



## The impact of psychological trauma on wages in post-conflict Bosnia and Herzegovina



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### ABSTRACT

In the last three decades, armed conflict has increasingly been fought among civilian populations, resulting in greater physical and mental tolls. Soldiers returning from combat with psychological trauma are now receiving medical and policy attention for reintegration into the workforce. However, there is little attention on the impacts and options available to civilians who may face similar problems achieving labor force success after exposure to war-related trauma. Using the Bosnia and Herzegovina Living Standards Measurement Survey for years 2001–2004, we study wage attainment for 7659 respondents in relation to a series of psychological trauma measures which correspond to those used in PTSD diagnosis. In standard OLS regression, all subcomponents of PTSD have a negative impact; however, once unobserved individual heterogeneity is taken into account, some of the individual elements of psychological trauma have positive impacts on wage attainment. This is one of the first studies to find evidence of Posttraumatic Growth using information beyond psychometric instruments. The impact of the PTSD condition itself is insignificant in both models, and we do not find evidence of selection bias. We determine that the traditional means of predicting wages in labor economics are relevant in a post-conflict environment.

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### Introduction

In the aftermath of conflict, many studies have been conducted on how to repair capital, whether physical (Giovannetti, 2009; OECD, 2009), human (Collier, 2003; León, 2010), or social (Colletta & Cullen, 2002; Collier, 2002, pp. 19–41). Much of the work in human capital, however, has been focused on either the emigration or “brain drain” of the conflict area (Schierup, 1995; Straubhaar, 2000; Vuković, 2005) or the impacts on the educational system (Justino, 2011, pp. 1–17; Shemyakina, 2011), which affects the accumulation of human capital in the future. Existing human capital can also suffer damage and wear; however, the economic literature has put little attention on contemporaneous effects and re-establishment policies of these potential workers following civil conflict, especially in an international and non-migratory context. Fields such as medicine have studied the lingering psychological impacts of conflict to a great extent; a growing body of work discussing civilian post-traumatic stress disorder (PTSD) mirrors the necessary shift that battlefield

medicine needs to take when war is no longer confined to formal battlefields (Mollica, 2000; Shapinsky, Rapport, Henderson, & Axelrod, 2005). However, the consequences of unnoticed or poorly measured damage in the productive capacities of the workforce itself may be dire for both the individual and the economy at large.

This study uses the World Bank Bosnia and Herzegovina (BiH) Living Standards Measurement Survey, which is a longitudinal dataset from 2001 through 2004, to determine the impacts of conflict-related mental trauma on wages for individuals in the Republic of Bosnia and Herzegovina and Republika Srpska. The information between was collected September and November of each year by State Agency for Statistics for BiH – BHAS, the RS Institute of Statistics-RSIS, and the FBiH Institute of Statistics-FIS, with support from Department for International Development of the British Government (DfID), United Nations Development Program (UNDP), the Japanese Government, and the World Bank. The survey uses questions which are analogous to the DSM-IV instrument for Post-Traumatic Stress Disorder diagnosis, allowing us to draw reasonable conclusions about the impact of such trauma on wage rates and labor force participation; further, each individual component of the PTSD criterion is also tested to see if the impacts on labor market outcomes can be traced to any aspects of PTSD. Using a standard

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Mincerian approach, we evaluate whether these mental health indicators have any effect on average log monthly wages after controlling for socioeconomic and job characteristics, using a standard ordinary least squares approach as well as a panel fixed effect model to control for individual heterogeneity. We find that the classification of a PTSD-like condition has no impact on wage earnings, but that the different psychological components which comprise diagnosis have differing, and often significant, impacts. We also find that the negative impacts attributed to psychological trauma may be due to other elements of individual heterogeneity, since the coefficients on some measures of trauma are positive and significant when such factors are controlled using fixed effects regressions.

## Background

### *The conflict in Bosnia–Herzegovina*

The conflict in Bosnia and Herzegovina between April 1992 and December of 1995 can be considered a prototype for modern conflict (Andreas, 2004; Carballo et al., 2004; Martin, 2007). Presaged by economic difficulties and political unrest, violence spread throughout the population since civilians were often the intentional targets (Chossudovsky, 1997; Jung, 2003). In addition to the physical toll, however, the Bosnian War involved the largest contingent of mental health professionals used in a conflict up to that point, primarily due to the war's omnipresence in the lives of citizens (Mooren, de Jong, Kleber, & Ruvic, 2003). Up to 1 million people experienced mental trauma directly attributable to a war-related incident, with many more suffering from war-related mental trauma (Kozariæ-Kovaæia, Kocijan-Hercigonja, & Jambrošia, 2002).

