

Effects of the Global Economic Crisis and Public Spending On Income Distribution in Bosnia and Herzegovina

Naida Trkić-Izmirlija

Freelance Public Finance Management Expert, Sarajevo, Bosnia and Herzegovina
n_trkic@bih.net.ba

Adnan Efendić

School of Economics and Business in Sarajevo, Sarajevo, Bosnia and Herzegovina
adnan.efendic@efsa.unsa.ba

Abstract

This research focuses on the relationship between public spending and income inequality in Bosnia and Herzegovina (BiH). In our empirical strategy we rely on unique survey data used to establish a proxy for inequality over the observed period (2000-2010). Then, we investigate consequences of the contemporary global economic and financial crisis on income distribution. We find indications that the global economic crisis, with its BiH onset in 2009-2010, increased income inequality in BiH. Our findings also imply that increased public spending and improvement in the quality of institutions in BiH were supportive to reducing income inequality. Disaggregated analysis of public spending revealed that higher expenditures for social protection and capital spending are associated with lower income inequality. Contrary, higher expenditures for education are linked with higher income inequality. After examining several institutional indicators, we identify a particular importance of political stability in BiH as a determinant of income inequality.

Keywords: Global economic crisis; income inequality; Gini coefficient proxy; public spending, education expenditures; health expenditures; social protection expenditures; Bosnia and Herzegovina; Southeast Europe

Introduction

During the first years of the new millennium, macroeconomic indicators in countries of Southeast Europe largely resembled those of developed economies. With the onset of the global economic and financial crisis in 2008, the situation started changing. That is the period of widening income inequality in most European countries, primarily linked to factors lying behind the crisis (Watt 2009). While the effects of the crisis on developed economies have been explored relatively more, the effects on transition and developing countries, and more specifically those in the Southeast European (SEE) regionⁱ, are less known.

The main hypothesis tested in this research is that *the economic downturn which occurred in BiH as a result of the global crisis has introduced a structural break in income distribution by increasing income inequality*. In addition to testing this hypothesis, we aim to identify the effects of certain public spending policiesⁱⁱ on income distribution.

This research paper starts with a detailed investigation of existing applied research in this field of economics (Section 2), in particular, focusing on Southeast Europe. Building upon that, a methodological framework for conducting such analysis is designed, taking into account specifics of BiH (Section 3). In Section 4 a short overview of the fiscal situation (expenditures' volume, structure, trends etc.) in BiH is provided, and existing and new data on income distribution in BiH are presented. With this background, the empirical part of the research is presented (Section 5), reporting a descriptive analysis of the variables of interest (public spending variables, inequality and institutional variables), investigating relationships (correlations) among them and reporting some quantitative and qualitative results derived from a simple empirical modelling. Section 6 concludes this paper.

Literature review

Over the last decade, numerous authors have analysed the causes of inequality in income distribution, focusing their attention on public spending policies and often institutional determinants. We discuss several studies we consider most insightful.

Afonso et al. (2008; 2010) use a cross-country empirical research focusing on OECD countries to explain income distribution with overall public spending, education spending and performance, and institutional performance. Their findings confirm that public policies have a significant effect on income distribution, which happens most notably through social spending but also (albeit in an indirect way) through high quality education and sound economic institutions.

Gregorini and Longoni (2009) examine the link between public spending, political institutions and inequality, and test political, economic, demographic and social variables as potential determinants of public spending. They focus on developing countries over the time period 1970-2005, and using panel data analysis they find evidence that income distribution is indeed linked with public spending, which in turn depends on institutional characteristics.

Holzner (2011) also analyses the relationship between economic growth and inequality, while focusing on public spending. The author utilizes empirical data for fourteen Central and East European transition countries over the period 1998–2006, and confirms that countries with higher expenditures for social protection, health and economic affairs typically experience less inequality.

De Grigorio and Lee (2003) concentrate on how education affects income distribution. Based on a large sample of countries observed during a time period of three decades (1960-1990), the authors find evidence that educational factors (higher educational attainment and more equal distribution of education) play a significant role in better income distribution – the same finding reported by Afonso et al. (2010). They also find that social expenditures have a positive effect on income distribution. However, a significant proportion of cross-country income inequality identified in their research remains unexplained.

In their analysis of distributional effects of public spending, Schwarz and Ter-Minassian (2000) confirm that public spending can affect income distribution, through economic development and growth (first and foremost, qualitative aspects of growth). Further, the

authors point out the importance of political and institutional pressures, to the extent that political and institutional pressures and constraints hampering redistribution may affect distribution even more than policy design does. Accordingly, the authors recommend that, if public spending is aimed to affect income distribution, measures that have wide support are designed and scope for various interest groups to use expenditure policies as a way to pursue their own interests is limited.

Roine et al. (2009) investigate the long-run determinants of inequality in a panel data study covering the entire twentieth century. The authors report that different determinants of inequality (e.g. economic growth, financial development, banking crisis, trade openness and taxation) might have different influences on income distribution between different income groups. Another interesting finding is that the banking crisis seems associated with a reduced income share of the rich category. Their sample does not include SEE though.

Numerous existing studies support the hypothesis that public spending might affect income inequality and that spending changes together with the economic environment. Accordingly, public spending will usually change during an economic crisis as a consequence of the structural changes in the economic system (e.g., Afonso and Jalles 2012; Corsetti et al. 2012; Kollmann et al. 2012). Such changes in public spending are not expected only because of changes in public revenues and problems related to financing of expenditures, but also because of government responses and policies pursued primarily to stabilize the economic output. Hence, in the period of global economic downturn, we can expect variations in public spending, which may change income distribution.

There is also a good number of papers which specifically investigate the link between institutions and inequality, mainly finding that institutional inefficiency increases income inequality.

For example, Chong and Calderon (2000) report a cross-section empirical research between institutions and income distribution. The authors find a quadratic relation between institutions and income inequality (in other words, institutional quality is positively linked with income inequality in low-income countries, while for rich economies the link is negative). However, this research fails to establish any dynamic link between the variables of interest.

