment and Allegiance: The Microfoundations of Rebellion. *Journal of Conflict Resolution* 46:111–130.

GLEDITSCH, NILS PETTER, PETTER WALLENSTEEN, MIKAEL ERIKSSON, MARGARETA SOLLENBERG, AND HÅVARD STRAND. (2002) Armed Conflict 1946–2001: A New Dataset. *Journal of Peace Research* 39:615–637.

GOLDSTEIN, JOSHUA. (2001) *War and Gender: How Gender Shapes the War System and Vice Versa*. Cambridge: Cambridge University Press.

GOLDSTONE, JACK A. (1991) *Revolution and Rebellion in the Early Modern World*. Berkeley: University of California Press.

GOLDSTONE, JACK A. (2001) Demography, Environment, and Security. In *Environmental Conflict*, edited by Paul F. Diehl and Nils Petter Gleditsch. Boulder: Westview.

GURR, TED ROBERT. (1970) *Why Men Rebel*. Princeton: Princeton University Press.

HARBOM, LOTTA, AND PETER WALLENSTEEN. (2005) Armed Conflict and Its International Dimensions, 1946–2004. *Journal of Peace Research* 42:623–635.

HAUGE, WENCHE, AND TANJA ELLINGSEN. (1998) Beyond Environmental Scarcity: Causal Pathways to Conflict. *Journal of Peace Research* 35:299–317.

HEGRE, HÅVARD, TANJA ELLINGSEN, SCOTT GATES, AND NILS PETTER GLEDITSCH. (2001) Toward a Democratic Civil Peace? Democracy, Political Change, and Civil War, 1816–1992. *American Political Science Review* 95:33–48.

Henderson, Errol A., and David J. Singer. (2000) Civil War in the Post-Colonial World, 1946–92. *Journal of Peace Research* 37:275–299.

Heston, Alan, Robert Summers, and Bettina Aten. (2002) Penn World Table, Version 6.1. Center for International Comparisons at the University of Pennsylvania (CICUP). ⟨http://pwt.econ.upenn.edu/php_site/pwt_index.php⟩, October 1, 2004.

Heuveline, Patrick. (2001) Demographic Pressure, Economic Development, and Social Engineering: An Assessment of Fertility Declines in the Second Half of the Twentieth Century. *Population Research and Policy Review* 20:365–396.

Hudson, Valerie M., and Andrea M. den Boer. (2004) *Bare Branches: The Security Implications of Asia's Surplus Male Population*. Cambridge: MIT Press.

Huntington, Samuel P. (1996) *The Clash of Civilizations and the Remaking of World Order*. New York: Simon & Schuster.

Kahl, Colin H. (1998) Population Growth, Environmental Degradation, and State-Sponsored Violence: The Case of Kenya, 1991–93. *International Security* 23:80–119.

Kaplan, Robert D. (1994) The Coming Anarchy. *Atlantic Monthly* 273:44–76.

Kelley, Allen C. (2001) The Population Debate in Historical Perspective: Revisionism Revised. In *Population Matters: Demographic Change, Economic Growth, and Poverty in the Developing World*, edited by Nancy Birdsall, Allen C. Kelley and Steven W. Sinding. New York: Oxford University Press.

Kelley, Allen C., and Robert M. Schmidt. (2001) Economic and Demographic Change: A Synthesis of Models, Findings, and Perspectives. In *Population Matters: Demographic Change, Economic Growth, and Poverty in the Developing World*, edited by Nancy Birdsall, Allen C. Kelley and Steven W. Sinding. New York: Oxford University Press.

King, Gary, and Langche Zeng. (2001) Improving Forecasts of State Failure. *World Politics* 53: 623–658.

Kivimäki, Timo. (2003) Executive Summary. In *Development Cooperation as an Instrument in the Prevention of Terrorism*, edited by Timo Kivimäki. Copenhagen: The Royal Danish Ministry of Foreign Affairs/Nordic Institute of Asia Studies.

Korenman, Sanders, and David Neumark. (1997) *Cohort Crowding and Youth Labor Markets: A Cross-National Analysis*, Working Paper 6031. Cambridge, MA: National Bureau of Economic Research.

Kravdal, Øystein. (2002) Education and Fertility in Sub-Saharan Africa: Individual and Community Effects. *Demography* 39:233–250.

Kögel, Tomas. (2005) Youth Dependency and Total Factor Productivity. *Journal of Development Economics* 76:147–173.

LeBillon, Philippe. (2001) The Political Ecology of War: Natural Resources and Armed Conflicts. *Political Geography* 20:561–584.

Lia, Brynjar. (2005) *Globalisation and the Future of Terrorism: Patterns and Predictions*. London: Routledge.

