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The Balanced Development Index: Its Construction and Application in Times of Uncertainty, Poland 1999–2017

Abstract: This paper presents interdisciplinary research on the transformation of Polish society and the economy. A new composite Balanced Development Index (BDI) has been constructed and applied in a 'beyond GDP' paradigm to analyse Poland's socio-economic development during the 1999–2014 period and to make predictions for 2015–2017. Four groups of detailed indicators—two economic ones (external and internal) and two social ones (concerning the objective and subjective current situation, and public expectations for the future)—are used to construct four middle-level indexes, which are subsequently aggregated into the general BDI index. The congruency between the four middle-level indexes is interpreted in terms of the balance relevant for future socio-economic development. The validity of the index is proven by its high correlation with the psychological conditions of society. The results indicate a less optimistic picture of development in Poland than is provided by the GDP, which has been constantly growing.

Keywords: socio-economic development, balanced development, flourishing, social indicators, economic indicators, composite indexes, forecasts.

Background

Until the second half of the twentieth century, the general indicator of socio-economic development was almost exclusively national income, particularly Gross Domestic Product or Gross National Income. Eighty years ago, Simon Kuznets (1934) was arguing that this indicator is too simplistic to characterize the economy, let alone both economic and social aspects of development together. Despite such criticism, serious work on improving, supplementing, or replacing the GDP only started around fifty years ago, stimulated by an interest in social indicators (Baurer 1966; Cohen 1968, Moser 1973) and the integrated system of social statistics that grew at the international level (UN 1975), including Poland (Zagórski 1975). These attempts quickly led to work on composite indexes of social development, with UNRISD's research programme being the pioneer (McGranahan et al. 1970). After a short period of inexplicable lack of interest in such endeavours, new attempts to de-

sign and apply composite indexes were made a few years later by Estes (1976, 1984, 1988) and his collaborators, who worked on the International Index of Social Progress, and by Morris (1980), who worked on the Physical Quality of Life Index. The King of Bhutan inspired the Gross National Happiness index to be developed (for its history and current findings see Pennock, Ura 2011, and Ura et al. 2012). It took some time for others to follow but the number of such projects has recently been growing almost exponentially (Cummins et al. 2003; Berenger, Verdier-Chouchane 2007; Constanza et al. 2009; NEF 2009; Shopelmann et al. 2010; Bilbao-Ubillos 2013; Espinoza, Somarriba Arechvala 2013; Huppert and So 2013; Madonia et al. 2013; OECD 2013; Reig-Martinez 2013; UNDP 2013; Porter et al. 2015, to mention only a few). In Poland, the proposal to construct a composite index of economic and social aspects of development was made by Grzegorz Kołodko (2008). The Polish Central Statistical Office proposed a series of social and economic indicators rather than a composite index (GUS 2011). This represented a ‘dashboards approach’, as discussed by Fleurbaey and Blanchet (2013: 27–33). Construction of various quality-of-life indexes currently constitutes the mainstream of such research (for a discussion see: Hagerty et al. 2001, Sirgy 2011, Fleurbaey and Blanchet 2013). In addition to the UN (particularly UNDP) and OECD, various state authorities have also expressed a rapidly growing interest in complex country-specific measures of socio-economic development, e.g., the French president (Stiglitz et al. 2009), the German Bundestag (Gisselmann et al. 2013) and the Italian parliament (BES 2014). Our index of balanced socio-economic development was presented to the president of Poland in 2014 at a special conference. The last economic crisis has produced growing interest in a complex approach to development, with an emphasis on people’s well-being (Guardiola et al. 2014; Samarriba Arechvala et al. 2014).

Some of the projects mentioned above concern only social indicators, while others combine social and economic ones. However, even those not totally neglecting the economy tend to overemphasize social aspects and underemphasize economic aspects of development. Our approach assumes equal importance of these two aspects.

Aims

There is still a prevailing tendency to confuse the means and the ends of economic policy (Kołodko 2002: 84). Economic growth measured by GDP still constitutes the main point of interest of most economists, politicians, and journalists despite the growing awareness that GDP, i.e., the production of material goods and provision of services, is not an end in itself but should lead to better lives.