Carmingnani (2009) uses panel data and an endogenous system of three structural equations to investigate the links between institutional quality, government stability and income distribution. The author finds that less efficient institutions increase inequality and that greater inequality increases the probability of government termination.

Chong and Gradstein (2007) also investigate the relationship between institutional quality and inequality. The authors rely on a dynamic panel model estimated as a system GMM (generalised method of movements) to control for potential endogeneity caused by simultaneity. They find that bad institutions cause inequality (which is in line with economic theory). In addition, the authors identify a mutually reinforcing mechanism between these variables, i.e. they find evidence of simultaneity caused by reverse causality. Hence, greater inequality may explain to some extent weak institutional performance as well.

Finally, mindful that the financial sector was at the core of the crisis, Watt (2009) argues that its effect on income distribution could be negative and that income distribution could be affected through number of direct and indirect channels of influence. Although we can identify some key channels of influence, as Nolan (2009) points out, income inequality reflects a complex interaction of various, rarely short-rooted, factors. One of the most important direct channels of influence is raising unemployment, which increases poverty and widens income distribution (Nolan 2009; Watt 2009). Also, workers defend their jobs accepting lower wages, and governments generally support cuts in public sector wages in the time of deficit. All of these measures again might increase income inequality in the lower and the middle class. During the latest global economic crisis, a whole spectrum of policies was used to fight the recession. These policies affected not only growth, but also income distribution (Garcia-Penalosa 2010), which is another channel of influence worth investigating.

Methodological framework of the research

The research will be focused on Bosnia and Herzegovina (where necessary, other SEE countries will be examined for reference purposes). Wherever possible, the period examined shall include year's 1996-2010ⁱⁱⁱ. The research will be based on annual data since more frequent indicators are not available.

Our key empirical investigation will be based on time series analysis, constrained by a very small sample of maximum fifteen observations. This will be rather challenging as more advanced econometric modeling (e.g. panel analysis) is not feasible. We will estimate pairwise correlations among the variables of interest calculate their statistical significance and investigate whether there is an indication of certain relations between the variables. These results will motivate our deeper quantitative investigation that will be done through a simple time-series modeling in order to estimate causal links.

All empirical results should be treated with considerable caution though having in mind the limited time span and the general problem of data availability for BiH. To reduce the effect of these limitations, we shall complement official data through qualitative judgments, insider expertise and data that are not publicly available.

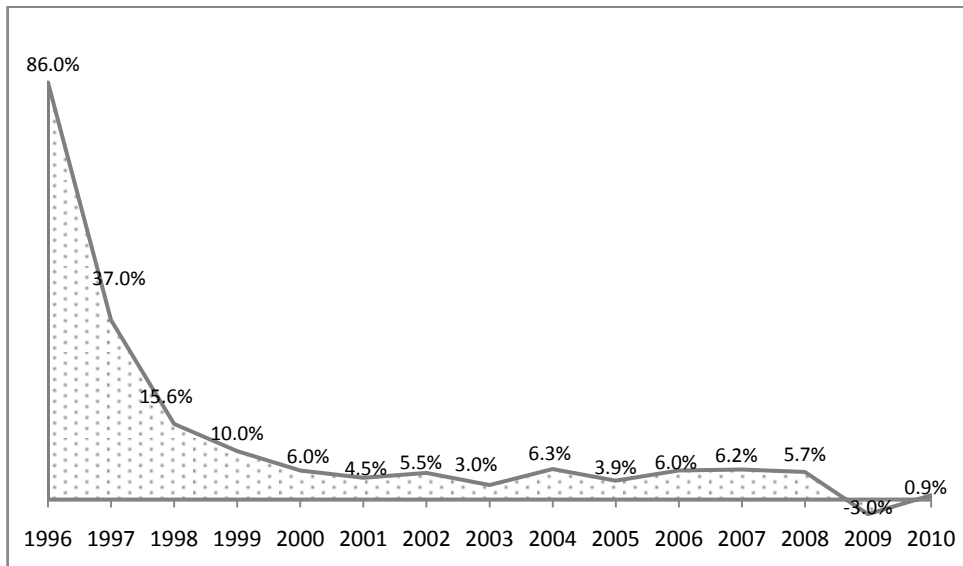
Contextual framework

1 Global economic crisis and Bosnia and Herzegovina

The global economic crisis, which started in most of the developed economies in 2008, hit the BiH with a one-year lag, i.e. in 2009. That was the year when post-war BiH registered for the first time a negative growth rate and a significant drop in most macroeconomic indicators (see Figure 1 below).

If we exclude the period immediately following the war, average real growth in BiH was around 5% during the last decade. With the onset of the crisis, the growth rate turned negative (-3.0% in 2009) indicating that BiH faced a recession in 2009. In the next year, the situation improved only slightly and the real growth rate for 2010 suggested a positive value of around 1%.

