Naida Trkić-Izmirlija and Adnan Efendić

Effects of the global economic crisis and public spending on income distribution in Bosnia and Herzegovina

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Research paper:

Effects of the global economic crisis and public spending on income distribution in Bosnia and Herzegovina

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Abstract

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

1. Introduction

During the first years of the new millennium, macroeconomic indicators in countries of southeast Europe on average largely resembled those of EU countries and developed economies. With the onset of the global economic and financial crisis in 2008, the situation started changing dramatically. That is the period of widening income inequality in most European countries, which is 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 developing countries, and more specifically southeast European (SEE) countries[1] are less known.

The latest crisis has been rather specific in its appearance compared to the past global economic downturns. Also, there is no strongly established research tradition in this field and more often than not, empirical work is guided by a lack of relevant data (which is a general problem in transition countries).

The main hypothesis tested in this research is that *economic downturns which have occurred in BiH as a result of the crisis introduced structural breaks in overall income distribution by increasing income inequality*. In addition to testing this hypothesis, we aim to identify the effects of certain public spending[2] policies on income distribution (given their effects on income distribution are unknown).

The research starts with a detailed investigation of existing applied research in this field of economics (Section 2), in particular, applied research focused on southeast Europe. Building upon that, the research aims to develop a methodological framework for conducting such analysis that is designed to take into account specifics of BiH (Section 3). In Section 4 we provide a short overview of the fiscal situation and of public spending (in terms of

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[1] For 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.
[2] If not specified differently, expenditures/spending refers to the sum of expenditures incurred by all state-level institutions of BiH, expenditures of Brčko District in BiH, expenditures of both entities and expenditures of all cantons.

magnitude, structure and trends) in BiH, and present existing and new data on income distribution in BiH. With this background in mind, we present the empirical part of our research in Section 5. This section provides a descriptive analysis of variables of interest (public spending variables, inequality and institutional variables), investigates relationships (correlations) among them and reports some quantitative and qualitative results derived from a simple empirical modelling. Section 6 concludes the paper.

2. 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, aiming to explain income distribution with public spending, education (spending but also performance) and institutional performance. Their findings confirm that public policies have a significant effect on income distribution and the effect happens most notably through social spending but also (albeit in an indirect way) through high quality education (i.e. human capital) and sound economic institutions.

Gregorini and Longoni (2009) examine the link between inequality, public spending and political institutions and test political, economic, demographic and social variables as potential determinants of public spending. They focus on developing countries over the period 1970-2005. 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) considers the joint relationship between inequality and economic growth stressing the role of public spending in transition economies. The author utilizes empirical data for fourteen Central and East European countries over the period 1998–2006. The results of this research confirm that countries with higher expenditures for social protection, health and economic affairs tend to experience less inequality.

De Grigorio and Lee (2003) investigate how education affects income distribution. Based on a large sample of countries observed during a time period of three decades (1960-1990), they find evidence that educational factors (higher educational attainment and more equal distribution of education) play a significant role in better income distribution, which is the finding reported by Afonso et al. (2010) as well. They also find that social expenditures affect income distribution positively. A significant proportion of cross–country income inequality identified in their research remains unexplained though.

In their analysis of distributional effects of public spending, Schwarz and Ter-Minassian (2000) accept that public spending can influence income distribution and that this happens through economic development and growth (first and foremost, qualitative aspects of growth). Further, the authors point out that political and institutional pressures play important roles too, 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 to truly 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 covering the entire twentieth century. The authors distinguish determinants of inequality between different income groups, reporting 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 categories. Another interesting finding is that the banking crisis is associated with a reduced income share of the rich category. However, their sample does not include the region of our interest.

Existing research supports the hypothesis that public spending might affect income inequality through different channels. At the same time, public spending changes together with the economic environment, and accordingly, public spending will usually change over the period of 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). The change in the

public spending is not expected only because of the changes in public revenue side and problems related to financing expenditures, but also because of government responses and policies pursued primarily to stabilize economic output. Accordingly, in the period of global economic downturn we can expect variations in public spending, which could change income distribution.

There is also a good number of papers which specifically investigate the link between institutions and inequality and mainly find 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 the case of 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 income distribution, institutional quality and government stability. The author finds that less efficient institutions increase income inequality while greater inequality increases the probability of government termination.

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

Finally, having in mind that the financial sector was at the core of the crisis, Watt (2009) argues that the effect on income distribution could be particularly negative and that income distribution could be affected through number of direct and indirect channels of influences. Although we can identify some key channels of influences, as Nolan (2009) points out, income inequality reflects a complex interaction of various factors which are not often short-run rooted. One of the most important direct channels of influence is raising unemployment which increases poverty and widens income distribution (Watt, 2009; Nolan, 2009). In addition, workers are forced to defend their jobs with lower wages while governments generally support public sector wage cuts in the time of deficit. All of these measures again might increase income inequality at the bottom and in the middle class. The latest global economic downturn is a period when a whole spectrum of policies have been used to fight the recession. However, all of these policies affect not only growth, but simultaneously income distribution as well (Garcia-Penalosa, 2010), which is another direct and/or indirect channel of influence worth investigating.

3. Methodological framework of the research

With the aforementioned aim of our research and our research hypothesis in mind, as well as experiences and findings of other researchers which were set out in the foregoing literature review, we formulate our methodological framework as follows.

The research will be focused on Bosnia and Herzegovina (where necessary, SEE countries will be examined for reference purposes). Wherever possible, the period that will be examined shall include years 1996 - 2010[3]. The research will be based on annual data since more frequent indicators are not available.

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

Our key empirical investigation will be based on time series analysis, constrained by a very small sample (maximum fifteen observations, i.e. years). This will be rather challenging, and more advanced econometric modelling (e.g. panel analysis) is not feasible. Accordingly, we will need to rely on techniques that will give us intuitions and guides for qualitative interpretation. All variables that will be used in our investigation (e.g., inequality, total public spending, public spending on health, education and social protection, current and capital spending, and different indices capturing institutional efficiency) will be more discussed through a qualitative analysis of the data and the obtained empirical results. Also, we will estimate pair-wise 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 modelling in order to estimate the causal links.

All empirical results should be treated with considerable caution having in mind the limited time span and 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.

4. Contextual framework - global economic crisis, public spending and income distribution in BiH

4.1. Global economic crisis in 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 the post-war BiH registered for the first time a negative growth rate and a significant drop practically in all macroeconomic indicators.

Graph 4.1 Real GDP growth in Bosnia and Herzegovina:
In 2009, the crisis put an end to BiH GDP growing
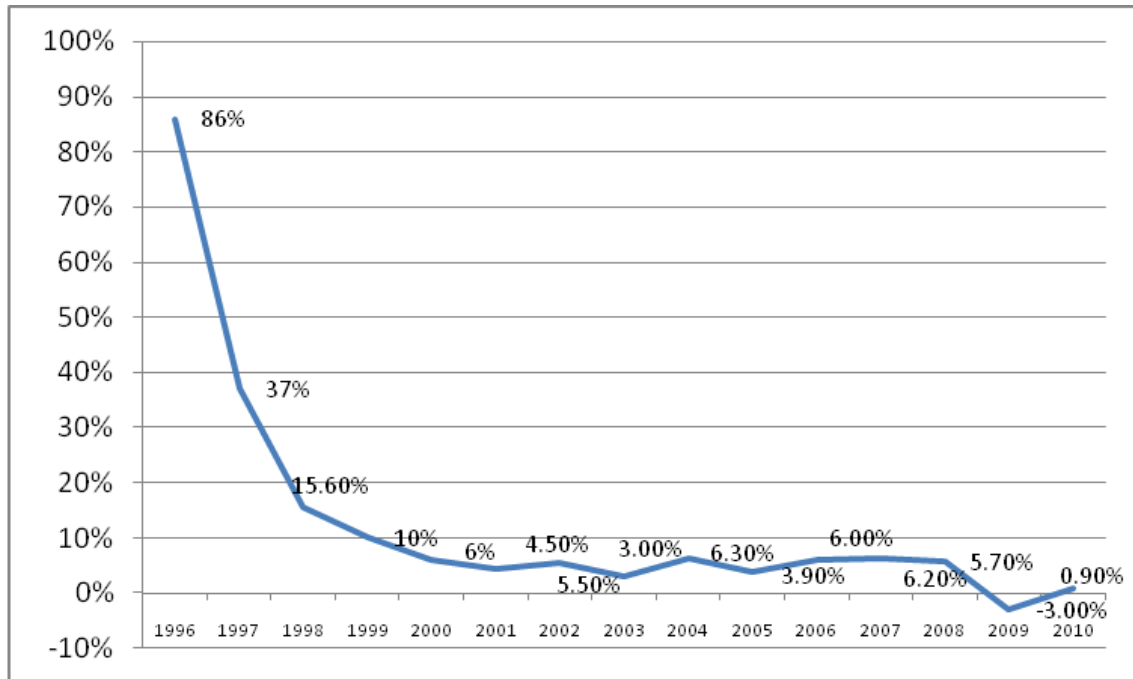
Source: Central Bank of BiH (CBBiH), 2011

If we exclude the years immediately following the war period, 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 that year, i.e. in 2009, absence of the inflationary effect caused nominal and real GDP to have practically the same values (BiH actually had a negative rate of inflation in 2009, -0.4%, which is the first deflation registered in BiH since the last war). This indicates that BiH faced a recession in that particular year. In the next year, the situation improved only slightly and the real growth rate for 2010 suggested a positive value of around 1%, while the first data suggests that in 2011 the growth rate is around 1.5% (CBBiH, 2012).