Our work is in line with the ‘beyond GDP’ paradigm (Constanza et al. 2009; Fleurbaey and Blanchet 2013; Thiry 2014). However, though GDP ignores certain economic issues and subjective as well as objective aspects of social conditions (Kuznets 1934, Guardiola et al. 2014), we consider it an important element of socio-economic development. We agree with Fleurbaey and Blanchet (2013: 249), who propose speaking about a ‘GDP and beyond’ rather than ‘beyond GDP’ concept of development that includes both economic and social domains—while most other national and international indexes of a similar nature either neglect or completely ignore economic conditions. After separately analysing economic and social aspects of development (Zagórski 2011), we introduce a composite Balanced Devel-

opment Index (further called BDI) which includes GDP as one of its many components and assumes the equal importance of its social and economic aspects. Contrary to many developmental indexes, which overemphasize either the economic or the social aspects, our index puts equal weight on these two aspects of development. A preliminary version of this index has already been published (Kozłowski et al. 2014). Our current objective is substantially to improve and update the initial index and its four composite components (middle-level indexes), as well as to analyse and predict changes in Poland's economy and society. We wish to advance a method of constructing an index and analysing current trends, and to formulate a short-term prognosis based on our newly developed statistical model. We will also examine the correlations of our index with some aspects of social flourishing that are outside its scope. Our index should show how and why the levels and specific configurations reflected of four middle-level indexes may either foster or hamper socio-economic development.

Conceptual-theoretical Basis

Theory–Research Interrelation

The strategic dilemma we have faced in planning our research is whether social scientists should try to construct an empirically driven theory (Carnap 1962, Keynes 1948) or should rather conduct theory-driven empirical research (Popper 1959). This is one of the basic dilemmas of the social sciences and can be interpreted in terms of the inductive versus deductive accumulation of knowledge (Nowak 1977: 248–260), or a bottom-up versus top-down proceeding (Sirgy 2011: 7–8). We are inclined to adhere to the first rather than the second approach but not in its extreme form. Some theoretical framework is always useful, if not necessary, for the development of basic concepts and hypotheses, or at least for the formulation of research problems. On the other hand, empirical research should contribute to building up or modifying the theory. This creates a research-theory cycle, enriching both in a sequence of iterations rather than one influencing the other in a pre-determined one-way direction. Accepting such an approach and believing that ‘...useful theoretical concepts do not always translate into interesting statistical indicators that meet social demands’ (Fleurybaey and Blanchet 2013: 239), we did not construct or adapt any comprehensive and general theory as a blueprint for our whole project. We have conducted our analyses to uncover some regularities in the form of historical generalizations, which hopefully may have some more general theoretical implications (Malewski 1962). This does not preclude the location of our research in some theoretical and conceptual context.

Balanced Development and Its Measurement

Our assumption is that research into socio-economic development should pay attention to the balance between its different social and economic aspects. Further on, we base the analyses of balanced socio-economic development on several complementary theoretical presumptions:

1. The concept of balanced development implies that the social and economic aspects of development are equally important. This will be especially apparent in the case of misguided economic growth, which may not lead to improvement in the population's 'quality of life' or to 'well-being' in the broad sense. Economic growth and the social conditions of life have to go hand in hand. There is no sense in assuming the superiority of one over the other. The materialist point of view would suggest that 'proper' economic growth is indispensable for the fulfilment of social goals and for better conditions in society: that is, growth constitutes the precondition for a good life (for the discussion see [Sirgy 2011: 2](#)). On the other hand, economic growth is impossible in conditions of prolonged dissatisfaction, deprivation, and distorted social relations. Thus, both social and economic factors are equally important.