Figure 1. In 2009, the crisis put an end to BiH (real) GDP growth

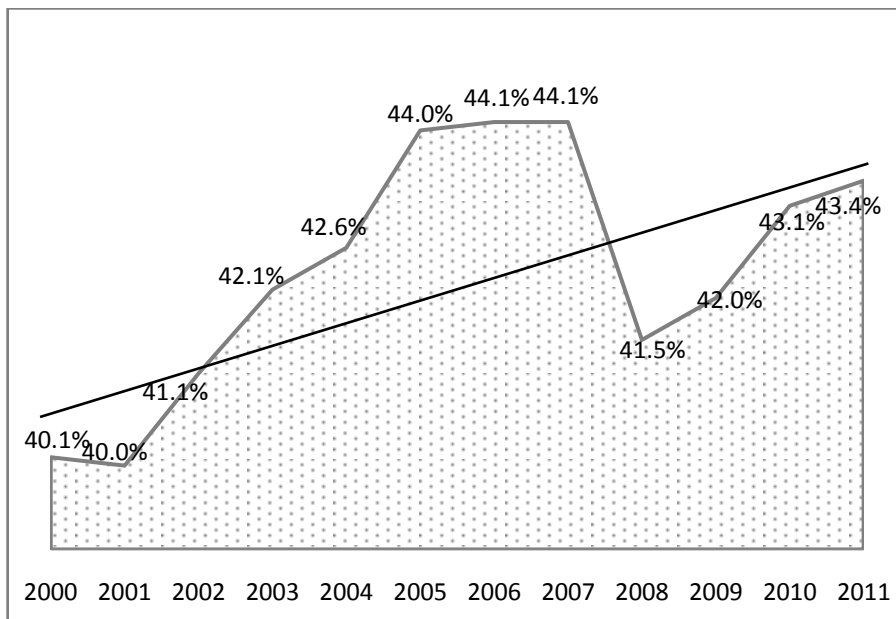


Source: CBBiH 2012

Similar to the trend in the growth of GDP, BiH faced twelve years of continuous increase in GDP/capita following the war. However, in 2008, the GDP/capita reached its peak and for the first time after the war, it started falling in 2009, falling further in 2010 (CBBiH 2012).

In the context of the real economy, the official unemployment rate increased in 2009 and 2010 (see Figure 3). Estimates of the International Labor Organization (ILO) report a lower rate but also show an increasing trend over those two years (from 25% in 2008 to 29.1% in 2010).

Figure 2. Following a short stabilization and a subsequent drop, unemployment (in % of labor force) started rising again in 2009



Source: BiH Directorate for Economic Planning (DEP), 2011

All in all, over the period of the global crisis, there was a significant drop in key macroeconomic indicators in BiH. Although growth and unemployment indicators showed a slightly positive change in 2010, it is hard to say that BiH witnessed significant improvement (which should normally be the case in a post-crisis period).

2 Public spending during the crisis

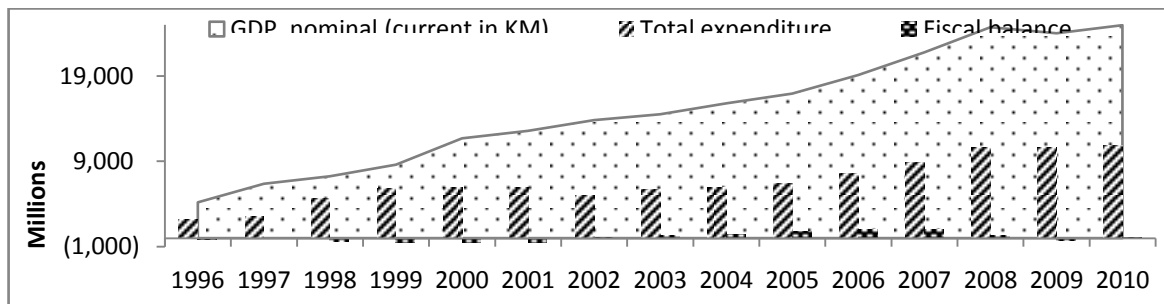
In line with existing research and theory, we expect the crisis to affect volume and structure of public spending, which should in turn affect income distribution. However, testing this in the BiH context is not simple. Reliable figures about public spending in BiH, and especially consolidated in a reasonable way and based on a methodology consistent throughout time, do not exist. Each of the fourteen governments in BiH^{iv} and almost 150 local self-governance units (municipalities) plan, execute and report their expenditures rather independently, and efforts to introduce unified and systematic reporting necessary to provide answers to questions such as ‘How much public money was spent overall?’ or ‘How much of that amount was spent on education, social protection or health?’ had only limited success.

In absence of such information, a significant part of this research had to be allocated to liaison with individual governments in BiH and collecting information about their total expenditures, expenditures for social protection^v, for health^{vi} and for education^{vii}. The results are presented in Table 1. While these figures should not be considered accurate, they are the best possible estimation based on fragmented and limited information available.

It was already mentioned that the BiH GDP experienced continuous growth prior to 2009. Total spending, on the other hand, seems to have followed its own, cyclical trend. While spending increased steadily until 2000, it fell before catching up again in 2002, rising ever since^{viii}. This trend does not follow the trend of revenues either - although BiH legislation stipulates that expenditures should not exceed revenues and financing, cash accounting and debt make it possible. So, until 2000, fiscal balance was continuously negative (i.e. expenditures were higher than the sum of revenues and financing), which reoccurred with the onset of the crisis in 2009.

On average, public expenditures were responsible for around 45% of the GDP throughout the fifteen years analysed. However, just like the total volume of expenditures, share of public expenditures in the GDP varied greatly over those fifteen years. Still, some stabilisation (at around 40%) could be seen over the last five years observed.

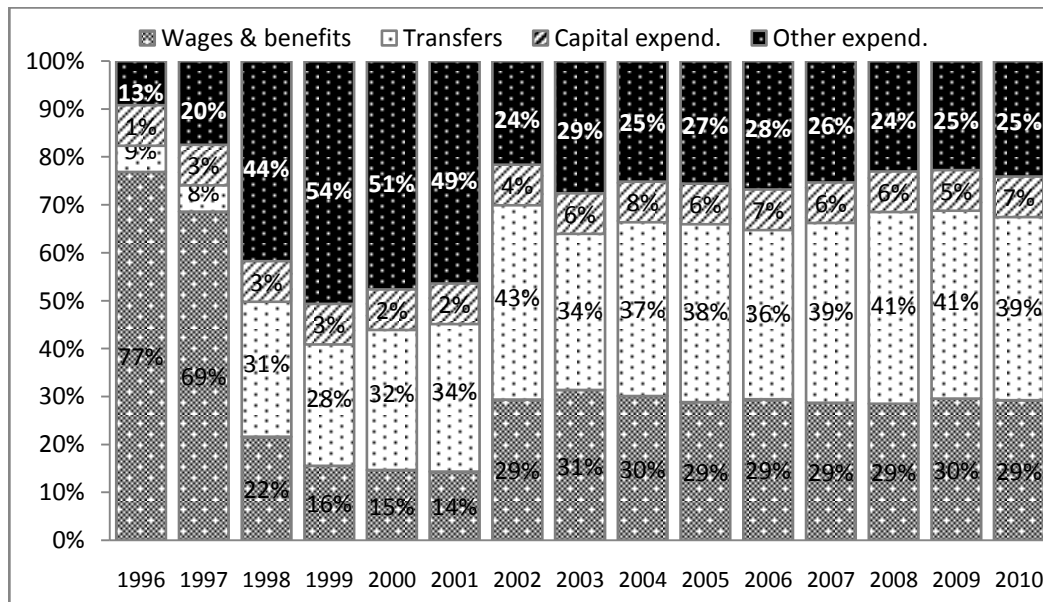
Figure 3. The public sector consumed almost half of the GDP over the last fifteen years. Yet, BiH governments have not responded to the crisis with restrictive fiscal policies