Lujala, Päivi, Nils Petter Gleditsch, and Elisabeth Gilmore. (2005) A Diamond Curse? Civil War and a Lootable Resource. *Journal of Conflict Resolution* 49:538–562.

Machunovich, Diane J. (2000) Relative Cohort Size: Source of a Unifying Theory of Global Fertility Transition? *Population and Development Review* 26:235–261.

Marshall, Monty G., and Keith Jaggers. (2000) *Polity IV Project: Political Regime Characteristics and Transitions, 1800–1999*. University of Maryland, MD: CIDCM. ⟨http://www.cidcm.umd.edupolity/index.html⟩.

Mesquida, Christian G., and Neil I. Wiener. (1996) Human Collective Aggression: A Behavioral Ecology Perspective. *Ethology and Sociobiology* 17:247–262.

Moller, Herbert. (1968) Youth as a Force in the Modern World. *Comparative Studies in Society and History* 10:238–260.

Neapolitan, Jerome L. (1997) *Cross-National Crime: A Research Review and Sourcebook*. Westport: Greenwood.

Neumayer, Eric. (2003) Good Policy Can Lower Violent Crime: Evidence from a Cross-National Panel of Homicide Rates, 1980–97. *Journal of Peace Research* 40:619–640.

Neumayer, Eric. (2004) The Impact of Political Violence on Tourism: Dynamic Cross-National Estimation. *Journal of Conflict Resolution* 48:259–281.

Raknerud, Arvid, and Håvard Hegre. (1997) The Hazard of War. Reassessing the Evidence of the Democratic Peace. *Journal of Peace Research* 34:385–404.

Sambanis, Nicholas. (2002) A Review of Recent Advances and Future Directions in the Quantitative Literature on Civil War. *Defence and Peace Economics* 13:215–143.

Sen, Amartya. (1998) Mortality as an Indicator of Economic Success and Failure. *Economic Journal* 108:1–25.

SMALL, MELVIN, AND DAVID J. SINGER. (1982) *Resort to Arms: International and Civil Wars, 1816–1980*. Beverly Hills: Sage. An extended list up to 1997. Available at: ⟨http://pss.la.psu.edu/intsys.html⟩.

DE SOYSA, INDRA. (2002) Paradise Is a Bazaar? Greed, Creed, and Governance in Civil War, 1989–99. *Journal of Peace Research* 39:395–416.

TOSET, HANS PETTER WOLLEBÆK, NILS PETTER GLEDITSCH, AND HÅVARD HEGRE. (2000) Shared Rivers and Interstate Conflict. *Political Geography* 19:971–996.

URDAL, HENRIK. (2005) People vs. Malthus: Population Pressure, Environmental Degradation, and Armed Conflict Revisited. *Journal of Peace Research* 42:417–434.

WARE, HELEN. (2005) Demography, Migration and Conflict in the Pacific. *Journal of Peace Research* 42:435–454.

WILLIAMSON, JEFFREY G. (2001) Demographic Change, Economic Growth, and Inequality. In *Population Matters: Demographic Change, Economic Growth, and Poverty in the Developing World*, edited by Nancy Birdsall, Allen C. Kelley and Steven W. Sinding. New York: Oxford University Press.

WINCKLER, ONN. (2002) The Demographic Dilemma of the Arab World: The Employment Aspect. *Journal of Contemporary History* 37:617–636.

XENOS, PETER. (2004) Demographic Forces Shaping Youth Populations in Asian Cities. In *Youth, Poverty, and Conflict in Southeast Asian Cities*, edited by Lisa M. Hanley, Blair A. Ruble, Joseph S. Tulchin and Diana H. Varat. Washington: Woodrow Wilson International Center for Scholars.

XENOS, PETER, AND MIDEA KABAMALAN. (2005) A Comparative History of Age Structure and Social Transitions Among Asian Youth. Springer Series on International Studies in Population. In *Population, Resources and Development: Riding the Age Waves.*, Vol 1, edited by Shripad Tuljapulkar, Ian Pool and Vipan Prachuabmoh. New York: Springer.

ZAKARIA, FAREED. (2001) The Roots of Rage. *Newsweek* 138:14–33.

UN. (annual) *Demographic Yearbook*. New York: United Nations.

UNDP. (2002) *The Arab Human Development Report 2002: Creating Opportunities for Future Generations*. Amman: United Nations Development Program.

UN. (1999) *World Population Prospects: The 1998 Revision*. New York: United Nations.

USAID. (2003) *Global Education Database,* Version 4. ⟨http://qesdb.cdie.org/ged/index.html⟩

WORLD BANK. (2003) *World Development Indicators. CD-Rom*. Washington: World Bank.