IS GDP AN APPROPRIATE INDICATOR OF SUSTAINABLE ECONOMIC DEVELOPMENT?

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The System of National Accounts (SNA 1993, ESA 1995) as an internationally agreed framework for the compilation and presentation of economic data defines gross domestic product (GDP) as an overall indicator of economic growth. Accounting for the environment's contribution to the economy and human welfare was considered extremely difficult, requiring the resolution of intractable methodological problems and the generation of a large amount of data. Besides environmental aspects, GDP also fails to fully explain differences in overall satisfaction of the citizens and perception of quality of life and well-being.

One of the most ambitious efforts to reform the calculation of an indicator of economic welfare is presented in Daly and Cobb (1989). They propose a GDP substitute, the Index of Sustainable Economic Welfare (ISEW) which, apart from the conventional national accounts data includes environmental variables and income distribution indicators.

In this paper we apply the ISEW methodology to the Croatian economy and construct the index of sustainable economic welfare for Croatia in the

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period 2000-2010. Index of Sustainable Economic Welfare constructed for Croatia has not recorded significant differences in comparison to GDP trends. Until 2003, the ISEW index was below GDP and personal consumption. In period 2003-2006 ISEW recorded higher levels than GDP while in 2007 and 2008 both indices are moving in line. During the recession period, overall welfare has not decreased substantially because GDP drop is partially compensated by non-monetary activities with positive impact on household wellbeing.

Keywords: sustainable economic development, ISEW index, Croatia.

1. Introduction

Although some postulates of national accounts have been used centuries ago, the gross domestic product (GDP) concept has been developed in the 1930s, becoming a standard benchmark used by analysts and policy-makers as a general indicator of economic development. GDP is defined as the market value of all final goods and services produced within a country in a given period and according to fundamental macroeconomic identities can be measured by production, income or expenditure approach. For the purpose of comparability, international organisation such as United Nations and Eurostat developed a set of concepts, definitions and tables published in the System of national accounts (SNA 1993 and ESA 1995) which should be used in the statistical system of member states.

Methodology of national accounts is very detailed regarding definition of production boundaries and rules for recording of economic transactions which allow comparisons to be made between countries. Because of that, GDP is broadly regarded as a proxy indicator for overall societal development and economic progress in general. However, according to the theoretical background, GDP cannot be relied upon to explain all social and economic phenomenon. According to definition (sum of market value of final production) GDP is not convenient measure of environmental sustainability or social inclusion (Commission of the European community, 2009).

The need to improve data and indicators to complement GDP in order to allow better insight in overall economic sustainability and social cohesion has been increasingly recognised not only in economic literature but is in the focus of a number of international initiatives. European commission (2009) concludes that GDP (although a powerful tool for monitoring of short and medium term economic fluctuations) is not meant to be an accurate gauge of long-term economic and social progress and notably, the ability of a society to tackle issues such as climate change, resource efficiency or social inclusion. At the moment, the EC recommen-

dation is not to construct a new indicator for economic development but there is a clear case for complementing GDP with statistics covering other economic, social and environmental issues, critically influencing people's well-being.

In this paper we applied the ISEW methodology (index of sustainable economic welfare) to the Croatian economy and construct the index of sustainable economic welfare for Croatia for the period 2000-2010. The methodology is slightly adjusted due to data constraints. The aim of that index is not to replace GDP as overall measure of economic development but to construct an indicator which could better describe sustainable economic welfare and explain a growing gap between hard statistical data and subjective perception of well-being. After introductory remarks in next chapter, a short literature review on indicators of sustainable economic welfare is presented. In chapter 3, we developed methodology for Croatian ISEW index and compare results with GDP trends for analysed period. Chapter 4 concludes.

2. Economic activity and welfare

European system of national accounts (ESA 1995) defines gross domestic product at market prices as the overall result of the production activity of resident producer units in a given period of time. GDP can be calculated in three ways:

a) As a sum of gross value added (value of production minus intermediate consumption) of the various institutional sectors or the various industries plus taxes and less subsidies on products.

b) As a sum of final uses of goods and services by resident institutional units, plus exports and minus imports of goods and services;

c) As a sum of transactions on income account (compensation of employees, taxes on production and imports less subsidies, gross operating surplus and mixed income of the total economy).

Obviously, GDP is primarily concerned with the measurement of current transactions comprised of production and consumption of goods and services. A positive relationship can be expected between the volume of goods and services consumed and the well-being of the population on the national level but there are no straightforward conclusions on the functional form of that relation. An additional unit of consumption does not necessarily result in comparable growth of well-being. GDP is primarily a measure of value added defined as value of production minus intermediate production which is identical to domestic absorption only in the theoretical model of closed economy. On the other hand, welfare primarily

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relates to the level and structure of consumption. According to theoretical background used in general equilibrium models, marginal utility of a certain product is not the same for all consumers and from that point of view, distributional features of an economy have an important role in assessing overall welfare.