Source: CBBiH, DEP, IMF and World Data Bank, 1998-2011

Observing the structure of spending (Figure 4), we see that public expenditures in BiH have a predominantly re-current character and little funds are directed toward capital expenditures^{ix,x}. Immediately following the war, the largest share of the budget (around 70%) was spent on wages and benefits. This is not surprising since total expenditures were very low in international and historical comparison, while governments were staffing up and payment of wages and benefits is a contractual obligation. On transfers (to individuals, NGO's and state owned enterprises) less than 10% of expenditures were spent right after the war. On capital expenditures, as little as 1% and 3% were spent in 1996 and 1997 respectively. Major changes in the structure of expenditures were introduced in 1998 though. Wages and contributions dropped to 22% and less (but have 'recovered' in 2002 with 29% and have been growing ever since). Transfers increased to 36% on average (their growing trend remained until 2010) and capital expenditures increased to around 5%. The main determinants of these changes were post-war affairs (financing of defense, war veterans, reconstruction, etc.), transition to market economy and state-building efforts. More details on events that have taken place in BiH between 1996 and 2010, which may have had an impact on volume and structure of expenditures, are presented in Textbox 1 in the appendix.

Figure 4. Transfers play a key role in BiH budgets

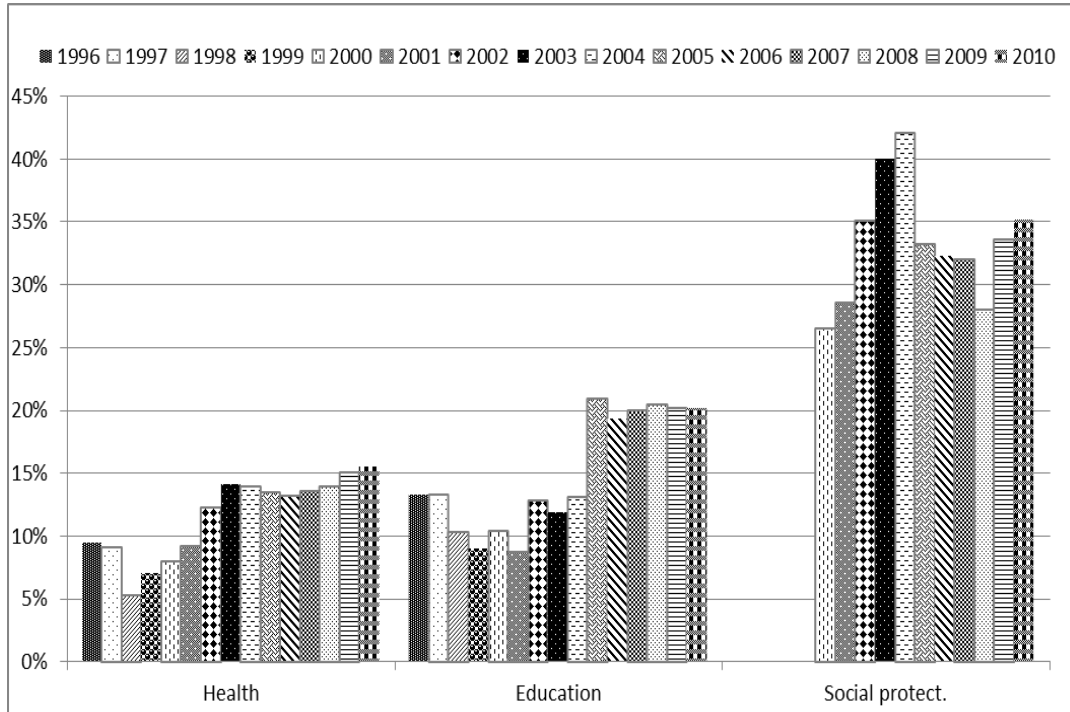


Sources: IMF's Article IV Reports and Selected Issues, 1998-2010

Having reviewed indicative trends and patterns in total expenditures, it is also worth reviewing those of the other three selected expenditure-related variables – expenditures for health, education and social protection. As introduced in the foregoing discussion, BiH expenditures are dominated by expenditures targeting social protection. Fiscal data are not available for the first four years of interest, but during the period between 2000 and 2010, social protection consumed one third of country's expenditures (from 2000 until 2004, this figure was lower but grew continuously - from 27% in 2000 to 42% in 2004. Following that, it dropped and started rising again, resulting in 35% of total expenditures in 2010). Health and education were allocated far smaller shares (on average 12% and 15% respectively between 1996 and 2010). Also, these two government functions seem to follow a different trend from that of social protection - both functions have started off

somewhat stronger in 1996 but dropped in 1998, and since then, both have been mainly growing, reaching 16% and 20% respectively in 2010. Figure 5 provides more information.