Graph 4.2 GDP per capita in Bosnia and Herzegovina (in US$):
After 12 years of continuous increase, GDP/capita started deteriorating in 2009
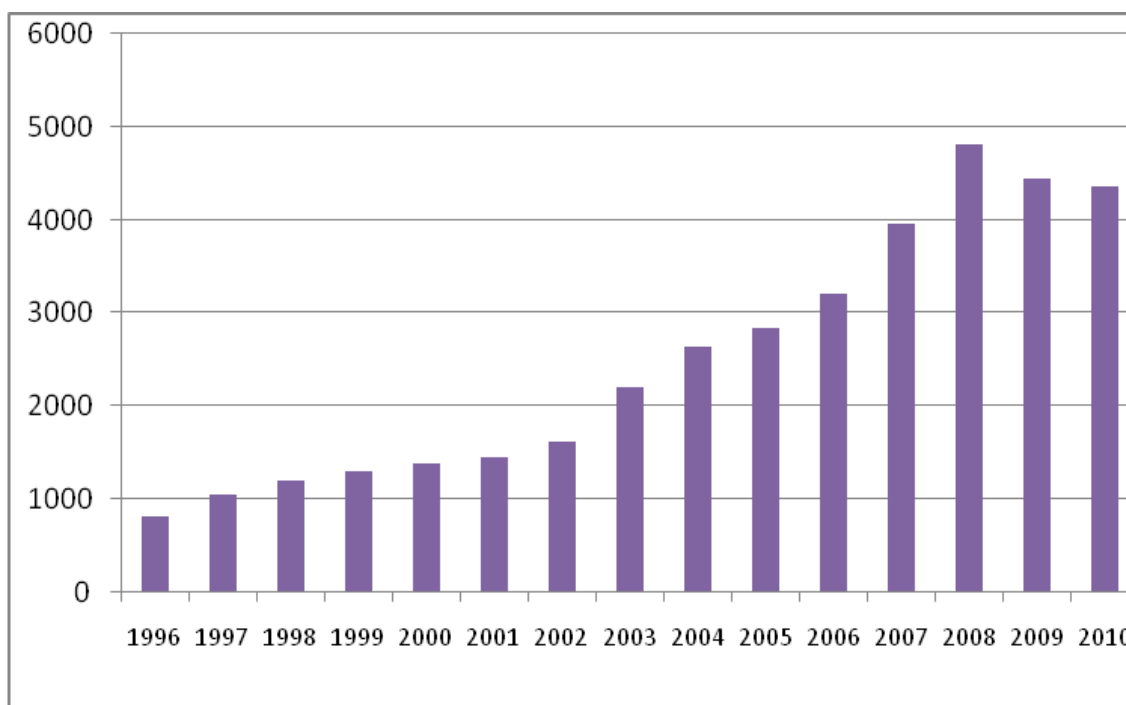
Source: CBBiH, 2011

Similar to the trend in the GDP, BiH faced 12 years of continuous increase in GDP/capita following the war, as we can see from the above graph. However, in 2008, the GDP/capita reached its peak and for the first time after the war, it started falling in 2009 and fell further in 2010. In the context of the real economy, the already high official unemployment rate (Graph 4.3) increased in both 2009 and 2010. Estimates of the International Labour Organisation (ILO) report a lower unemployment rate but also show an increasing trend over those two years (i.e. from 25% in 2008 to 29.1% in 2010). All these macroeconomic indicators are in line with expected trends for a recession period.

Graph 4.3 Unemployment in Bosnia and Herzegovina (% of labour force):
Following a short stabilisation of unemployment and a subsequent drop,
unemployment started rising again in 2009
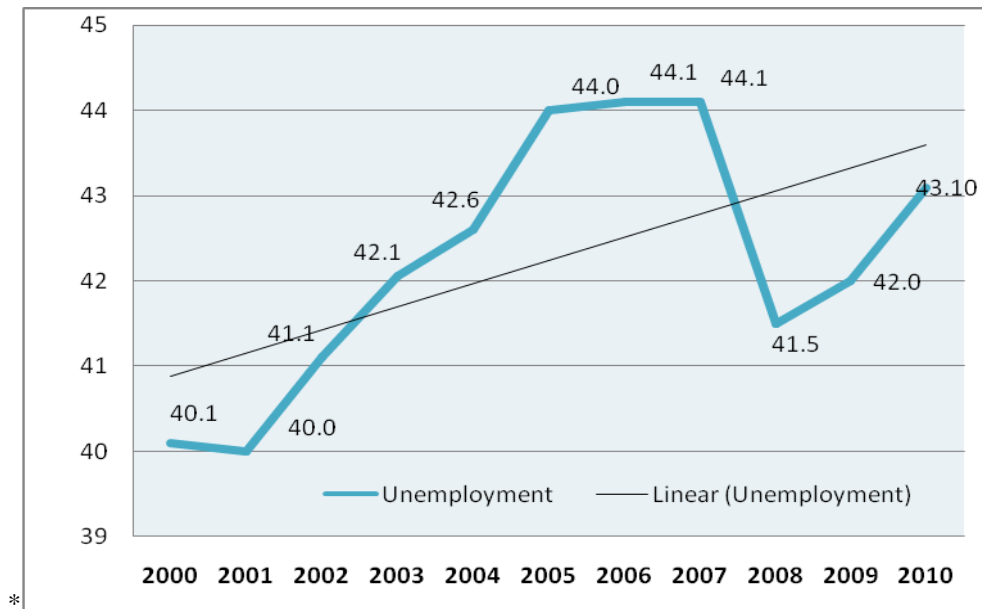
Source: BiH Directorate for Economic Planning (DEP), 2011

All in all, over the period of the global economic downturn (which is in the case of BiH linked primarily to 2009) there was a significant drop in key macroeconomic indicators. Although growth and unemployment indicators showed a slightly positive change in 2010, it is hard to say that we have witnessed significant improvement, which should normally be the case had the crisis period ended.

4.2. Public spending in Bosnia and Herzegovina

In line with existing research and theory, we expect the crisis to affect structure and magnitude of public spending, which should in turn affect income distribution. However, testing this assumption 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, unfortunately do not exist. Each of the fourteen

governments in BiH[4] and almost 150 local self-governance units (municipalities) plan, execute, manage, record and report their expenditures rather independently. Accordingly, efforts to introduce unified and systematic expenditure reporting that would allow consolidation which is necessary to provide an answer 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 large portion 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[5], for health[6] and for education[7]. The result of that process is presented in the Appendix 1, in Table A.1, and 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 earlier in this paper that the GDP of BiH experienced continuous growth prior to 2009. Total expenditures, on the other hand, seem to have followed their own, cyclical trend - while expenditures increased steadily until 2000, they fell before catching up again in 2002, rising ever since[8]. This trend differs from that of revenues as well - although BiH legislation stipulates that expenditures should not exceed revenues and financing, cash accounting and debt make this possible. Accordingly, until 2000, fiscal balance in BiH was continuously negative (i.e. expenditures were higher than the sum of revenues and financing), which reoccurred once the crisis kicked in in 2009.

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[4] 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.

[5] 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 in RS.

[6] Health expenditures include expenditures of all ministries of health as well as expenditures of health protection funds.

[7] Education expenditures include expenditures of ministries of education, schools, on-budget universities, pedagogic institutes, and scholarships and grants.

[8] 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 simply as the sum of official budgets but include also extra-budgetary expenditures for health and social protection where such information was available. Please note though that no information could be obtained about social protection expenditures incurred between 1996 and 1999 and that total expenditures for those years are net of social protection expenditures.

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.