In economic literature, the most used definition of income is the Hicksian definition, stating that income is the maximum amount which can be spent during a period if there is to be an expectation of maintaining the capital value of prospective returns intact (Nordhaus, 1995). In terms of national accounts this concept is close to net national income (GDP + balance of primary incomes from abroad – consumption of fixed capital). The standard set of national accounts does not account for resource depletion and environmental degradation as intermediate or capital consumption and those items should be deducted from net national income in order to derive sustainable income. Nordhaus (1995) defines sustainable income as the maximum amount that a national can consume while ensuring that all future generations can have living standards at least as high as those of the current generation.

The concept of sustainable welfare should account for long-term effects of current consumption. Additionally, the output of many economic activities is not directly consumed but specifically set aside to defend a population from the side-effects of past and present economic activities. Some authors (Daly, 1996) proposed a measure of national income in which GDP should be corrected for consumption of human made capital and natural capital.

All of the proposed correction of conventional GDP in order to construct an indicator which is more appropriate in describing overall welfare can be classified in the following:

a) Methodological treatment of compensation for non-monetary transactions not included in standard system of national accounts but affecting well-being of the population, valuation of the leisure, services of consumer durables and defensive expenditures;

b) Income inequality and well-being;

c) Long-term effects of current economic transactions on natural resources; and

d) Long-term effects of current economic transactions on future consumption.

2.1 Methodological difference in a system of national accounts and studies on well-being of population

In conventional system of national accounts non-monetary activities within a household and not affecting other units are not included in overall gross value

added, although households certainly have benefits from those activities. These activities typically include cooking (food preparation), child care, adult care, stitching of clothes, upkeep of dwellings and surroundings, repairs and maintenance of dwellings, household equipment's, household management, shopping, gardening, pet care, etc. In the national accounts system, if a household pays a non-household member for performing those activities, then the value of the services should be included in the GDP. This value is not included in cases when these activities are carried out by a household member. Those unpaid activities certainly affect household wellbeing, hence the reason for their inclusion in some welfare indicators.

A very important example of the failure of the monetary income in describing "utility" of a unit concerns the valuation of leisure time, which could be also treated as part of consumption according to the broadest definition. The two variants of the revealed preference argument are presented in Fleurbaey (2008) and both advocate using individuals' net wage rate as the proper valuation of leisure time. On the other hand, it is very complicated to delineate between voluntary and involuntary leisure, especially in the case of rigid and unfavourable labour market conditions. Because of that, leisure is rarely included in the construction of welfare indicators although there were some examples (Fleurbaey and Gaulier, 2007).

In the standard system of national accounts, consumer durables (cars, household equipments) are recorded as final consumption of households at the moment when product is bought using actual market value. It does not reflect the real welfare of consumers related to these goods because it is obvious that the utilization period of these goods are not taken in account. In order to be in line with concept of utility, the services connected with these goods should be treated as benefits during the entire utilisation period of the products, while the cost of acquisition should be subtracted from private consumption in the period when product is bought.

A certain share of the production does not contribute to the additional income of a nation. It is produced to prevent the undesirable side-effects of the economic process reducing future income. The following defensive and rehabilitative expenditures are subtracted from the GDP in some studies on well-being of the population (Lawn, 2003):

- the cost of household pollution abatement,

- the cost of vehicle accidents,

- the cost of family breakdown,

- in some cases, a certain percentage of private health expenditure assumed to constitute a form of defensive expenditure.

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2.2 Income inequality and well-being

The distribution of income in national economy can have a significant impact on economic welfare of the population. Even in cases when overall personal consumption expenditure does not increase from one period to the next but the distribution of income becomes more equal, the total welfare is likely to increase because the marginal benefit of the poor is higher than the marginal benefit of the rich segment of the population.

The form of the social welfare function is generally intended to express a statement of objectives of a society. The neoclassical utilitarian social welfare function is expressed as

$$W = \int U(x)dF(x) \ .$$

Rawls (1973) attaches more importance to the benefit of the poor and proposes a definition of the social welfare function as the welfare of the poorest in the society and maximizing social welfare amounts to maximize the welfare of the poorest. Sen (1973) proposed to measure social welfare by:

$$W_{\text{Gini}} = \overline{\text{Income}} \cdot (1 - G)$$

where G is the Gini coefficient. Foster (1996) proposed a modification of formula and using one of Atkinson's Indexes instead of the Gini index.