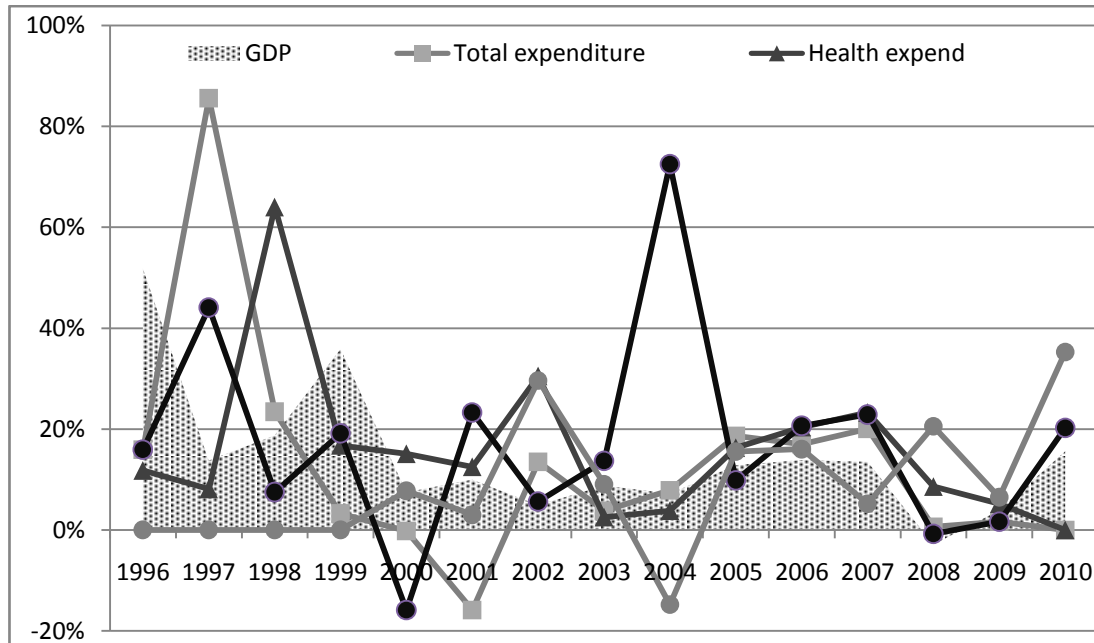
Figure 5. Health and education expenditures constitute very small portions of total expenditures, while social protection is put far more emphasis on



Sources: WHO (health), Council of Europe, EU, WB and BiH ministries of finance (education), WB, IBHI and BiH ministries of finance (social p.) and CBBiH, DEP and IMF (other exp.), 1998-2011

The described situation is quite different from that of other countries in Southeast Europe^{xi}. While the other eight SEE countries analysed have on average doubled their GDP during the period of observation (212%), in BiH, it has grown five times (495%), mainly as a result of reconstruction of the war-damaged economy. Growth in reported population was also stronger in BiH than elsewhere in the region (14% compared to 10%). Finally, differences could be observed also in the share of public expenditures in the GDP - while public consumption contributed to BiH GDP by 45% on average, in other countries of the region GDP was less driven by public consumption (32% on average). Of that, Bosnia and Herzegovina spent relatively more on health than other SEE countries (5.4% compared to 4.5%), while it spent the double on education (7.1% compared to 3.6% on average in other countries of the region).^{xii} Figure 6 shows the growth rates for public expenditures overall and expenditures for health, education and social protection, compared with nominal GDP growth.

Figure 6. While allocations for health, education, social protection and expenditures seem independent of GDP growth, it appears that two of them (for health and social protection) are related to growth in overall expenditures



Sources: WHO (health), Council of Europe, EU, WB and BiH ministries of finance (education), WB, IBHI and BiH ministries of finance (social p.) and CBBiH, DEP and IMF (other exp.), 1998-2011

As Figure 6 showed, it appears that initially, total expenditures grew counter-cyclically (i.e. in opposite relationship to the GDP growth). In 2004, the situation changed and they started following the GDP trend (which is the pattern one would expect, as public expenditures were almost half of the GDP during each year observed). Within that, education expenditures seem to have followed an independent trend until 2006, when they started taking into account the growth in total expenditures. Allocation for health expenditures mimicked the trend in total expenditures almost from the beginning (possibly, health allocations were determined based on a percentage of total expenditures and were adjusted using the same increment). Social protection expenditures seem to have followed the trend of total expenditures too, albeit less strictly than health expenditures.

From this analysis and the fact that reported population in BiH has not grown by more than 14% over the relevant period of time, we can conclude that changes in expenditures for human capital related government functions (education, health and social protection), which as the theory claims affect income distribution, were most likely not been based on population estimates or the economic situation, but were rather result of arbitrary decisions.

These relationships were concluded based on a simple visual analysis of the trends. Whether there is also evidence of statistically significant relationships among these variables, and most importantly between them and income inequality, will be discussed in the empirical part of this research paper (Section 5).

3 Income distribution in Bosnia and Herzegovina

3.1 Existing data about income distribution

There is very little information available about income distribution in BiH. Although different statistical sources report the Gini coefficient, it does not seem to go beyond three years. This circumstance represents an obstacle for any research dealing with income distribution in BiH, since no continuous variable exists that would allow econometric analysis and credible conclusions. Still, looking at the coefficient for these three years, we see a considerable increase over a short period of time, ranging from 0.28 (in 2001), over 0.35 (in 2004) to 0.37 (in 2007) (WB 2012). While these data do not allow us to say a lot about this indicator or to estimate the effect of the current global economic crisis on inequality in BiH, they do indicate that inequality in BiH has risen over the observed period.

Having in mind the aim of this research, we opt to rely on alternative sources of data and establish our own proxy for the Gini coefficient. Although poverty and income distribution are multidimensional phenomena (Ferreira 2011) and any measure of income distribution is at the best proxy, the novelty longitudinal data developed here should be able to provide further insights in origins of and trends in inequality in BiH.