Graph 4.4 GDP, expenditures and fiscal balance:
The public sector consumed almost half of the GDP over the last fifteen years
and BiH governments have not responded to the crisis using restrictive fiscal policies
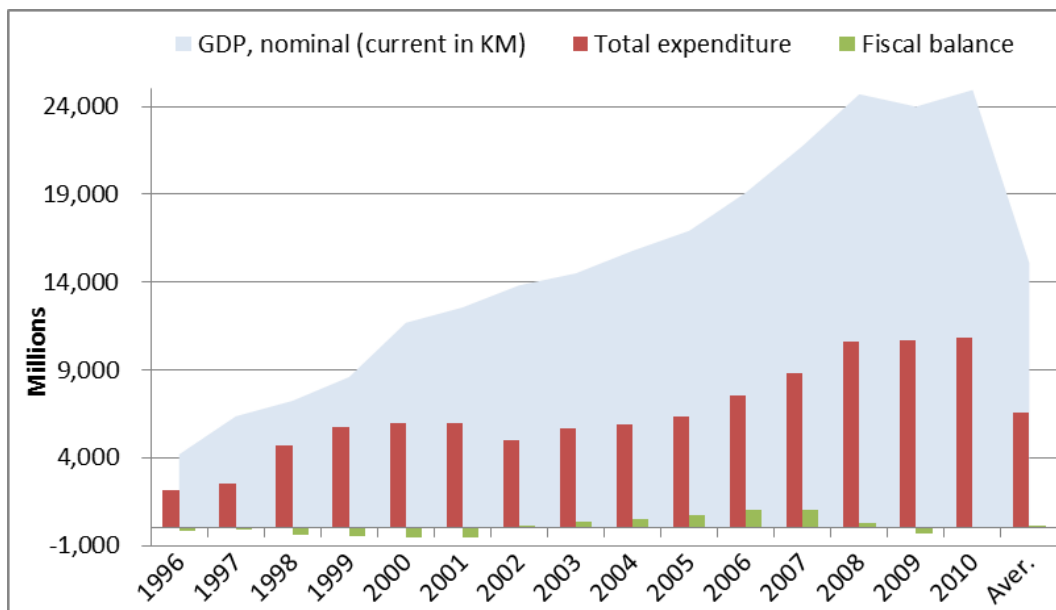
Source: CBBiH, DEP, IMF and World Data Bank, 1998-2011

Looking at the structure of expenditures, we see that public expenditures in BiH have a predominantly re-current character and that only a small portion of funds is directed toward capital expenditures[9,10]. Also, public expenditures in BiH are heavily biased toward transfers and particularly those targeting social protection. This is particularly true if we also account for expenditures incurred by extra-budgetary funds, such as pension funds and unemployment funds.

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[9] Most capital expenditures in BiH budgets refer to capital transfers and acquisition of capital assets (vehicles, furniture, PCs), 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 catered by this figure.
[10] The category "other expenditures" is a residual, and is calculated as reported total expenditures minus wages and benefits, transfers and capital expenditures.

As demonstrated below in Graph 4.5, in the period immediately following the war, the largest portion of public expenditures (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 which must be met. On transfers (to individuals, NGO's and state owned enterprises) less than 10% of expenditures were spent. On capital expenditures, as little as 1% and 3% were spent in 1996 and 1997 respectively. However, in 1998, major changes in the structure of expenditures were introduced. Wages and contributions dropped to 22% or 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 this significant change in the structure of expenditures were post-war affairs (financing of defence, war veterans, reconstruction, etc.), transition to market economy and state-building efforts. More details on events that have taken place in BiH during the period between 1996 and 2010, which may have had an impact on volume and structure of expenditures, are presented on the next page, in Textbox 4.1.

Graph 4.5 Structure of expenditures:
BiH budgets' focus has shifted toward transfers
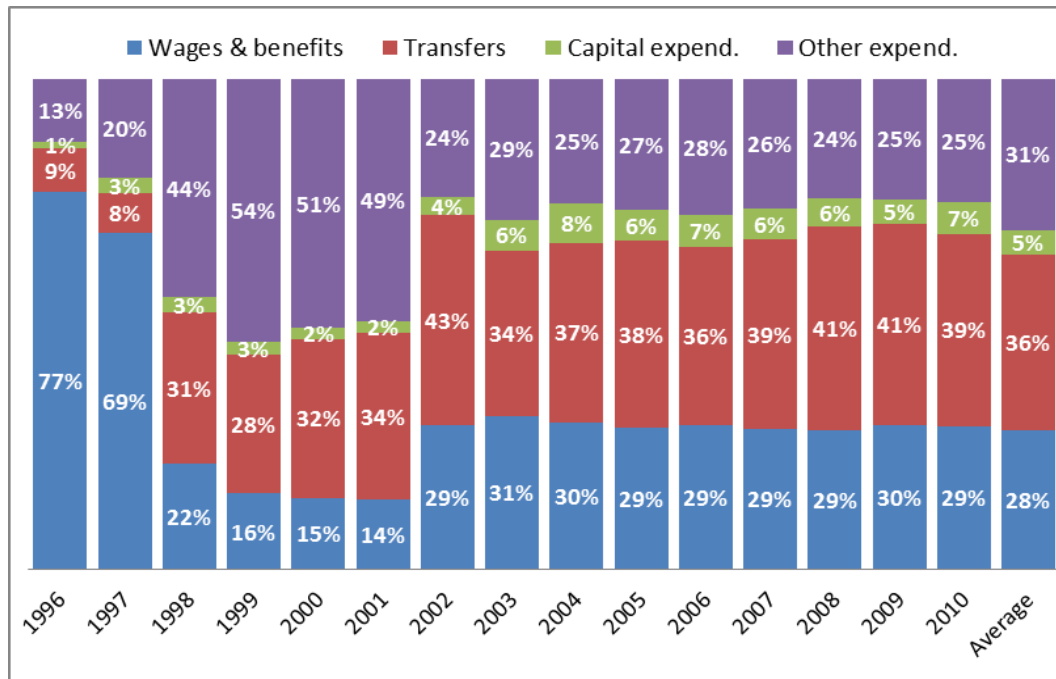
Sources: CBBiH, DEP and IMF, 1998-2011

Textbox 4.1 Major events in BiH between 1996 and 2010

In the period between 1996 and 1998, BiH made significant efforts to increase its revenues – it launched privatisation and liquidation of state-owned banks and enterprises, reformed the customs tariff system and administration, started harmonising the sales tax countrywide, unification of tax policies, reduction of corporate income tax rates and social insurance contribution rates. Its expenditure side was governed by considerable military service expenditures (which made up more than 5% of the 1998 GDP according to IMF estimates, excluding off-budget military expenses which were almost just as high) and social expenditures (benefits for pensioners and invalids, war invalids and survivors, child protection, health insurance and unemployment insurance. According to IMF, benefits for war invalids and war survivors made up almost 10% of the 1998 budget). Expenditures for education, health and infrastructure were relatively low compared to other countries in the region, partly due to significant off-budget donor support in these areas.

Between 1999 and 2000, privatisation (particularly of small enterprises) progressed, labour market reform was implemented and military employment was further reduced. War invalids and their families continued to receive a high portion of the budget, and social insurance and assistance programs remained poorly targeted. While reported unemployment was high (many companies decide not to register their employees to have their health insurance covered by the unemployment fund), the governments widened continuously and new institutions were formed (an example being the State Border Service, which replaced entity functions and resulted in more employees earning higher, State-level pay-scale salaries). Brčko separated as an administrative unit, with its own institutional structure causing considerable costs. Also, public sector wages continued increasing and public servants continued receiving privileges such as allowances for participation in committees. At the same time, recovery from devastation caused by the war was aided by considerable foreign assistance and nearly all investments in education and health were financed by donors.

During 2001 and 2002, revenues increased considerably, tax administration was strengthened and the country had better control over spending (the country was again under an IMF Stand-by Agreement regulating its expenditures but also closing financing gaps). Pensions grew, certain customs privileges for war veterans were abolished and new identification documents and passports were issued brining in additional revenues. Domestic claims were restructured and ex-Yugoslavia succession proceeds were used to cover costs of further military demobilisation.

Between 2003 and 2007, tax administration was further strengthened, indirect taxation and customs were introduced at the State level and one of the three telecommunication companies was privatised boosting revenues. Import tariffs were cut under free-trade agreements. There were only few smaller investments in infrastructure, limited efforts to accelerate repatriation of refugees and internally displaced persons, and while major defence reforms were carried out (centralisation and control structures, continued demobilisation etc.) the social benefits system was reformed only marginally.

Between 2008 and 2010, public debt was low compared to other SEE countries. Income tax and public wage reforms were carried out (wages were reduced in 2009 and frozen in 2010 at the 2009 level to free up money for new institutions and capital investments). Repatriation of displaced persons continued. Finally, the Federation of BiH, the larger of the two entities in the country, made the first steps toward reducing transfers by eliminating special unemployment benefits for demobilised soldiers and embarked on an audit of rights-based benefits for non-war and war invalids.

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

Having reviewed indicative trends and patters in total expenditures, it is also worth reviewing those of the other three selected expenditure-related variables – expenditures for health, education and social protection. The below Graph 4.6 presents them in comparison with total public expenditures in BiH. As the foregoing discussion already introduced, 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 expenditures 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 during the period 1996-2010, on average 12% and 15% respectively. 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 mostly growing, reaching 16% and 20% respectively in 2010.