2.3 Long-term effects of current economic transactions on natural resources

The famous publication, 'Club of Rome (1972) Limits to Growth' concluded that environmental pollution and resource depletion caused by population growth and industrial expansion would lead societies to unsustainable positions. Since then, the impact of economic development on natural resources became an important subject of interest not only in academic research but also in a number of reports of international organisation. At the EU level, the directions on monitoring of natural resources sustainability have been clearly set. COM(94)670 Directions for the EU on Environmental Indicators and Greened National Accounting – Integration of Environmental and Economic Information Systems identified the main lines of actions as "continuing and enlarging work on satellites to National

Accounts (natural resources accounting, environmental expenditures, etc.)" and "linking economic performance indicators and environmental pressure indices".

The concept of economic growth as a positive indicator of society's well-being was criticised. In economic literature there is a broad scope of literature dealing with so-called Green National Accounting which extends conventional national product measures and provide better indicators of the degree to which welfare levels can be sustained. Although this concept starts from standard national accounts, green accounting uses a broader concept of economic welfare. In addition to standard economic transactions as a key factor determining overall welfare, environmental amenities, pollution levels and availability of natural resources are included.

While standard national accounts concentrate more on short-term effects, the green national accounts take advantage of the fact that utility levels of future generations may matter for the welfare objective of current generations. Society might care in particular for the utility levels of those generations that are worse off in future.

Many sets of accounts have been developed and successfully applied in practice. Well known types include:

- Asset accounts for natural resources including accounts for forests, subsoil assets, land, soil and water; these accounts may be using physical or both physical and monetary units;

- Emission accounts including accounts for air emissions, energy use, waste and use and pollution of water;

- Material flow accounts, ranging from specific substance flows (e.g. for carbon) to economy-wide material flows which are used to derive key material use indicators (such as total material requirement) and physical input–output tables;

- Environmental protection expenditure satellite accounts and environment industry accounts showing the financial resources dedicated to environmental protection and the employment generated due to environmental protection; and

- Resource management accounts describing the money flows related to management of natural resources.

In addition to the above mentioned set of accounts, various indicators for measuring sustainability in the context of natural resources are proposed in literature. The sustainability gap indicator is an example (Ekins and Simon, 1999). Since welfare is critically dependent on air quality, a minimum level of air quality can be defined that is needed to maintain welfare at a reasonable level, and it can

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be measured how far society is from this standard; the exercise can be repeated for other natural resources.

Another popular example is the "ecological footprint", which measures the amount of land that is needed to generate the consumption of a country, including the land needed to assimilate the waste generated and undo climatic change from carbon dioxide emissions by means of carbon sequestration (Wackernagel and Rees 1996). Similar measures, with a similar aggregation problem, keep track of varieties of material resource flows.

2.4. Long-term effects of current economic transactions on future consumption

On the individual level, income is defined as maximum amount which can be spent in certain period, assuming that real value of assets remains the same. If household consumption in a certain period is higher than income, it should be financed by decreasing stock of assets or increasing liabilities. In the long-term perspective, continuous consumption that exceeds income is not sustainable. Accrued liabilities due to financing of consumption higher than income in current period should be paid back in future periods which decreases potential future welfare.

The same holds for a country. Domestic absorption higher than production is financed by current account (CA) deficit. If a country invests more than its saves, it has to borrow from the rest of the world to finance this deficit. In fact, a CA deficit means that the country is producing an amount of output/income (GNP) that falls short of the total spending on the goods of the country (the sum of consumption and investment):

$$CA = GNI - C - G - I$$

To finance the excess of investment over savings, the country either runs down its financial foreign assets (if there are enough foreign assets to be run down) and/ or borrow from the rest of the world to finance new investment. In either case, the excess of I over S (S=GNI – C-G) leads to a increase of the net foreign liabilities (foreign liabilities - foreign assets). More formally, the change in the net foreign assets of a country (a change in stocks) will therefore be equal to the current account (a flow) or:

$$NFA_{t+1} - NFA_t = CA_t$$

Foreign Capital Inflow (FCI) is widely accepted in economic literature as a factor stimulating economic growth in the developing world. FCI enables receiving countries to achieve investment levels beyond their own domestic savings. Besides other positive impact of investment (higher capital stock and speeding up of technological progress) in this paper we are primarily concerned with above-mentioned macroeconomic identities. In the short run, availability of foreign capital inflow is boosting domestic absorption and positively influences GDP growth. On the other hand, growth based on domestic absorption financed by foreign capital is limited because in the long-run high foreign liabilities to GDP ratio influence willingness of foreign investors to further finance current account deficit.

Structure of gross domestic product is also important in defining sustainable development. If gross fixed capital formation is higher than consumption of fixed capital, capital stock of a nation is increasing which positively influence future potential growth. To summarise, sustainable growth in macroeconomic context could be defined as GDP growth corrected for change in net fixed and financial assets of a country.