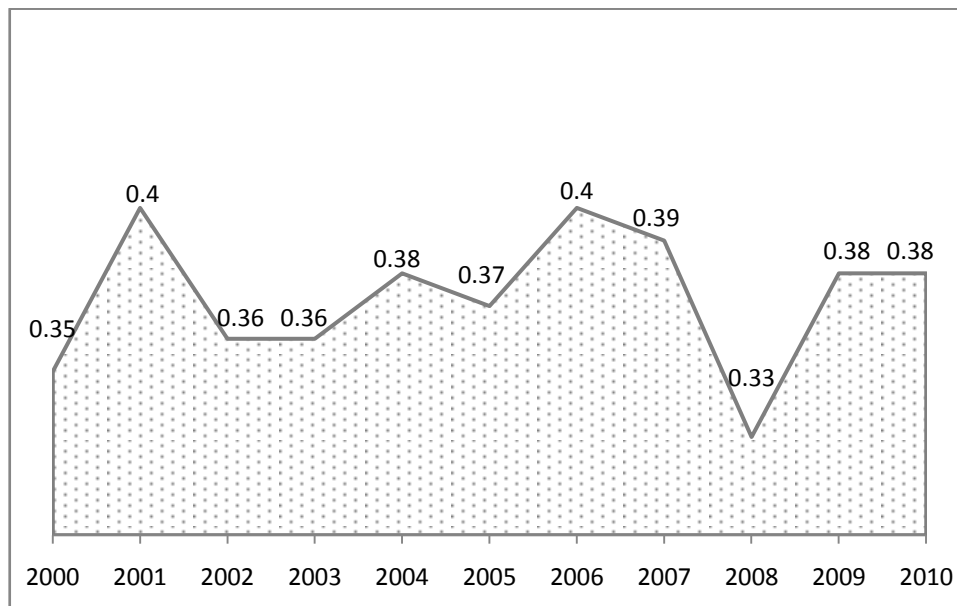
3.2 Establishing a proxy for income distribution

Having considered numerous sources which could help establish the necessary Gini coefficient proxy, we assessed the UNDP BiH Early Warning System (EWS) surveys database as most suitable. The EWS surveys were conducted on a quarterly, semi-annual or annual basis over the period 2000-2010, resulting in eleven years of continuous data. The sample used was representative of the BiH population (in terms of entities in BiH, different ethnicities, cantons, municipalities, urban-rural aspects, male-female and minority-majority respondents). The overall sample size was around 66,000 observations, giving around 6,000 observations per year on average. Finally, the used questionnaires contained one question which stood out as particularly suitable for proxying income distribution (details can be found in Textbox 2 and are complemented by summary statistics presented in Table 2).

In calculating the proxy, a methodology typically used for census data was employed (as supporting reference, see Sen (1997)). We established five categories of households (0-400KM; 401-800KM; 801-1200KM; 1201-1600KM; 1601-2000KM), identified respondents per group, calculated income per group based on averages^{xiii}, obtained the accumulated income per group, and using the formula from detailed in Table 3 of the appendix, calculated proxies for the Gini coefficients for all observed years.

Summary statistics show that the average Gini coefficient proxy for the period 2000-2010 was 0.37, the lowest proxy calculated was 0.33 and the highest was 0.40, standard deviation being 0.02. A visual interpretation of the proxy follows in Figure 7.

Figure 7. Calculation of the Gini coefficient proxy yielded eleven continuous observations



Source: Authors' calculations

The calculated Gini coefficient proxy shows three significant changes. In 2006, the first structural break occurred, most likely triggered by the introduction of the value added tax in BiH, with higher rates of average taxation, especially on essential goods (which particularly affected lower income categories). The second structural break was in 2008. From the economical point of view this was a rather successful year, which, combined with political and institutional achievements geared toward the preparation of the country for EU accession, brought an optimistic trend to almost all indicators in BiH including the Gini coefficient proxy. The third structural break seems to have taken place between 2009 and 2010. The most likely reason for it was the effect of the global economic crisis combined with internal political and institutional problems^{xiv}.

While the previous method has the advantage of producing an inequality measure for eleven continuous years (which is not available in any other source), it also has few important limitations. Firstly, it relies on survey data and responses which may not be accurate, partly due to people's hesitance to disclose their income. Secondly, this methodology was originally designed for population census data; however, in absence of any census data in the post-war period, data about a representative sample of the population were used. Thirdly, we cannot directly compare inequality in BiH with that in other countries since our measure is only a proxy of the Gini coefficient. Finally, although the time span of this proxy is better than in other sources, time-series modeling with eleven years of data remains very limited.

Empirical investigation of the link 'global crisis - public spending in BiH - inequality'

1 Initial investigation of the variables of interest

As already mentioned, our key variables of interest are indicators proxying income inequality, institutional performance and public spending. In our model, variable *INEQUAL* denotes inequality (i.e. the Gini coefficient proxy), *DTIME* is a time dummy

variable, *INST* stands for the aggregated composite institutional index, *PSTAB* for the index of political stability, *GEFFIC* for the government effectiveness index, *PREGUL* for the regulatory quality index, *PSPEND* for total public expenditures in BiH, *PSOCIAL* for public expenditures for social protection, *PEDUC* for public expenditures for education, *PHEALTH* for public expenditures for health and *CAPITEX* for total capital expenditures financed through BiH budgets. All variables except *DTIME* were transformed to be indices in the range from 0 to 1, making empirical investigation easier.

As Table 4, summarizing descriptive statistics, shows, six indicators are available for fifteen years, three are available for twelve years, and social protection expenditures and the Gini proxy are available for eleven years only. Since the Gini proxy is the dependent variable in this model, this reduces the sample size to eleven years effectively.

Neither Table 4 nor simple correlations between variables of interest (Table 5) are discussed here in detail since potential associations will be modeled in the following subsection. Yet, it is worth noting that most variables show fairly strong correlation with one another but less so with inequality (*INEQUAL*). There is a possibility that they may be associated with inequality in their transformed forms and that kind of causation will be discussed later.