Graph 4.6 Shares of health, education and social protection in total expenditures:
Health and education expenditures constitute very small portions of total expenditures, while social protection is put far greater emphasis on
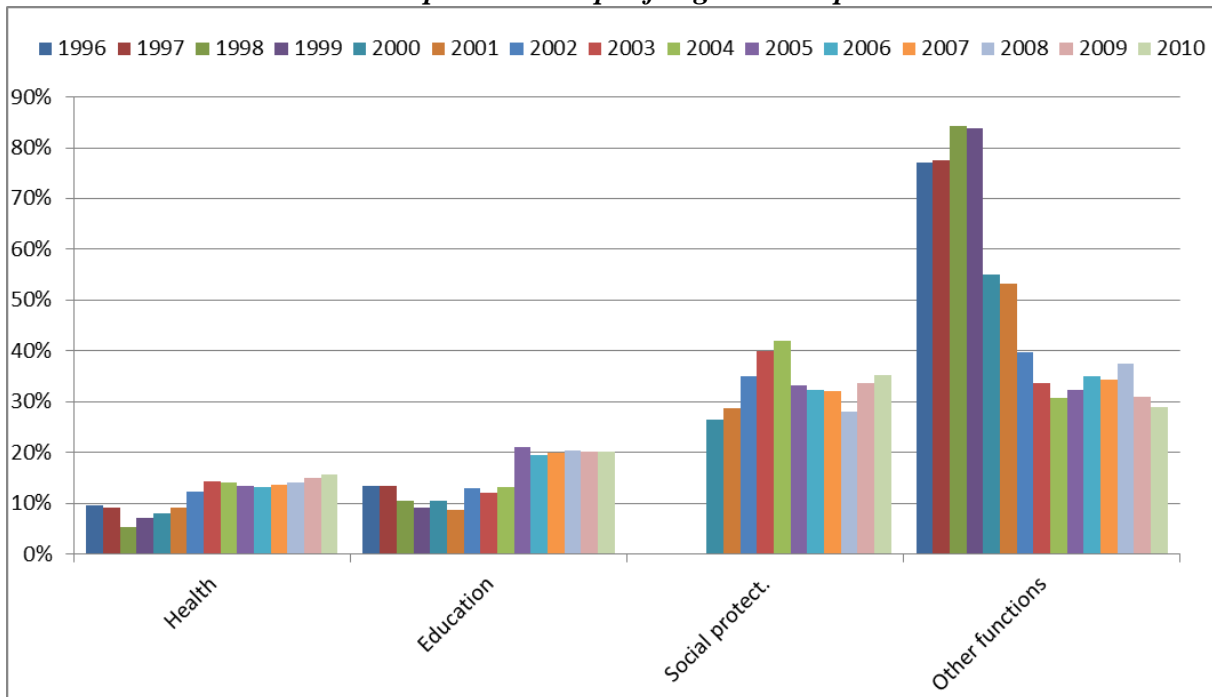
Sources: WHO (health), Council of Europe, EU, WB and BiH ministries of finance (education),WB, IBHI and BiH ministries of finance (social p.) and CBBiH, DEP and IMF (other exp.), 1998-2011

The described situation is quite different from that in other countries in southeast Europe[11]. While the other eight SEE countries of interest for this study have on average doubled their GDP during the period of observation (212%), in BiH, it has grown almost five times (495%). It should be noted though that such growth in BiH mainly reflects reconstruction of the war-damaged economy and not "real" economic growth. 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 44% on average, in other countries of the region GDP was less driven by public consumption (32% on average). Of that, Bosnia and Herzegovina spent slightly 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).[12]

Graph 4.7 shows the growth rates for public expenditures overall and expenditures for health, education and social protection, compared with the growth in the nominal GDP.

Graph 4.7 Growth rates of GDP, total exp., health, education and social protection:
While allocations for health, education, social protection and expenditures seem unrelated to the GDP growth, it appears that two of the allocations (for health and social protection) are linked to overall expenditures
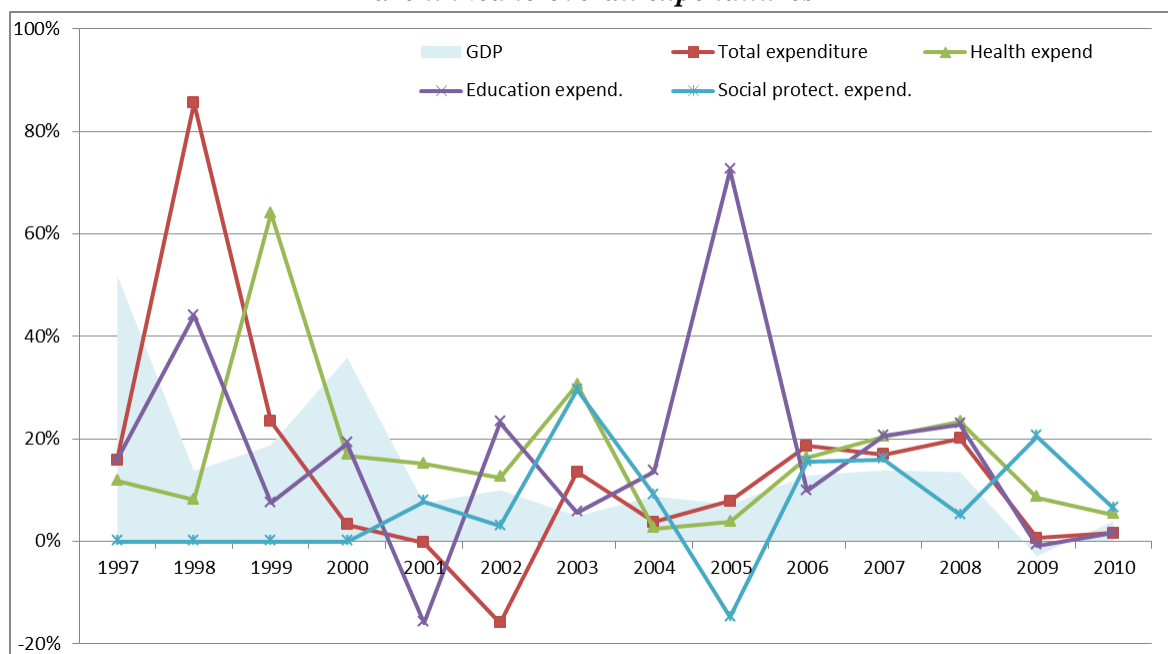

Sources: WHO (health), Council of Europe, EU, WB and BiH ministries of finance (education),WB, IBHI and BiH ministries of finance (social p.) and CBBiH, DEP and IMF (other exp.), 1998-2011

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[11] This comparison is based on country data available in the World Data Bank as of February 2012.
[12] Similar data on social protection could not be found.

With respect to total expenditures, it seems that until 2003, they grew counter-cyclically (i.e. in opposite relationship to the GDP). In 2004, the situation changed and they started following the GDP trend (which is the pattern one would expect, as expenditures were around 44% of the GDP during the fifteen years observed). Education expenditures seem to have followed an independent trend until 2006, when the situation changed and they started following growth in total expenditures. Allocation for health expenditures followed the trend in total expenditures almost from the beginning (possibly, allocations for health were decided based on a percentage of total expenditures and were adjusted using the same increment as with total expenditures). Social protection expenditures seem also to have followed the trend of total expenditures, albeit less than health.

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

4.3. Income distribution in Bosnia and Herzegovina

4.3.1.   Current data on income distribution in BiH

There is very little information available on income distribution in BiH. Although different statistical sources reported the Gini coefficient in their works, to our knowledge, it does not go beyond three years: 2001, 2004 and 2007. This circumstance represents a serious obstacle for any research dealing with income distribution in BiH; in particular, no continuous variable exists that would allow econometric analysis including calculation of any kind of

correlations between variables of interest. However, if we look at the coefficient for the three years available, we see an increasing trend of this index, ranging from 0.28 in 2001; 0.35 in 2004 to 0.37 in 2007 (WB, 2012), which is a considerable increase over such a short period of time. These three time-series observations do not allow us to say a lot about this indicator or estimate the effect of the current global economic crisis on inequality in BiH though. We may conclude only that we have indication that inequality in BiH has risen over the observed period.

Having in mind our aim to investigate the origins of and trends in inequality in BiH, we opt to rely on alternative sources of relevant data and establish our own proxy for the Gini coefficient, which will give us a longer time-span and provide sufficient inputs for more credible conclusions. We are aware that poverty and income distribution is a multidimensional phenomenon (Ferreira, 2011) and any income distribution measure is at the best proxy. However, we try to go a step further by using some novelty longitudinal data in our analysis. Accordingly, the following sub-section describes our alternative strategy in measuring inequality in BiH.

4.3.2. Establishing a proxy for income distribution in BiH

During the process of this research, we have investigated all available data bases which could help us establish the necessary Gini coefficient and ended with the UNDP BiH Early Warning System (EWS) surveys database (2000-2010) as the second-best source for this purpose. The main reasons why we have selected this database are as follows. The EWS survey was conducted on a quarterly, semi-annual or annual basis over the period 2000-2010, giving us eleven years of continuous data. The sample used was established to be representative in terms of different entities in BiH, ethnicities, cantons, municipalities, urban-rural areas, male-female and minority-majority respondents, i.e., being representative of BiH population. The overall sample size is around 66,000 observations from over 30 views that took place over eleven years, giving us around 6,000 observations per year on average. As part of our research, we have identified the most suitable question from the used questionnaires that can be used to proxy income distribution (more details about the question are provided, in Textbox 4.2).