2.5 Short overview of the alternative approaches in measuring sustainable development

Nordhaus and Tobin (1972) developed experimental measure of economic welfare (MEW) which relates to conventional set of national accounts but some items are rearranged. In order to construct a welfare indicator they reclassified some categories from private and public consumption into intermediate consumption and investment. They also proposed imputation for services of consumer durables and household work, valuation of leisure as well as corrections for negative aspects of urbanisation. Authors concluded that although standard national accounts are not a perfect measure of economic welfare, the above mentioned correction do not significantly change the picture of long-term economic developments.

UNDP developed Human Development Index (HDI) which is published annually and comprises four sets of data: life expectation at birth, adult literacy rate, combined gross enrolment ratio for primary, secondary and tertiary schools and GDP per capita. Although HDI covers only a limited set of sustainable development indicators it is very suitable in describing development levels.

Environmental Sustainability Index, ESI-2005 has been developed by Columbia University and Yale University, USA. ESI comprises 76 variables, which are aggregated into 21 indicators grouped together in 5 categories. ESI covers the

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broad range of aspects of sustainable development, but it is not very transparent due to the great amount of data and inconvenient for updating.

Concept of Ecological Footprint was developed by Wackernagel and Rees and published every two years by the WWF in the Living Planet Report. Ecological Footprint is based on methodology which converts all products (including intermediate consumption) into the required number of hectares per capita. The Ecological Footprint only partly covers sustainability in its wider sense. Because other aspects of sustainability are not included, the footprint is not suited as a sustainability measure in a broader sense.

In order to monitor progress of achieving the Millennium Development Goals UN developed a set of Millennium Development Indicators. Although comprised of a lot of useful information, this set of indicators does not cover a broad concept of economic sustainability.

Index for Sustainable Economic Welfare (ISEW) was based on the methodology presented in Daly and Cobb (1989) and since then calculated for over 10 countries. In the ISEW index GDP is adjusted for items that are currently not included in the scope of standard national accounts but influence future welfare. Methodology for calculation of this index will be presented in the next chapter and applied to the Croatian economy. The Genuine Progress Indicator (GPI) is similar to ISEW and measure whether or not a country's growth, increased production of goods, and expanding services have actually resulted in the improvement of the welfare (or well-being) of the people in the country (Lawn, 2003).

3. ISEW index for Croatia in period 2000-2010

We apply the ISEW methodology to the Croatian economy and construct the sustainable economic welfare index for Croatia in the period 2000-2010 for which final data on GDP are available. The methodology is slightly adjusted due to data constraints. The index does not aim to replace GDP as overall economic development measure but to construct an indicator which could better describe sustainable economic welfare. A comparison of the ISEW index and official national accounts figures will answer the question whether GDP is appropriate measure of sustainable development in Croatia.

3.1 Methodology and data sources

The basic methodology used to calculate the ISEW index for the Croatian economy is similar to research for other countries (e.g. Jackson et al., 1997, Pulselli et al., 2006, Bleys, 2008). In most papers, the index of sustainable economic welfare is defined as follows:

ISEW = personal consumption expenditures
    − losses from income inequality
    + value of domestic labour
    + non-defensive public expenditures
    − defensive private expenditures
    − costs of environmental degradation (direct and longterm)
    − depletion of natural capital
    + capital adjustments.

Theoretical background and rationale for positive/negative adjustments are presented in previous chapter. Table 1 summarises the impact of various factors on welfare, methodology and data sources used in ISEW estimation for Croatia. Most important data sources are national accounts data and household budget survey data. Most of data is drawn from official sources without any transformation. National accounts provide data on personal consumption, gross fixed capital formation and consumption of fixed capital. Ministry of finance publishes data on public expenditures on education and health. Croatian National Bank compiles balance of payments statistics including current transactions and flows of foreign capital. Household budget statistics (HBS) provide detailed structure of household expenditures which we used for relevant items. Results of HBS are also used for income inequality (Gini coefficient) valuation.

In estimation of costs of air pollution, we considered various types of emissions and their cost per ton of emission which are taken from Pulselli et al. (2006):

- SOx 2324 Euro/ton

- NOx 904 Euro/ton

- TSP (total suspended particles) 130 Euro/ton

- CO2 10 Euro/ton.

Costs were multiplied by the quantity of emissions (from Croatian Bureau of Statistics database), to obtain total costs of air pollution in relevant year.