As the Bosnian governments with the international financial community began post-war economic reconstruction, many programs and initiatives were created to separately address the employment crisis (Bayliss, 2005 Aug; Demirgüç-Kunt, Klapper, & Panos, 2011; Hartarska & Nadolnyak, 2008) and the mental health crisis (Laurie & Burton, 2005; Mooren et al., 2003; Pevalin & Robson, 2007). Several initiatives targeting employment in specific sectors or privatization became popular (Tiongson & Yemtsov, 2008), and although the rates of labor force participation increased, overall employment rates decreased, particularly in the private sector. However, there is a general lack of literature on the effectiveness of policy interventions for PTSD in relation to regained economic prospects (McCrone, Knapp, & Cawkill, 2003).

### *Mental health following civil conflict*

There have been several studies of mental health in post-war Bosnia, both in the aggregate sense and on subsets of the population. Powell, Butollo, and Hagl (2010) compare the mental health outcomes of women whose husbands are missing versus those with confirmed spousal death. Siwiec (2011) finds that Bosnian refugees that immigrate to the U.S. did not have higher levels of depression, but Craig, Sossou, Schnak, and Essex (2008) found in their study of 126 Bosnian refugees in the U.S. that 66% of them displayed symptoms of PTSD between 6 and 12 years after displacement. Rosner, Powell, and Butello's (2003) study of Sarajevo survivors finds significant levels of PTSD (18.6%) in the control group of random residents, compared to the 32.7% and 38.6% in medical and psychiatric treatment plans, respectively. Witnessing violence was found to increase the prevalence of psychological disorders such as depression and anxiety in displaced Bosnian youth (Angel, Hjern, & Ingleby, 2001; Sujoldzic, Perternel, Kulenovic, & Terzic, 2006). Notably, however, Slodnjak, Kos, and Yule (2002) found that youths with more symptoms of PTSD performed better academically than comparable students.

This unanticipated result is an example of a new empirical finding called Posttraumatic Growth (PTG), which is part of a larger scope of research that explores positive personal growth following adversity (for an excellent summaries of the literature, see Linley & Joseph, 2004; Zoellner & Maercker, 2006, and Meyerson, Grant, Carter, & Kilmer, 2011 for the literature on PTG in children, specifically). The underlying theory of PTG is that experiencing trauma causes damage to pre-trauma beliefs and structures, which then causes the individual to spend a great deal of time in self-evaluation (Calhoun, Cann, Tedeschi, & McMillan, 2000; Tedeschi & Calhoun, 1996; Tedeschi, Park, & Calhoun, 1998); this process of evaluation and rebuilding causes grief and distress, but also adaptive growth of both the self and the new lifestyle (Janoff-Bulman, 2002; Joseph & Linley, 2006). The traumatized person is able to rely on the support and archetypes of existing social and religious structures during their self-rebuilding process, emphasizing the continued and important role of support structures (both personal and mental health professionals) in recovery from trauma (Calhoun & Tedeschi, 2006; Helgeson, Reynolds, & Tomich, 2006; Prati & Pietrantonio, 2009; Tedeschi & Calhoun, 1996). Most of the research in this area, however, has used psychometric properties such as self-evaluation such as the PTG Inventory (Tedeschi & Calhoun, 1996) or the Stress-Related Growth Scale (Park, Cohen, & Murch, 1996) and not external indicators of PTG such as school or work performance. This paper makes a contribution to the PTG literature by studying personal growth using an external outcome measure (wages) versus psychometric variables which are often difficult to precisely measure. The results, that those with higher levels of trauma experience faster wage growth, supplement the findings of Powell, Rosner, Butollo, Tedeschi, and Calhoun (2003), who found little evidence of PTG in Sarajevo survivors, but also experienced difficulty with the suitability of the American-made psychometric testing instrument.

### *Mental health and labor market outcomes*

There is a significant subset of mental health work which observes the U.S. labor force outcomes for those suffering from PTSD and similar symptoms. Anderson and Mitchell (1992) found that military service increases the likelihood of many kinds of mental health and substance abuse, and these in turn negatively affect the employment decision and wage outcomes of U.S. veterans. Savoca and Rosenheck (2000), using cross-sectional information, found that U.S. veterans of the Vietnam War with PTSD diagnoses had both a lower likelihood of participating in the workforce and lower wages than those without PTSD. Smith, Schnurr, and Rosenheck (2005), also studying Vietnam veterans, found that those with PTSD symptoms were more likely to opt out, but that there were no wage impacts once occupation was controlled for. For Bosnia specifically, Mollica et al. (2001) found that refugees that emigrated were more traumatized, but had better mental health outcomes; this can be partially attributed to the access to an employment market and infrastructure that did not endure the conflict. Blight, Ekblad, Persson, and Ekberg (2006) interviewed Bosnian refugees in Sweden to assess the relationship between general mental health and unemployment, finding that unemployed men were generally unhappier (2006). Regardless of conflict location, the literature supports that the resumption of employment gives positive direction and purpose in addition to resources (Aycan & Berry, 1996).

## Methodology

### *Data description*

The primary data source is the World Bank Bosnia and Herzegovina (BiH) Living Standards Measurement Survey, administered

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