Textbox 4.2: Developing a proxy for the Gini coefficient using the EWS BiH survey

The Early Warning System question assessed as most suitable for the purpose of establishing a proxy for the Gini coefficient was: *"This is a list with different categories of total income. In which category would you put your household if you included all salaries, pensions and other sources of income?"*. The scale provided ranged as: 0; 1-100KM; 101-200KM; 201-300KM; .... 1900-2000KM; over 2000 KM. The distribution of answers is reported in Table A.2 in Appendix 2.

Around 4.6% of respondents did not answer this question and 9.7% reported they did not know the answer. This is not surprising since respondents are generally often not keen to report their income and all such responses were excluded. Another challenge was the category "over 2000 KM". In our methodology we need to calculate the total income of all categories based on upper limits and/or averages of all scales. Since this category is without an upper level, we had to exclude it as well. However, there were only 1.7% of such responses and we do not have indications that the obtained results are significantly different after this remedy.

In order to calculate our proxy for the Gini coefficient, we rely on the methodology used for census data that is described in Appendix 3 (as supporting reference, please see also Sen (1997)). Generally, based on the survey data we have 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[13], obtained the accumulated income per group, and based on the formula detailed in Appendix 3 calculated the proxy for the Gini coefficients for all of the observed years. Summary statistics of the Gini coefficient proxies is below (in Table 4.1) while a visual interpretation of our calculations of the Gini coefficient follows in Graph 4.8.

Table 4.1 Descriptive statistics of the proxies of the Gini coefficient for BiH (2000-2010)

	Mean	St. dev.	Min.	Max.
EQUAL	0.37	0.02	0.33	0.40

Source: Authors' calculations using Stata 11

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[13] 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 150 KM. The next income scale (201-300KM had) the average of 250KM; etc.

Graph 4.8 Visual interpretation of the Gini coefficient proxies for BiH:
Calculation of the proxy for the Gini coefficient returned eleven observations
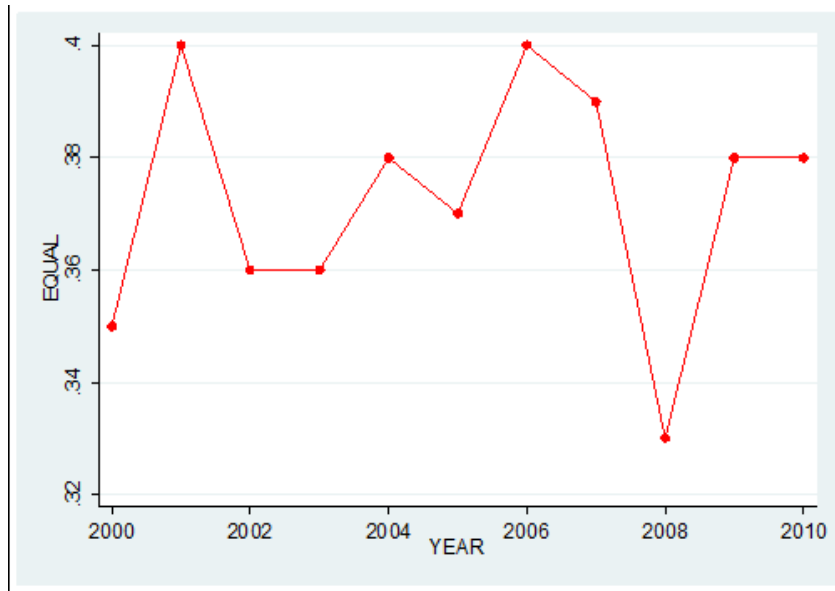
Source: Authors' calculations

To draw a representative Lorenz curve, which is a graphical interpretation of income distribution, we use data from the latest available year (i.e. 2010). The result is reported on Graph 4.9. As depicted in the above Graph 4.8, the obtained Gini coefficient proxy for 2010 was 0.38.

Graph 4.9 Illustration of the Lorenz curve of income distribution in BiH (2010)
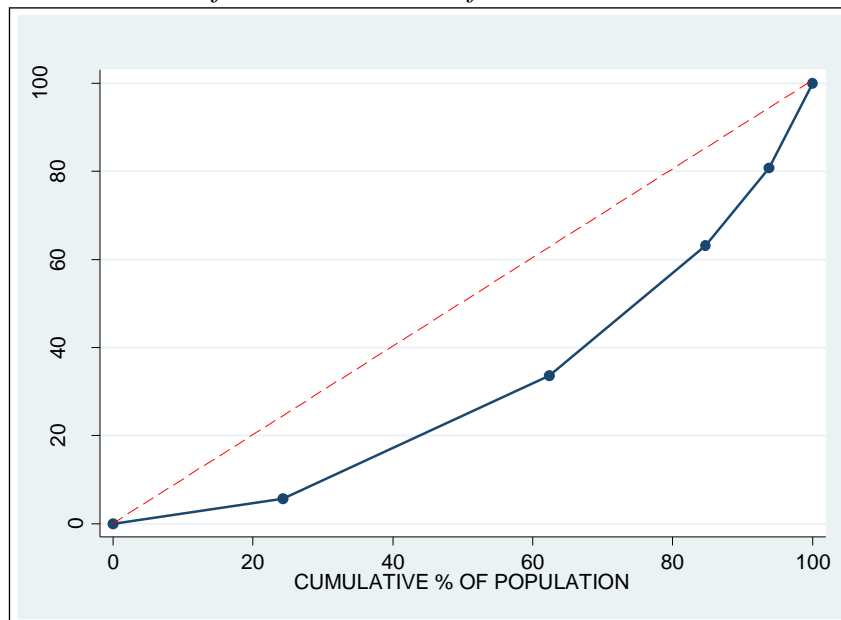
Source: Authors' calculations

The calculated proxies for the Gini coefficient suggest three changes that are worth mentioning: in 2006, in 2008, and between 2009 and 2010. In 2006, there was the first structural break. The most likely reason for this break in 2006 was the introduction of the value added tax in BiH, with higher rates of average taxation, especially on essential goods[14]. Such measure should make us expect a rise in inequality, as lower income categories were affected by the rise in taxation of essential goods more than the rich in relative terms. The second structural break that is suggested was in 2008. From the economical point of view, this was a rather successful year combined with political and institutional achievements in the country geared toward the preparation of the country for EU accession. That structural break had brought an optimistic trend to almost all economic indicators in BiH for that particular year and it seems to the Gini index as well (which fell in that particular year). The third structural break seems to have taken place in the period 2009-2010. The most likely reason for that is the effect of the global economic crisis combined with internal political and institutional problems, which we aim to explore in the remainder of this paper to an extent feasible with the data we operate with[15].

Although the main advantage of our proxy for the Gini coefficient is that we use new data and produce this longitudinal proxy for eleven years (which is not available in any other source), we need to mention a few limitations of our strategy. Firstly, we rely on survey data and responses on income, which might not be accurate, not least because people are often willing not to say an accurate level of their income. Secondly, this methodology is designed to be used more for data based on a population census, which has not been done in BiH since 1991, but we operate with a representative sample of the BiH population. A disadvantage of this coefficient is that we cannot use it for comparative purposes with other similar countries in the region. And finally, although the time span of this proxy is much better than in other sources, any time-serious modelling with eleven years of data remains very limited.

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[14] Prior to the introduction of the value added tax, the tax rate applicable to most essential products was 0%.

[15] 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 improvement was very limited.

5. Empirical investigation of the link "equality-crisis-public spending in BiH"

5.1. Initial investigation of the variables of interest

As already mentioned, our key variables of interest include indicators measuring and/or proxying income inequality, institutional performance and public spending in BiH. In Table 5.1 we report the descriptive statistics of these variables, while Table 5.2, which follows thereafter, reports pair-wise correlations between these indicators.

Table 5.1 Descriptive statistics of the main variables of interest

Variable	Observations	Mean	St. dev.	Min	Max
EQUAL	11	.3727273	.0214900	.33	.4
DTIME	15	.1333333	.3518658	0	1
INST	15	.5486667	.1001332	.32	.65
PSTAB	12	.3033333	.0600505	.24	.43
GEFFIC	12	.2408333	.1004045	.07	.38
PREGUL	12	.3783333	.1076892	.21	.51
PSPEND	15	.4546667	.0958322	.36	.67
PSOCIAL	11	.1390909	.0144600	.12	.16
PEDUC	15	.0666667	.0175933	.04	.09
PHEALTH	15	.0506667	.0116292	.03	.07
CAPITEX	15	.0193333	.0079881	.01	.03

Source: Authors' calculations using Stata 11

In our model, variable *EQUAL* denotes inequality (i.e. the proxied Gini coefficient), *DTIME* is a time dummy variable, *INST* stands for an aggregated composite institutional index, *PSTAB* for an index of political stability, *GEFFIC* for a government effectiveness index, *PREGUL* for a regulatory quality index, *PSPEND* for total public expenditures in BiH, *PSOCIAL* for total expenditures in BiH for social protection, *PEDUC* for total public expenditures in BiH for education, *PHEALTH* for total expenditures in BiH for health and

CAPITEX for total capital expenditures financed through BiH budgets. Note, all variables excluding the time dummy (*DTIME*) are relevant measures transformed to be indices in the range from 0 to 1 in order to make empirical investigation easier.