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Table 1:

METHODOLOGY AND DATA SOURCES USED IN CALCULATION OF ISEW INDEX FOR CROATIA IN PERIOD 2000-2010

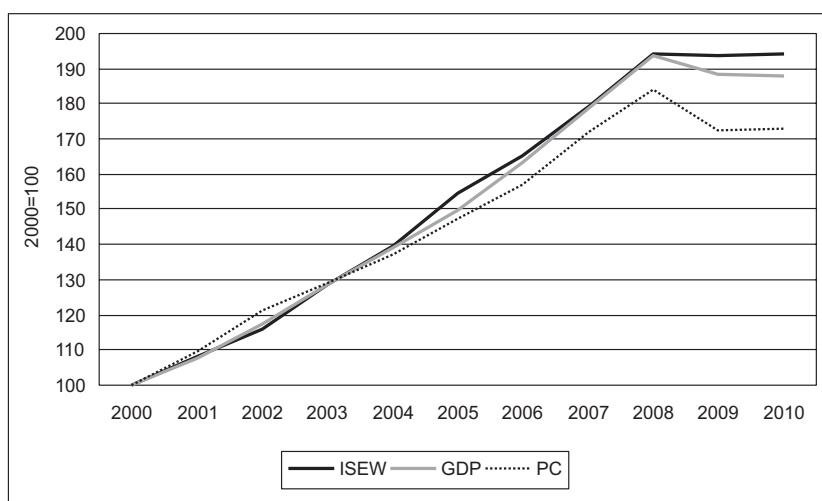|	Impact	Rationale	Methodology/Data source
Item			
Personal consumption C	+	Basis for assessment of welfare	National accounts data
Income distribution G	-	Income inequality negatively affects welfare	Gini coefficient, CBS
Weighted personal consumption C/(1+G)		Consumption corrected for inequality	C/(1+G)
Services from domestic labor	+	Unpaid domestic work positively influence welfare	Estimated time spent of household work valued at average wage rate
Services from consumer durables	+	Stock of durables impacts welfare	Estimated from Household Budget Survey
Public expenditures on health and education	+	Non-defensive public expenditures	Ministry of Finance data (50% of health and education expenditures are regarded as defensive expenditures)
Private expenditure on health and education	-	Defensive private expenditure	Estimated from Household Budget Survey (HBS) – 50% of health and education expenditures are regarded as defensive expenditures
Expenses on durable consumer goods	-	Stock of durables impacts welfare	Estimated from Household Budget Survey (HBS) - motor vehicles, furniture, electric household appliances
Costs of commuting	-	Defensive private expenditure	Percentage of private transportation costs, HBS data
Cost of car accidents	-	Defensive private expenditure	Cost paid by insurance companies for car accident
Costs of water pollution	-	Environment degradation	Croatian Water company (total expenses)
Costs of air pollution	-	Environment degradation	Emissions of different types of air pollution valued by estimated costs
Costs of noise pollution	-	Environment degradation	Not included
Loss of farmlands	-	Natural capital depletion	Not included
Depletion of non-renewable resources	-	Natural capital depletion	Quantities of oil and gas extraction (CBS data) valued by estimated costs
Cost of ozone depletion	-	Natural capital depletion	Not included
Net capital growth	+/-	Long-term effects of capital stock	Gross fixed capital formation minus consumption of fixed capital, national accounts data
Changes in net international position	+/-	Long-term effects of net foreign debt	Financial and capital account balance, balance of payment statistics data

Guenno and Tiezzi (1998)

Services from domestic labour contribute directly to economic welfare of households, even if it does not involve monetary transactions. Value of domestic labour is based on population data. It was assumed that inactive population in age 15-65 are partially engaged in providing of domestic services. Similarly to other ISEW papers we assumed that housewives spend 8 h/day in housework while other inactive persons spend 2 h/day on those activities. The income per hour generated by domestic labour was multiplied by the hours spent at home by people, as suggested by Guenno and Tiezzi (1998).

3.2. Results

Index of Sustainable Economic Welfare constructed for Croatia has not recorded significant differences in comparison to GDP trends. As can be seen from the figure 1 until 2003 ISEW index was slightly below indices of GDP and personal consumption. In period 2003-2006 ISEW recorded higher level than GDP while in 2007 and 2008 both indices are moving in line. During recession, overall welfare has not decreased substantially because drop of GDP is partially compensated by non-monetary activities with positive impact on wellbeing of households.

Figure 1:

ISEW, GDP AND PERSONAL CONSUMPTION, INDEX 2000=100

Source: Authors' calculations.

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Impact of individuals factors which directly or indirectly affect economic welfare were evaluated for Croatian economy (Table 2). After taking weighted private consumption (consumption adjusted for distribution of income) as the starting point, positive and negative items were added or subtracted in order to calculate ISEW index.