In order to measure balanced development, a balanced index must be used, i.e., an index consisting of both social and economic indicators, which are given equal importance, so they are equally weighted. For methodological reasons and because of our assumption of their equal importance, we do not give different weights to particular indicators and to the middle-level indexes contributing to the BDI. There are two habitual ways to weight various realms of development and their indicators: the use of expert opinion and statistical methods (predominantly various kinds of factor analysis). We do not make use of any expert wisdom as this is a much too subjective method. Adding one or two persons to a panel of experts may change the results drastically. On the other hand, public opinion, when used instead of expert opinion, may give varying weights to different developmental realms in different circumstances. Such statistical methods as the various kinds of factor analysis that are often used. They are based on correlation or covariance matrices. Adding or deleting some observation units in the sample of individuals, countries, or years may significantly change the correlations. This is a serious issue for us because our analysis concerns only sixteen years of socio-economic development in Poland and an observation unit is one year. In such a small sample, updating the data by adding one or two years may substantially change the correlations and, in consequence, the weights. Moreover, rigorously applied statistical rules would exclude highly correlated indicators from factor analysis, which is very sensitive to collinearity and produces very unstable results in such circumstances. Most indicators used in developmental studies—ours included—are highly correlated. Another reason for weighting our detailed indicators equally is the dynamic nature of our analysis. The relative weights of particular indicators may change in time in regard to one another, so that weights determined by either expert opinion or statistical methods for one year may be inappropriate for other years. On the other hand, changing the weights from year to year would make the index incomparable over time. Furthermore, we agree with Fleurbaey and Blanchet (2013: 240) that '...up to now, no serious proposal has been made to articulate a theory of weights.' All in all, we have decided not to apply different weights for both substantive and methodological reasons. A similar approach was taken by the OECD, for instance, in designing the economic Composite Leading Indicators (CLI) for particular countries¹ ([Nilsson 1987](#); [OECD 2012](#)).

¹ Country weights have been applied only for computing CLI for wider regions consisting of several countries.

2. We assume that there is an indispensable feature of a balanced economic and social development namely, its functional equilibrium, which is a prerequisite for controlling a complex system, for securing its sustainability and its persistence (continuity) in a turbulent environment. This concept, which has its roots in the Parsonian Equilibrium-Function model (Parsons and Shils 1951) and Homans' Equilibrium Model (Homans 1950), has been developed by several social scientists in order to explain the dynamics of societies (Buckley 1967; Merton 1967), organisations (March 1981; Cavaleri, Obloj 1993) and larger, more complex, systems (Weintraub 1974; Sutherland 1975; Koźmiński 1995). Our concept of equilibrium rests on the assumption that a certain level of balance is needed to control the system, while a certain level of imbalance is needed to instigate development. This view is consistent with Pareto's concept of functional equilibrium (Pareto 1935; Powers 2012). Imbalances occur when, according to the mathematical theory of Liapunov (1992), one of the forerunners of modern systems theory, individual elements diverge from one another *excessively*. Thus disruption of the system's equilibrium is reflected in excessive growth of standard deviations between constituent parts (variables, in analytical terms). Our hypothesis is that prolonged static equilibrium, i.e., a high degree of congruence between components of the system, leads to a lack of growth and to 'sticking points' in Pareto's meaning of the term (Powers 2012). This may also concern the so-called dynamic equilibrium, i.e., the parallel growth of all components without changing the relations (proportions) between them. However, as N. Tuma and M.T. Hannan (1984) have stressed, social phenomena seldom have a static equilibrium. Either the phenomena change continually or the equilibrium exists for a short time only. We assume that imbalance, understood as disequilibrium, may pull the general index up or down and may have either a positive or negative effect. However, when the imbalance grows over a long period of time, it threatens the controllability of the system—its responsiveness to managerial or governance measures that hamper or stop its further development, as static equilibrium does. We do not hypothesize about the optimum level of imbalance but simply include the measure of balance in our prediction model in order to discover when the developmental trend stops or changes and in which direction. We are interested in the level of balance between the four domains of development embraced by the BDI and described below. A standard deviation between the four middle-level indexes (components of the BDI) is used as a measure of balance. This approach has been taken, for example, in the US for building the dynamic macro-social indicator models used by police authorities to predict crime-rate rises in high-crime environments and to allocate police resources accordingly. (Land, Felson 1976).

Four Realms of Socio-economic Development, Their Indicators, and Their Contributions to the BDI

We have distinguished two economic and two social domains of development. Each is measured by a middle-level composite index constructed of several detailed indicators of equal weight. The four middle-level indexes, also equally weighted, are then combined into

a general Balanced Development Index. Thus, consistent with the above assumptions, equal weights are applied at two analytical levels.

We agree with the idea that several synthetic indexes of a middle level should be constructed and applied rather than a dashboard of many simple indicators or only one general synthetic index: ‘...trying to be synthetic does not mean that one absolutely needs to be *one-dimensional*’ (Fleurbaey and Blanchet 2013: 245). However, we also wish to examine the way in which different realms of development and their relations contribute to general socio-economic development in the broad sense. This should lead to a better understanding of developmental processes. The general Balanced Development Index is constructed in addition to middle-level indexes to give more general assessment of socio-economic development as a complex process. Of course, this should not preclude examining the role played by detailed indicators in each developmental realm considered separately. Such analyses remain, however, outside the scope of the present paper.