From Table 5.1 we see that the six of our indicators are available for fifteen years, three are available for twelve years, while social protection expenditures and the Gini proxy are available for eleven years only. Since the Gini proxy is the dependent variable in our model, this reduces the sample size to eleven years effectively.

Table 5.2 Simple correlations between the variables of interest

	EQUAL	DTIME	INST	PSTAB	GEFFIC	PREGUL	PSOCIAL	PEDUC	PHEALTH	CAPITEX
EQUAL	1.00									
DTIME	0.16	1.00								
INST	0.06	0.41	1.00							
PSTAB	0.00	-0.38	0.20	1.00						
GEFFIC	0.27	0.16	0.77***	0.37	1.00					
PREGUL	0.14	0.55**	0.79***	0.05	0.70**	1.00				
PSOCIAL	0.20	0.37	-0.09	0.14	0.03	0.16	1.00			
PEDUC	-0.03	0.54**	0.51*	-0.56*	0.35	0.50*	-0.35	1.00		
PHEALTH	-0.01	0.67***	0.61**	-0.23	0.46	0.80***	0.27	0.64**	1.00	
CAPITEX	0.37	0.28	0.69***	0.11	0.69**	0.61**	0.17	0.54**	0.54**	1.00
PSPEND	-0.10	0.08	0.43	0.63 **	0.59**	0.53*	0.04	-0.03	-0.33	-0.19
*,**,*** denotes significance levels at the 10%, 5%, 1% respectively										

Source: Authors' calculations using Stata 11

We do not aim to discuss the above presented simple correlations between variables of interest (nor their descriptive statistics) since we are going to model potential associations between them in the following section. However, it is worth mentioning that the majority of variables indicate some correlations with other variables but not a significant link with the index of inequality (*EQUAL*). There is a possibility that some of the transformed forms of these variables (e.g. lagged or differenced variables) might be associated with inequality and that kind of causation will be discussed later. Accordingly, we have some indications that it is worth continuing with empirical modelling and that, in the context of the Gini proxy, we will need to investigate independent variables in their current and/or transformed form.

5.2. Empirical modelling

Our model aims to investigate the effect of public spending (*PSPEND*) on income distribution (*EQUAL*); hence, these two variables will be of the main interest. The variable *EQUAL* (an index ranged from 0 to 1, 0 representing minimum and 1 maximum inequality) is the dependent variable, while *PSPEND* (% share of the total government expenditure in GDP) is the independent variable. We expect that changes in the total level of public spending over time might affect changes in income distributions. Namely, as Garcia-Penalosa (2010) point out, any public policy pursued, including a response to a crisis, might affect income distribution. We also need to investigate and control for some other potential determinants which might influence income distribution, which is a complex phenomenon affected with various factors (Nolan, 2009). Unfortunately, the very small number of the degrees of freedom in our sample forces us to keep the number of independent variables to a minimum. We believe that institutional performance (*INST*) is the best candidate to be examined and discussed in our research (we rely on a composite and later disaggregated indices constructed in the range 0 to 1, where 0 represents the minimum and 1 maximum of institutional efficiency). The main rationale for including this variable in the regression is a large body of literature which 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) explain that more efficient institutions are generally associated with more efficient allocation of resources, and hence, lower inequality. At the same time, having local expertise, we need to remind the reader that BiH has a quite specific, complicated and costly institutional environment (Efendic et al., 2011), which deserves a particular attention in any such research. We will employ a vector of institutional proxies (an aggregated and some disaggregated components) that will capture different institutional dimensions which might affect the relationship of interest. All these models need to be estimated separately. Some important time-series issues relevant for such a modelling cannot be properly investigated (because of the lack of observations), including the potential problem of spurious regression, endogeneity, and co-integration. However, we expect a negative coefficient, meaning that when institutions are efficient, it is more likely that distribution of income will improve.

We will estimate this simple model by employing OLS methodology and STATA 11 software, using the following simple specification in the first stage:

$$EQUAL_t = \alpha_t + \beta \times PSPEND_t + \gamma \times INST_t + DTIME + \varepsilon_t$$ *Equation (1)*

We follow the majority of authors and use our established Gini index as a proxy for income distribution (*EQUAL*), while the key independent variables are public spending (*PSPEND*) and institutional performance (*INST*) explained earlier. We include also a time dummy variable (*DTIME*). In addition, we will estimate this regression by using disaggregated components of government expenditure (instead of *PSPEND*) which might affect income distribution in BiH. These more focused data include: public spending on social protection (*PSOCIAL*), public spending on education (*PEDUC*) and public spending on health (*PHEALTH*) consolidated for all governments in BiH (details can again be found in Table A.1).

As it has already been touched upon earlier, in establishing institutional proxies we will follow the majority of institutional economists and rely on different aggregated and disaggregated institutional indicators used to measure institutional performance. Firstly, we will use a constructed aggregated composite institutional index (*INST*) which 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) in order to establish a proxy for general institutional quality in this country. Then, we will rely on different disaggregated institutional components (substituting *INST* in the model) that will enable us to explore more concrete institutional fields. For this analysis we will employ The Worldwide Governance Indicators including indices capturing government efficiency (proxied by the „Government effectiveness" index - *GEFFIC*); political stability (proxied by the „Index of political stability" - *PSTAB*) and quality of regulation by the government (proxied by the „Regulatory quality" index - *PREGUL*). These indicators are available annually and cover the observed period. Index „t" denotes the time 1996-2010, while α is the intercept term and β, γ and δ are the coefficients to be estimated.

A challenge is to investigate if there was a structural change in inequality before and after the crisis period in BiH (i.e., 2000, 2008 and 2009-2010). In order to do that, we would need to analyse whether the value of the parameters remains the same over the entire period or a structural change occurred in (we envisage) 2009-2010. This will be investigated by relying

on a time dummy variable in order to keep the specification and testing procedures as simple as possible. Since the structural break is related only to the last two years, formal testing procedures (e.g. the Chow test for structural stability) are not feasible. Hence, the variable *DTIME* will be a time dummy variable used to find out more about the potential structural breaks in the model, with a special focus on the period of the global crisis.

5.3. Qualitative discussion of the obtained results

Equation (1) is estimated by using the OLS cross-time methodology. The obtained empirical results are reported in Table 5.3, including some basic model diagnostics.

Table 5.3 Base-line model results

Variables	The dependent variable *EQUAL* is an index measuring inequality				
	Model I coeff. (p-value)	Model II coeff. (p-value)	Model III coeff. (p-value)	Model IV coeff. (p-value)	Model V coeff. (p-value)
CONSTANT	0.62 (0.01)	1.20 (0.02)	0.37 (0.01)	0.37 (0.00)	0.37 (0.00)
DTIME	0.04 (0.09)	0.05 (0.04)	0.01 (0.20)	0.01 (0.94)	-0.01 (0.87)
D5.INST	-0.21 (0.03)		-0.47 (0.03)	-0.25 (0.08)	-0.22 (0.09)
D4.PSTAB		-0.03 (0.07)			
PSPEND	-0.60 (0.08)	-2.00 (0.03)			
D6.PSOCIAL			-0.06 (0.01)		
D6.PEDUC				0.07 (0.06)	
CAPITAL					-0.11 (0.04)
Observations	10	5	5	9	9
F-statistic p-value reported	p=0.11	p=0.06	p =0.02	p =0.02	p=0.08
R-squared	0.61	0.99	0.99	0.99	0.70
Ramsey RESET test	0.20	-	-	-	0.67
Breusch-Pagan test	0.27	0.64	0.74	0.74	0.73
Variance inflation factor	Mean=3.1 Max=3.95	Mean=1.85 Max=2.32	Mean=2.09 Max=2.16	Mean=2.09 Max=2.16	Mean=1.07 Max=1.11

Sources: Authors' calculations using Stata 11

Before we interpret any of the obtained results we would like to remind the reader that we operate with a very short time span of the data and that all results should be treated with caution and at the best as intuitive. That is an external limitation that cannot be influenced; still, as much information will be extracted from this dataset as possible.[16]

Equation (1) is estimated in its general form (Model I) including also different variations of institutional variables (Model II) and public spending variables (Models III-V). Majority of estimated models had problems with model diagnostics and we report in Table 5.3 only models which had satisfactory or at least close to satisfactory model diagnostics. Interestingly enough, some estimated models (i.e. Model III and Model IV) have very high R-squared indicating that the estimated linear regressions fit the data almost perfectly. However, the sample size limits us in making strong statistical inference from these coefficients.