Table 2:

RESULTS - ISEW INDEX FOR CROATIAN ECONOMY

Item	2000	2005	2010	Index 2005/2000	Index 2010/2005	Index 2010/2000
Personal consumption C	107.525	158.456	186.098	147,4	117,4	173,1
Income distribution G	28	30	32	107,1	105,0	112,5
Weighted personal consumption C/(1+G)	84.004	121.889	141.519	145,1	116,1	168,5
Services from domestic labor	24.051	30.212	36.349	125,6	120,3	151,1
Services from consumer durables	8.262	9.877	12.627	119,5	127,8	152,8
Public expenditures on health and education	9.704	13.581	19.067	140,0	140,4	196,5
Private expenditure on health and education	-1.225	-1.570	-2.277	128,1	145,0	185,8
Expenses on durable consumer goods	-7.703	-8.161	-5.590	106,0	68,5	72,6
Costs of commuting	-2.171	-2.395	-3.285	110,3	137,1	151,3
Cost of car accidents	-2.121	-2.214	-2.074	104,4	93,7	97,8
Costs of water pollution	-1.125	-1.489	-1.779	132,4	119,5	158,1
Costs of air pollution	-1.765	-1.773	-1.740	100,4	98,1	98,6
Depletion of non-renewable resources	-3.176	-4.565	-6.551	143,7	143,5	206,3
Net capital growth	6.366	26.205	20.986	411,6	80,1	329,7
Changes in net international position	-11.128	-22.040	-9.313	198,1	42,3	83,7
Total ISEW	101.973	157.557	197.939	154,5	125,6	194,1
GDP	178.118	266.652	334.564	149,7	125,5	187,8

Source: Authors' calculations.

If we compare index of total ISEW and GDP for period 2010/2000 we can conclude that difference between those two indicators are not substantial. GDP in nominal terms were growing 6.6 percentage points on annual basis while ISEW recorded average annual growth of 6.9%. All of the difference in average growth is related to the first period 2000-2005 while on average no difference in growth was recorded in later period.

As can be seen, growth of income inequalities has a negative impact on overall welfare, and personal consumption adjusted for inequalities recorded slower growth. Difference in treatment of consumer durables has no significant impact on overall welfare. While national accounts recorded transactions in the moment when durables are acquired, in concept of economic welfare their impact is spanned over the whole utilisation period.

The most important factor behind higher growth of ISEW index relates to public expenditures on health and education. As explained in the methodological part of the paper, non-defensive government expenditures which positively affect welfare of population are estimated as 50% of expenditures on health and education. Those expenditures almost doubled over the analysed period. In interpreting those results one should bear in mind that all items are expressed in nominal terms because no appropriate deflators are available for some items. Because of that it is not possible to delineate real growth of benefits which household receive for health and education and impact of changes in prices for those items.

In the group of items reflecting negative ecological impact, the most significant is item depletion of non-renewable resources (oil and gas extraction). Other items have a lower impact on sustainable growth. Long-term effects of current transactions are more substantial in the case of changes in overall national assets and liabilities. Overall, growth in stock of fixed capital is financed by foreign capital inflows. In recent periods, an overall increase in asset value of Croatian residents is higher than net incurrence of foreign liabilities which positively affected future prospects of economic growth. However, the analysis reflects the accounting point of view only, while overall economic sustainability relates more to investment efficiency. Some studies conclude that investments in Croatia are less efficient in comparison to NMS as a consequence of high share of public investment in infrastructure.

Over the period 2000-2010, the most significant negative impact was attributed to income distribution (-22,8), Table 3. This is followed by the item Changes in net international position (-14,1). On the other hand Costs of water pollution (-1,0) and Costs of air pollution (-1,2) recorded the smallest negative contribution. Overall, in period 2000-2010, the average negative impact was -51,9 on average with a decreasing trend at the end of period under observation.

As for positive impact, the most significant item Services from domestic labor (+20,2) and Net capital growth (+13,7). Overall positive impact was, on average +49,9. Total correction of personal consumption in period 2000-2010 should be -2,0 on average with significant negative values at the beginning of the period, and positive values at the end. It is evident that during 'good times', the official GDP figures overestimate true welfare, while the opposite holds at the time of recession thanks to the services from domestic labor and services accruing from durable consumer goods usually bought in good times.