2 Empirical modeling

Since the aim of this model is to investigate the effect of public spending on income distribution, these two variables are of main interest. The variable *INEQUAL* (an index in which 0 represents minimum and 1 maximum inequality) is the dependent variable, while *PSPEND* (% share of the total government expenditure in the GDP) is the first key independent variable. We expect that changes in the total level of public spending will affect changes in income distribution for, as Garcia-Penalosa (2010) points out, any pursued public policy, including a response to a crisis, might affect income distribution.

Other potential determinants could be investigated and controlled for in addition to public spending; however, the very small number of the degrees of freedom in this sample requires the number of independent variables to be kept at a minimum. A large body of literature finds evidence of a positive effect of institutional quality/efficiency on income inequality (e.g., Chong and Gradstein 2007; Carmingnani 2009; Afonso et al. 2010). Therefore, institutional performance (*INST*) - a composite index in which 0 represents the minimum and 1 maximum institutional efficiency – was chosen as the second key independent variable. *INST* relies on the EBRD structural and institutional change indicators (more on such established indicators can be found in Falcetti et al. 2006; Eicher and Schreiber 2010; Efendic 2010). BiH has very specific, complicated and costly institutional environment (Efendic et al. 2011), which is why a vector of institutional proxies will be used to capture different institutional dimensions. All these models need to be estimated separately.

Due to the lack of observations, some important time-series aspects (such as the potential problem of spurious regression, endogeneity or co-integration) and their investigation will have to be ignored.

We will estimate the model by employing OLS methodology and STATA 11 software, using the below specification in the first stage. Index 't' denotes the time (1996-2010), while α is the intercept term and β , γ and δ are the coefficients to be estimated.

$$EQUAL_t = \alpha_t + \beta \times PSPEND_t + \gamma \times INST_t + DTIME + \varepsilon_t \quad \text{Equation (1)}$$

We use our established Gini index as a proxy for income distribution (*INEQUAL*), while the key independent variables are public spending (*PSPEND*) and institutional performance (*INST*). *PSPEND* was constructed based on BiH governments' financial statistics and *INST* relies on the EBRD structural and institutional change indicators (more on such established indicators can be found in Falcetti et al. 2006; Eicher and Schreiber 2010; Efendic 2010). We also include a time dummy variable (*DTIME*).

Later, we will use disaggregated institutional components substituting *INST* in the model. We will employ The Worldwide Governance Indicators with indexes proxying government effectiveness (*GEFFIC*), political stability (*PSTAB*) and regulatory quality (*PREGUL*).

Finally, we will estimate this same regression using disaggregated components of government expenditure instead of *PSPEND*: public spending on social protection (*PSOCIAL*), public spending on education (*PEDUC*) and public spending on health (*PHEALTH*).

Investigating if structural changes occurred during the period observed is a challenge. We need to analyse whether the value of the parameters remains the same over the entire period or if change occurred in 2009-2010 for instance, as we envisage. This will be investigated by relying on *DTIME*, the time dummy variable, in order to keep the specification and testing procedures as simple as possible. Since the only structural break that seems to have occurred during the crisis period refers to the last two years, formal testing procedures (e.g. the Chow test for structural stability) are not feasible.

3 Qualitative discussion of the obtained results

Equation (1) is estimated using the OLS cross-time methodology. It is estimated in its general form, controlling for the effects of total public spending and general institutional efficiency on income inequality (Model I), including different variations of institutional variables (Model II), and including public spending variables (Models III-V). The obtained results as well as some basic model diagnostics are reported in Table 6; however, before these results are interpreted, the reader ought to be reminded that the time span of data is extremely short and that all results should be treated with caution and at the best as intuitive. This is an external limitation that cannot be influenced.^{xv}

Majority of estimated models had problems with model diagnostics and Table 6 presents only those which had satisfactory (or at least nearly satisfactory) diagnostics. Model II, III and IV have very high R-squared, indicating that the estimated linear regressions fit the data almost perfectly. Model I have weaker statistical diagnostics^{xvi} but still provide some insight. Firstly, this model suggests that the crisis period saw a systematic increase in income inequality - the economic downturn of 2009-2010 increased income inequality on average by 4%, which is consistent with our data on income inequality presented in Figure 8. Secondly, a positive change in the institutional environment is negatively associated

with income inequality over a five year period (*D5.INST*^{xvii}). In other words, more efficient institutions decrease income inequality, which confirms the findings of some non-transition studies (e.g., Chong and Gradstein 2007; Carmingani 2009). The results imply though that the effect works only with a five-year lag and this lagged effect is generally recognized by institutional researchers (a similar finding was obtained by Efendic (2010), using a transition sample of countries)^{xviii}. Thirdly, public spending (*PSPEND*) has a negative coefficient in this model, suggesting that higher levels of public spending are associated with lower inequality, which is consistent with the research of Holzner (2011) for example.

In the second stage, we substitute the aggregated institutional index with indices measuring political stability, government effectiveness and regulatory quality. Only one of these determinants, political stability (*D4.PSTAB*), appeared to be significant in a model with acceptable diagnostics (Model II), suggesting that grater political instability is associated with an increase in income inequality. Since BiH is a transition country which faced a number of political crises following the war, this result is not surprising. An interesting feature of this variable though is its influence with a lagged effect (with a four years difference, which coincides with electoral cycles). This importance of political stability in decreasing income inequality deserves appropriate attention and is worth investigating further in future studies.

Model III reports the effect of social protection spending (*D6.SOCIAL*) with a negative and significant correlation. In other words, higher spending for social protection is associated with lower income inequality (which is a conventional finding). It is worth mentioning though that in this model, the magnitude of the estimated coefficient of *D6.SOCIAL* is much lower than that of institutional proxies.

Model IV reports a positive and significant (albeit weak) effect of spending on education (*D6.EDUC*) on income distribution. In other words, higher spending on education is associated with an increase in income inequality. Bergh and Fink (2008) for example report similar results, despite the conventional argument that higher educational attainment results in a higher and more equal distribution of human capital which reduces the wage and income gap (e.g. Afonso et al. 2010) and despite Holzner's (2011) finding that in transition countries, tertiary education has a positive effect on income distribution and secondary education has a negative one. A possible justification of the obtained result could be the existence of a so-called 'dual economy' - coexistence of the modern/formal and the traditional/informal sector (Yuki 2012). In other words, more spending on education in BiH raises the total share of educated people labour force, who *per se* belong to higher income categories. However, the effects of education and spending on education could be properly measured and investigated only in a long-run, which cannot be done as part of this research due to the limited time span.