The general model (Model I), which controls for the effects of total public spending and general institutional efficiency on income inequality, is estimated with rather weak statistical diagnostics[17] but still provides a few interesting results. Firstly, in line with discussed literature, the model suggests that there was a systematic increase in income inequality over the crisis period (*DTIME*) in comparison to the rest of the observed period. The economic downturn in BiH of 2009-2010 has increased income inequality on average by 4% and this result comes to be consistent with our visual inspection of the data on income inequality presented in Graph 4.8. Further, in terms of institutional influence on income inequality, two important observations could be made. Firstly, a positive change in institutional environment over five year period (*D5.INST[18]*) is negatively associated with income inequality. Hence, more efficient institutions decrease income inequality, which confirms the findings of some other non-transition studies (e.g., Chong and Gradstein, 2007; Carmingani, 2009). Secondly, this effect is not contemporaneous; instead, the results imply that the effect works only with lags, i.e., the effect of institutions works with a five year difference. Institutional literature generally recognizes the lagged effect of institutions in economics, and a similar finding for

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[16] In order to avoid repetition: the same limitation to the rest of this section.

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

[18] Note, 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 reasanably apropriate diagnostics. Note that this is not the case with the current (*INST*) or lagged effect (anything less than five-years difference) of this variable.

transition sample of countries is obtained by Efendic (2010)[19]. Finally, public spending (*PSPEND*) in the model has a negative coefficient, suggesting that higher levels of public spending in the model are associated with lower inequality, which is consistent with some transition research (e.g. Holzner, 2011).

The base model is estimated in the second stage by substituting the aggregated institutional index with more specific institutional determinants (including indices measuring political stability, government effectiveness and regulatory quality). Only one of these determinants, political stability, appeared to be significant in a model that had acceptable diagnostics (Model II). Accordingly, we identify political stability (*D4.PSTAB*) to be a relevant determinant in the model, suggesting that grater political instability is associated with an increase in income inequality. Since BiH is a transition country which has faced a number of political crises in the post-war period, this result is not surprising. An interesting feature of this variable though is its influence with a lagged effect (this time with a four years difference), which coincide with electoral cycles. This importance of political stability in decreasing income inequality deserves appropriate attention and would need to be investigated further in the future.

In the remaining models we report effects of different components of public expenditures i.e. spending for social protection (Model III), spending on education (Model IV), and the effect of public capital spending (Model V).

Model III reports the effect of spending on social protection (*D6.SOCIAL*) with a negative and significant correlation. Hence, higher spending for social protection is associated with slightly lower income inequality, which is a conventional finding. Still, in our model, the magnitude of the estimated coefficient (being 0.06) is much lower than for institutional proxies, for example.

The effect of public spending for education (*D6.EDUC*) has a positive and significant (albeit weak as well) effect on income distribution; a higher spending on education is associated with an increase in income inequality. Although some authors report similar results (e.g. Bergh and

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

Fink, 2008), this result seems somewhat unconventional. A conventional argument is that higher educational attainment results in a higher and more equal distribution of human capital, reducing the wage and income gap (e.g. Afonso et al., 2010). Holzner (2011), on the other hand, observes that in the transition context, tertiary education has a positive effect on income distribution while secondary education has a negative effect. However, we are controlling only the total public spending for education without distinguishing between different levels of education. Nevertheless, 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), which is very likely the case in BiH. In other words, more spending on education rises the total share of educated people in BiH labour force, who *per se* belong to higher income categories (modern sector). However, the effects of education and spending on education could be properly measured and investigated only in a long run, which we cannot do due to the limited time span of this research.

The effect of capital expenditure (*CAPITAL*) on inequality (Model V) is negative and significant, and one of the strongest of all the examined public expenditure categories. In addition, capital expenditure has a contemporaneous effect on income inequality in the direction that more capital expenditures reduce income inequality. Apart from well-known long-run effects of investment (of stimulating economic growth), capital spending also have a short-run positive and multiplying effect in the economy. An increase in capital spending is namely associated with a higher level of national output, generally stimulating higher standard of living. In addition, public capital spending is often used to target projects of public interest that have social dimensions and address different public interests, which can positively influence income distribution in the economy. Accordingly, public investments might be considered a public instrument that can be used as a short-run remedy for reducing income inequality in BiH.

The last model (a model in which public spending on health was an independent variable) has a problem with model diagnostics, which is why it is not reported here. Still, it is very interesting to notice that the observed human capital related components of public expenditures (social and education) have a significant effect only with a six years difference. In any other specification that is different from these ones reported in Table 5.3, these public spending variables were not significant and the models had problems with diagnostics. Although this needs to be investigated more, there is a rather strong indication that changes

in the levels of above mentioned segments of public expenditures have a medium-term effect and that policy makers need to pursue these policies having in mind appropriate timespans.

6. Conclusion

One of the topics which have deserved a lot of attention in the recent period among many researchers is the effect of the global economic downturn on different countries and different social and economic indicators. In line with this interest, our research focuses on the effects of contemporary global economic and financial crisis in BiH on income distribution. It is important to mention that the global economic crisis hit BiH in 2009, although the crisis started a year (or even two) earlier in more developed economies. Hence, the global economic downturn affected BiH with a short-run lag. Throughout our empirical analysis we have found plenty indications that the global economic crisis has increased income inequality in BiH. At a very general level, we find that higher public spending and improvement in quality of institutions in BiH were supportive in reducing income inequality.

We have investigated the effect of some institutional determinants and different components of public expenditures on income inequality. After controlling different institutional indicators, we have identified a particular importance of political stability in BiH as a determinant of income inequality. This finding is important for policy makers and especially for domestic political forces, as a warning that political crises, which are rather frequent in BiH, have many negative indirect effects, including this one of increasing inequality.

A more disaggregated analysis of public spending 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 expenditures for education is more long-run oriented and registered through a positive effect on economic growth and development, this finding should be considered in this broader context.

An important feature of disaggregated public spending components is their timing effects, 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 purse these policies in line with their longer effects and not some short-run priorities.

References

Afonso A., Schuknecht L, Tanzi V. (2008). Income Distribution Determinants and Public Spending Efficiency. *ECB working paper series No. 861*.

Afonso, A. and Jalles, J. T. (2012). Fiscal volatility, financial crisis and growth. *Applied Economics Letters*, Vol. 19, Issue 18, pp. 1821-1826.

Afonso, A., Schuknecht, L. and Tanzi V. (2010). Income distribution determinants and public spending efficiency. *Journal of Economic Inequality*, Vol. 8, pp. 367-389.

Bergh, A., Fink, G. (2008). Higher education policy, enrolment, and income inequality. *Social Science Quarterly*, Vol. 89, pp. 217-235.

Carmignani, F. (2009). The distributive effect of institutional quality when government stability is endogenous. *European Journal of Political Economy*, Vol. 25, pp. 409-421.

Central Bank BiH (CBBiH) (2011). *Annual Report 2010*. Sarajevo: Central Bank BiH.

Central Bank BiH (CBBiH) (2012). *Annual Report 2011*. Sarajevo: Central Bank BiH.

Chong, A., Calderon, C. (2000). Institutional quality and income distribution. *Economic Development and Cultural Change*, Vol. 48, 761–786.

Chong, A., Gradstein, M. (2007). Inequality and institutions. *The Review of Economics and Statistics*, Vol. 89, pp. 454-465.

Corsetti, G., Meier, a. and Muller, G. J. (2012). What determines government spending multipliers?. *Economic Policy*, Vol. 27, Issue 72, pp. 521.565.

De Grigorio J. and J.-W. Lee (2003). Education and Income Inequality: New Evidence From Cross-Country Data. *Review of Income and Wealth*, Vol. 48, pp. 395–416.

Directorate for Economic Planning BiH (2011). *Bosna i Hercegovina – Ekonomski trendovi 2010. godina*. Sarajevo: Directorate for Economic Planning BiH. Directorate for Economic Planning BiH (2012). *Bosna i Hercegovina – Ekonomski trendovi 2011. godina*. Sarajevo: Directorate for Economic Planning BiH.

Efendic, A. (2010). *Institutions and economic performance in transition countries – with special reference to Bosnia and Herzegovina*. Germany, Saarbrücken: Lambert Academic Publishing.

Efendic, A., Pugh, G. and Adnett, N. (2011). Confidence in formal institutions and reliance on informal institutions in Bosnia and Herzegovina: an empirical investigation using survey data. *Economics of Transition*, Volume 19, Issue 3, pp. 521-540.

Eicher, T. and Schreiber, T. (2007). Institutions and Growth: Time Series Evidence from Natural Experiments. Unive*rsity of Washington, Department of Economics, Working Paper No. UWEC-2007-15*.