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Table 3:

POSITIVE AND NEGATIVE IMPACT OF ISEW COMPONENTS ON PERSONAL CONSUMPTION, EXPRESSED AS % OF TOTAL ISEW

Items	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Av. 2000-2010
Negative impact												
Income distribution	-23,1	-23,3	-24,8	-23,8	-23,9	-23,2	-22,0	-22,7	-21,9	-20,0	-22,5	-22,8
Private expenditure on health and education	-1,2	-1,2	-1,2	-1,0	-1,1	-1,0	-1,0	-1,0	-1,0	-1,1	-1,2	-1,1
Expenses on durable consumer goods	-7,6	-7,2	-7,1	-6,7	-6,2	-5,2	-5,0	-4,9	-3,8	-3,5	-2,8	-5,4
Costs of commuting	-2,1	-1,9	-1,8	-1,7	-1,6	-1,5	-1,5	-1,4	-1,5	-1,5	-1,7	-1,7
Cost of car accidents	-2,1	-1,9	-1,9	-1,7	-1,6	-1,4	-1,4	-1,4	-1,4	-1,2	-1,0	-1,5
Costs of water pollution	-1,1	-1,0	-1,0	-1,1	-1,0	-0,9	-1,1	-1,2	-1,2	-0,9	-0,9	-1,0
Costs of air pollution	-1,7	-1,6	-1,4	-1,4	-1,3	-1,1	-1,0	-1,0	-0,8	-0,9	-0,9	-1,2
Depletion of non-renewable resources	-3,1	-3,1	-3,1	-2,9	-2,9	-2,9	-3,2	-3,0	-2,9	-2,7	-3,3	-3,0
Changes in net international position	-10,9	-8,8	-16,8	-17,7	-13,1	-14,0	-17,4	-17,8	-20,9	-12,8	-4,7	-14,1
Total negative items	**-52,9**	**-50,0**	**-59,2**	**-58,0**	**-52,6**	**-51,3**	**-53,5**	**-54,4**	**-55,4**	**-44,5**	**-39,0**	**-51,9**
Positive impact												
Services from domestic labor	23,6	23,2	22,8	21,8	20,5	19,2	19,0	18,2	17,7	18,2	18,4	20,2
Services from consumer durable	8,1	7,8	7,7	7,0	6,8	6,3	6,2	6,4	6,0	6,3	6,4	6,8
Public expenditures on health and education	9,5	9,3	9,1	8,7	8,6	8,6	8,7	8,9	9,3	9,7	9,6	9,1
Net capital growth	6,2	3,2	9,2	14,8	13,2	16,6	19,1	19,7	22,3	16,2	10,6	13,7
Total positive items	**47,4**	**43,5**	**48,7**	**52,2**	**49,1**	**50,7**	**53,1**	**53,2**	**55,4**	**50,4**	**45,0**	**49,9**
Total correction of personal consumption	**-5,4**	**-6,5**	**-10,4**	**-5,7**	**-3,6**	**-0,6**	**-0,4**	**-1,2**	**0,0**	**6,0**	**6,0**	**-2,0**

Source: Authors' calculations.

Figure 2 presents the comparison of nominal growth rates of the sustainable economic welfare index, gross domestic consumption and personal consumption in Croatia in the period 2000-2010. Although, on average, growth differences are not substantial and in some years there were significant discrepancies. The highest difference in ISEW and GDP growth was recorded in 2005 when ISEW rose by approximately 3 percentage points above GDP, and in 2006 when opposite patterns are found. As a consequence of non-monetary transactions, (services of durables acquired in earlier periods, domestic services) welfare recorded only a slight decrease during the recession period, while GDP and personal consumption recorded significant reduction.

Figure 2:

NOMINAL GROWTH RATES OF ISEW, GDP AND PERSONAL CONSUMPTION IN CROATIA

Source: Authors' calculations.

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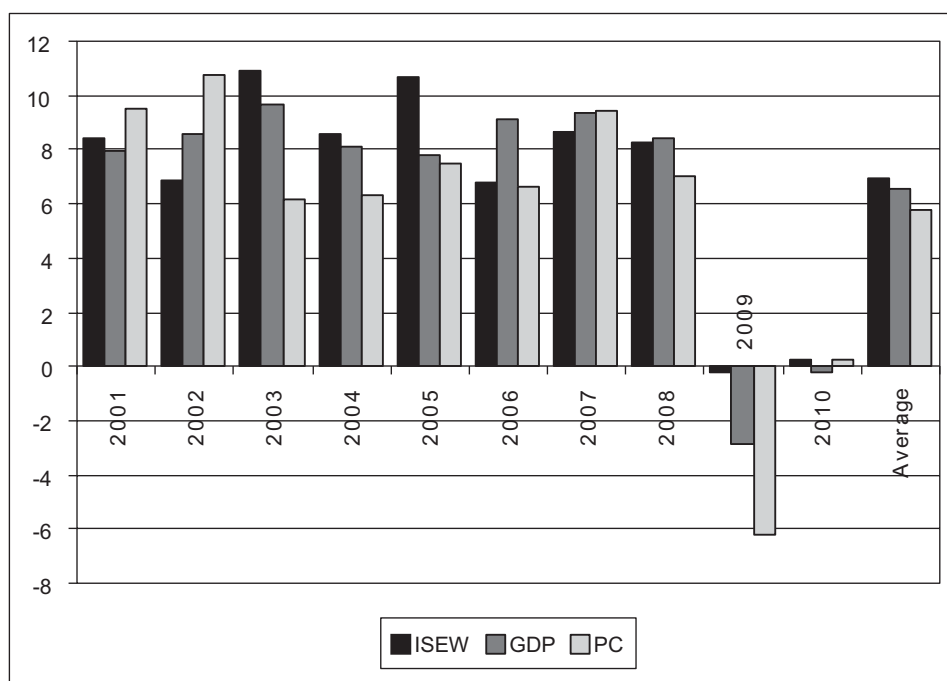
4. Conclusion