Model V investigates the effect of capital expenditure on inequality. *CAPITAL* appears to have a contemporaneous effect with a significant negative coefficient (one of the strongest of all the examined public expenditure categories); in other words, capital expenditure reduces income inequality. Apart from long-run effects of capital expenditure (such as stimulating economic growth), such expenditure also has a short-run positive and multiplying effect in the economy (it is associated with a higher level of national output, generally stimulating the standard of living). Also, capital spending is often used to target projects that have a social dimension and address different public interests. Accordingly, capital expenditures might be considered a public instrument that could be used as a short-run remedy for high income inequality in BiH.

The last model (Model VI) focuses on the effect of public spending for health. Because its diagnostics are not satisfactory, it is not reported in Table 6. Yet, it is useful in that it shows that public expenditures targeting social protection and education have a significant effect only with a six years difference, which indicates that changes in the levels of such expenditures have a medium-term effect and policy makers ought to have the appropriate timespans in mind when pursuing these policies.

Conclusion

The effect of the global economic and financial crisis on different countries and their social and economic indicators is one of the topics that were given lot of attention in the recent period. Accordingly, this research focused on the effects of the contemporary crisis on income distribution in BiH. It is important to mention that BiH was affected with a short-run lag - the global economic crisis hit BiH only in 2009 although it started a year (or even two) earlier in more developed economies. This research provided enough indications that the global economic crisis increased income inequality in BiH, while higher total public expenditures and better effectiveness of institutions in BiH were supportive in limiting it.

We have investigated the effects of several institutional determinants and different types of public expenditures. After controlling different institutional indicators, political stability in the country has been identified as an important determinant of income inequality. This finding is important for policy makers as it highlights that political crises (which are rather frequent in BiH) have many negative indirect effects, including this one on increasing inequality. Disaggregated analysis of public spending, on the other hand, revealed indications that expenditures for social protection are negatively correlated with income inequality, while spending on education has a positive effect. Since the effect of public spending for education is more long-run oriented and registered through a positive effect on economic growth and development, this finding should be considered in a broader context. Another important feature of disaggregated public spending is timing, which work only in a medium-run. Policy makers need to be aware that public spending policies and their effects very often overcome electoral cycles, which is why they need to pursue policies based on their long-run effects rather than short-run priorities.

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ⁱFor the purpose of this research, Southeast Europe shall be defined as the pool of the following nine countries: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Montenegro, Romania, Serbia and Turkey.

ⁱⁱ Unless specified differently, 'expenditures' or 'spending' refers to the sum of expenditures incurred by all state-level and Brčko District institutions, both entities and all ten cantons in BiH.

ⁱⁱⁱ Official data before 1996 do not exist. From 1992 to 1995, BiH was in a war, and data for that period cannot be considered reliable. Data for years prior to 1992 on the other hand are not comparable with current macroeconomic aggregates because of different systems of national accounting.

^{iv} Bosnia and Herzegovina is divided in fourteen administrative units – one national level (State), one district (Brčko District), two entities (Federation of Bosnia and Herzegovina and Republika Srpska) and ten cantons which are subdivisions within the Federation of Bosnia and Herzegovina.

^v In this paper, social expenditures refer to the sum of costs of all government agencies dealing with social issues, the Return Fund for Internally Displaced Persons, employment funds, pension funds and the Childcare Fund of RS.

^{vi} Health expenditures include expenditures of all ministries of health as well as expenditures of health protection funds.

^{vii} Education expenditures include expenditures of ministries of education, schools, on-budget universities, pedagogic institutes, and scholarships and grants for students.

^{viii} This statement, just as all other statements in this paper relating to expenditures, should be accepted with caution, as total expenditures were, for the purpose of this paper, not calculated as the sum of official budgets but also include extra-budgetary expenditures for health and social protection where such information was available. No information could be obtained about social protection expenditures incurred between 1996 and 1999 and total expenditures for those years are net of social protection expenditures.

^{ix} Most capital expenditures in BiH budgets refer to capital transfers and acquisition of capital assets (vehicles, furniture, PCs etc.), while major public investment projects (in schools, hospitals etc.) are financed through the Public Investment Programme which is not part of the 'regular' government budget and is not part of this figure.

^x The category 'other expenditures' is a residual, and is calculated as reported total expenditures minus wages and benefits, transfers and capital expenditures.

^{xi} This comparison is based on country data available in the World Data Bank from February 2012.

^{xii} Similar data on social protection were not available.

^{xiii} For instance, the second income group in its original scale is 1-100KM and the average used to calculate the total income of respondents belonging to this group is 50KM. For the following group, 101-200KM, the average is 150KM. The next income scale (201-300KM) had the average of 250KM, and so forth.

^{xiv} Following the general elections in BiH in 2010, political parties spent almost two years agreeing on the composition of the State government, while the Euro-Atlantic progress was very limited.

^{xv} In order to avoid repetition: the same limitation to the rest of this section.

^{xvi} The F-test of joint significance has a p-value of 0.11. Since this is reasonably close to the 10% level of significance (the threshold level acceptable for small samples), we have decided to discuss this model.

^{xvii} In our investigation we have obtained that only the five-years difference of the institutional proxy (*D5.INST*) has a significant effect in the model with reasonably appropriate diagnostics. Note that this is not the case with the current effect of this variable (*INST*) or the lagged effect of anything less than a five-year difference.

^{xviii} Using a dynamic panel model, the author identifies that in transition countries, changes in institutions are positively associated with economic performance over a period of five years. The key finding is that the time effect of institutions in transition countries matters and the peak effect is reached with a five year difference.