Falcetti, E., Lysenko, T., and Sanfey, P. (2006). Reforms and growth in transition: Re-examining the evidence. *Journal of Comparative Economics*, Vol. 34, pp. 421-445.

Ferreira F. H. G. (2011). Poverty is multidimensional. But what are we going to do about it?, *Journal of Economic Inequality*. Vol. 9, pp. 493-95.

Garcia-Penalosa, C. (2010). Income distribution, economic growth and European integration, *Journal of Economic Inequality*. Vol. 8, pp. 277-292.

Gregorini F. and E. Longoni (2009). Inequality, Political Systems and Public Spending. *Working paper series of the Department of Economics of the University of Milan – Bicocca No. 159.*

Holzner, M. (2011). Inequality, Growth and Public Spending in Central, East and Southeast Europe. *ECINEQ Working Papers No. 2011-221.*

International Monetary Fund (1998; 2000). *Bosnia and Herzegovina: Selected Issues.* Washington: IMF.

International Monetary Fund (2000; 2003). *Bosnia and Herzegovina: Reviews under the Stand-By Arrangement.* Washington: IMF.

International Monetary Fund (2002; 2004; 2005; 2006; 2007; 2008; 2010). *Bosnia and Herzegovina: Article IV Consultations – Staff Report.* Washington: IMF.

Kollmann, R., Ratto, M., Roeger, W, and in't Veld, J. (2012). Fiscal policy, banks and the financial crisis. *Journal of Economic Dynamics and Control*, Vol. 37, pp. 387-403.

Nolan, B. (2009). Income inequality and public policy. *The Economic and Social Review*, Vol. 40, No. 4, pp. 489-510.

Rodrik D. (1998). Why Do More Open Economies Have Bigger Governments?. *Journal of Political Economy*, Vol. 106 No. 5.

Roine, J., Vlachos, J. and Wadenstrom, D. (2009). The long-run determinants of inequality: What can we learn from top income data?. *Journal of Public Economics*, Vol. 93, pp. 974-988.

Schwartz G. and Teresa Ter-Minnassian (2000). The Distributional Effects of Public Expenditure. *Journal of Economic Surveys*, Vol. 14 No. 3.

Sen, A. (1997). *On Economic Inequality, expanded edition with a substantial annexe by* Foster, J. E. & Sen, A.. Oxford: Oxford University Press.

Watt, A. (2009). Distributional issues in the context of the economic crisis in Europe. *Intereconomics*, March/April 2009, 82-93.

World Bank (WB) (2012). http://data.worldbank.org/indicator/SI.POV.GINI, data taken for the Gini coefficient, visited in February 2013.

Yuki, K. (2012). Education, inequality, and development in a dual economy. *MPRA Paper No. 39062.*

Appendix 1

Table A.1 Fiscal Indicators for BiH for the period 1996-2010

	1996	1997	1998	1999	2000
Population	3,305,672	3,365,616	3,480,285	3,601,438	3,693,698
GDP, nom. (in KM)	4,192,441,000	6,367,297,000	7,244,156,000	8,602,999,808	11,689,205,000
Total revenue	1,991,000,000	2,428,000,000	4,285,400,000	5,275,000,000	5,389,800,000
Total expenditure	2,173,000,000	2,519,000,000	4,674,700,000	5,770,300,000	5,958,500,000
Wages & benefits	1,671,000,000	1,728,000,000	1,014,181,840	898,000,000	876,412,940
Transfers	198,000,000	206,000,000	1,437,200,000	1,631,200,000	1,918,900,000
Capital expend.	24,000,000	77,000,000	149,000,000	150,000,000	146,394,144
Other expend.	280,000,000	508,000,000	2,074,318,160	3,091,100,000	3,016,792,916
Health expend.	206,350,000	230,660,000	249,380,000	408,910,000	477,440,000
Education expend.	290,580,478	336,848,700	485,328,020	521,672,956	621,581,249
Social protect. exp.	N/A	N/A	N/A	N/A	1,582,143,425

	2001	2002	2003	2004	2005
Population	3,748,370	3,775,883	3,782,717	3,781,358	3,781,001
GDP, nom. (in KM)	12,564,994,000	13,821,248,000	14,505,245,000	15,785,974,000	16,927,863,000
Total revenue	5,433,200,000	5,133,000,000	6,020,900,000	6,380,100,000	7,122,000,000
Total expenditure	5,947,400,000	5,004,000,000	5,680,400,000	5,896,600,000	6,359,500,000
Wages & benefits	854,001,450	1,470,000,000	1,783,500,000	1,776,200,000	1,834,600,000
Transfers	2,011,100,000	2,145,000,000	1,909,200,000	2,154,600,000	2,432,200,000
Capital expend.	142,650,576	191,000,000	361,800,000	466,400,000	394,600,000
Other expend.	2,939,647,974	1,198,000,000	1,625,900,000	1,499,400,000	1,698,100,000
Health expend.	549,510,000	618,270,000	806,880,000	827,460,000	859,030,000
Education expend.	522,886,746	644,502,795	680,665,042	773,885,590	1,334,904,852
Social protect. exp.	1,704,675,187	1,755,753,988	2,275,506,191	2,481,192,109	2,113,696,073

	2006	2007	2008	2009	2010
Population	3,781,588	3,779,034	3,774,164	3,767,683	3,760,149
GDP, nom. (in KM)	19,105,855,000	21,759,000,000	24,702,000,000	23,994,000,000	24,943,000,000
Total revenue	8,586,400,000	9,832,600,000	10,903,000,000	10,342,500,000	10,862,500,000
Total expenditure	7,545,900,000	8,828,800,000	10,599,500,000	10,664,500,000	10,840,200,000
Wages & benefits	2,222,700,000	2,534,700,000	3,022,200,000	3,155,100,000	3,169,700,000
Transfers	2,736,900,000	3,408,800,000	4,384,700,000	4,369,500,000	4,246,900,000
Capital expend.	492,100,000	553,300,000	606,800,000	526,500,000	707,600,000
Other expend.	2,094,200,000	2,332,000,000	2,585,800,000	2,613,400,000	2,716,000,000
Health expend.	998,980,000	1,202,600,000	1,482,510,000	1,609,890,000	1,693,786,849
Education expend.	1,465,786,494	1,768,088,990	2,172,178,652	2,155,529,281	2,190,267,635
Social protect. exp.	2,441,489,000	2,832,196,494	2,978,551,681	3,589,911,758	3,822,564,409

Sources: CBBH, DEP and IMF, World Data Bank, WHO and BiH ministries of finance, 1996-2011

Appendix 2

Table A.2 Descriptive statistics on income question

2000-2010	Frequency	Percent	Valid Percent	Cumulative Percent
No income	902	1.4	1.4	1.4
Less than 100 KM/DM	3292	4.9	5.1	6.6
101 - 200	7532	11.3	11.8	18.3
201 - 300	7789	11.7	12.2	30.5
301 - 400	6921	10.4	10.8	41.3
401 - 500	5578	8.3	8.7	50.0
501 - 600	4303	6.4	6.7	56.8
601 - 700	3352	5.0	5.2	62.0
701 - 800	2843	4.3	4.4	66.4
801 - 900	2093	3.1	3.3	69.7
901 - 1000	2319	3.5	3.6	73.3
1001 - 1100	1340	2.0	2.1	75.4
1101 - 1200	1134	1.7	1.8	77.2
1201 - 1300	901	1.3	1.4	78.6
1301 - 1400	605	.9	.9	79.5
1401 - 1500	812	1.2	1.3	80.8
1501 - 1600	486	.7	.8	81.6
1601 - 1700	303	.5	.5	82.1
1701 - 1800	296	.4	.5	82.5
1801 - 1900	235	.4	.4	82.9
1901 - 2000	290	.4	.5	83.3
More than 2000 KM/DM	1129	1.7	1.8	85.1
BO/Od	3060	4.6	4.8	89.9
NZ/NS	6457	9.7	10.1	100.0
Total	63991	95.8	100.0	

Sources: Authors' calculations using Stata 11

Appendix 3

Methodology used to calculate the Gini coefficient proxies for BiH

Table A.3 The Gini coefficient proxy calculations for five income groups

Group	Members per group	Income per group	Accumulated income	Gini calculations
1	A_1	E_1	$K_1 = E_1$	$G_1 = (2 * K_1 - E_1) * A_1$
2	A_2	E_2	$K_2 = E_2 + K_1$	$G_2 = (2 * K_2 - E_2) * A_2$
3	A_3	E_3	$K_3 = E_3 + K_2$	$G_3 = (2 * K_3 - E_3) * A_3$
4	A_4	E_4	$K_4 = E_4 + K_3$	$G_4 = (2 * K_4 - E_4) * A_4$
5	A_5	E_5	$K_5 = E_5 + K_4$	$G_5 = (2 * K_5 - E_5) * A_5$
Totals	ΣA	ΣE		ΣG
Gini = 1 - ΣG/ΣA/ΣE				

Source: Based on Sen (1997)