GDP is defined as the market value of all final goods and services produced within a country in a given period, using an internationally agreed methodology which should be used in the statistical systems throughout the world. GDP is broadly regarded as a proxy indicator for overall social development and economic progress in general. However, according to the theoretical background, GDP cannot be relied upon to explain all social features as well as economic and environmental sustainability.

On the other hand, the Index of Sustainable Economic Welfare (ISEW), despite being based on national accounts data, attempts to improve the descriptive value and account for population welfare and long-term sustainability. Methodology for ISEW calculation was presented in Daly and Cobb (1989) and used in calculations for over 10 countries since. Results for other countries indicate towards different conclusions depending on analysed period and items included in study, but in most cases ISEW index recorded slower growth in comparison to GDP.

Index of Sustainable Economic Welfare is a valuable tool for highlighting the importance of its underlying rationale and for the assessment of appropriateness of standard GDP data for measuring sustainable development. It presents different effects economic growth can have on human welfare in the broadest sense. However, as different methodological and practical objections to the index suggest, the ISEW in its present form is still far of becoming an ideal measure of economic welfare accepted on international level.

Index of Sustainable Economic Welfare constructed for Croatia has not recorded significant differences in comparison to GDP trends. Until 2003, the ISEW index was below GDP and personal consumption. In period 2003-2006 ISEW recorded higher levels than GDP while in 2007 and 2008 both indices are moving in line. During the recession period, overall welfare has not decreased substantially because GDP drop is partially compensated by non-monetary activities with positive impact on household wellbeing.

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JE LI BDP PRIKLADAN POKAZATELJ ODRŽIVOG EKONOMSKOG RAZVITKA?

Sažetak

Sustav nacionalnih računa (SNA 1993, ESA 1995) predstavlja međunarodno usuglašen okvir za izradu i prikaz ekonomskih podataka, a kao temeljni pokazatelj ekonomskog razvitka i rasta koristi se bruto domaći proizvod (BDP). BDP prema svojoj definiciji ne obuhvaća ukupne učinke ekonomskih transakcija na okoliš i ne mjeri blagostanje pojedinca budući bi konstrukcija takvog pokazatelja zahtijevala rješavanje složenih metodoloških problema i uključivanje brojnih dodatnih varijabli u obračun. BDP također ne objašnjava ukupne razlike u zadovoljstvu građana i njihovu percepciju o kvaliteti života i blagostanju.

U ekonomskoj literaturi kao jedan od najambicioznijih prijedloga za izračun indikatora koji bi bio primarno vezan uz mjerenje blagostanja najčešće se spominje rad Daly i Cobb (1989). Oni su pored BDP-a osmislili konstrukciju indeksa ekonomskog blagostanja (ISEW), koji bi osim konvencionalnih pokazatelja vezanih uz nacionalne račune obuhvaćao i određeni skup indikatora vezanih uz stanje okoliša i raspodjelu dohotka.

U ovom radu je primijenjena metodologija izračuna indeksa ekonomskog blagostanja za hrvatsko gospodarstvo u razdoblju 2000.-2010. Indeks izrađen prema toj metodologiji u analiziranom razdoblju nije zabilježio značajne razlike u trendovima u usporedbi s kretanjem BDP-a. Do 2003. godine indeks ekonomskog blagostanja pokazivao je niži rast od rasta BDP-a i osobne potrošnje. U razdoblju 2003.-2006. indeks ekonomskog blagostanja pokazivao je višu razinu od BDP-a, dok se tijekom 2007.-2008. oba indikatora kreću usklađeno. U recesijskom razdoblju, za razliku od BDP-a indeks ekonomskog blagostanja nije pokazao značajno smanjivanje budući je pad monetarnih transakcija bio djelomice kompenziran kretanjem nemonetarnih aktivnosti koje pozitivno doprinose blagostanju kućanstava.

Ključne riječi: održivi ekonomski razvitak, indeks održivog ekonomskog blagostanja, Hrvatska