A primary and unique advantage of the BDI index and its middle-level components is the two-tier nature of the analysis, enabling the simultaneous examination of:

- the level and pace of development, covering a wealth of socio-economic aspects;
- the system’s functional balance, assessed by the degree of convergence, measured as the standard deviation of four basic dimensions, as well as the role played by this balance in general socio-economic development.

The distinguishing of four domains of socio-economic development and their four middle-level indexes are based on our previous analyses (Koźmiński et al. 2014) and further substantive and statistical considerations. The initial selection of the detailed indicators used in 2014 was done intuitively. The present, final selection is based on more substantive criteria and has been supported by statistical analysis. We have applied correlation matrices in order to eliminate those indicators not significantly correlated with others and to determine whether relations between the remaining ones are positive or negative, i.e., whether they should increase or decrease the middle-level indexes. Cronbach’s α , item-total mean correlation (r_{i-t}), and Spearman-Brown’s split-half reliability coefficient (r_{SH}) have been used at the second stage to check whether the chosen indicators can be combined into more general indexes.

As already stated, our composite BDI index consists of two economic and two social middle-level indexes. Each of these consists of a set of detailed indicators—45 altogether. The detailed indicators were drawn from publicly available statistics and from public opinion research. All the indicators were collected for all consecutive years in the period 1999–2014. Each year constitutes one case in our analysis.

1. External economic conditions

Contemporary societies and their economies exist in globalizing socio-economic conditions. We do not want to get involved in the acrimonious and far too ideological dispute between advocates and critics of globalization. We are inclined to interpret globalization, after Robertson (2000: 116), in terms of ‘intrasocietal civilizing processes’, and we share the opinion that the impact of globalization on domestic socio-economic conditions may

vary from country to country (Lee and Vivarelli 2006) or from domain to domain. A few examples will suffice. Dependence on foreign capital seems to have a positive effect on income inequality and population growth but hampers economic growth, which is facilitated by trade openness (Kentor 2001). Democracy seems to be positively influenced by foreign direct investment but negatively impacted by portfolio investment (Li and Reuveny 2003). Globalization produces a need to implement international labour standards and thus improves employment conditions (Sengenberger 2005). The shift of industrial production from high- to low-labour-cost countries may have a positive effect on employment and living conditions in the latter group of societies but a negative one in the former. It is not important here to discuss how well these statements are documented by sound empirical analyses. We merely want to stress that a country's socio-economic development should be analysed in the global context. This applies especially to transition or post-transition countries such as Poland. The post-socialist transformation to a market economy is occurring in the time of globalization. Hence integration with the world economy is an indispensable part of the transformation (Kołodko 2002: 83). Increasing foreign direct investment and opening previously relatively closed economies is an important contribution to this process (Ibidem: 5–6). Thus economic performance in the international context and the level of successful integration with the world economic system are no less important than domestic aspects of the economy. Our detailed indicators of the functioning of Poland's economy in its external context concern both the country's interrelations and its economic performance on the international scene. These are significantly correlated.

Components of the External Economic Index

($\alpha = .752$; $r_{i-t} = .484$; $r_{SH} = .507$):

- size of foreign direct investment (FDI) in Poland (source: PAIiZ—Polish Information and Foreign Investment Agency)
- WIG 20 (Warsaw Stock Exchange index) (source: Warsaw Stock Exchange)
- volume of import, (source: GUS—Central Statistical Office of Poland)
- volume of export (source: GUS)
- Euro/PLN exchange rate (inverted) (source: GUS)
- spread (difference) between the Polish interest rate on 10-year bonds and German bonds (inverted) (source: World Bank)
- spread between the Polish interest rate on 10-year bonds and US bonds (inverted) (source: World Bank).

The Warsaw Stock Exchange index is included among external rather than internal indicators, since it is largely dependent on international trading and international conditions.

The index was constructed as a yearly mean of all these indicators after their standardization ('z' scores).

Three statistical criteria are used to prove that all the chosen indicators contribute to the same scale (index), namely, Cronbach's α , item-total mean correlation (r_{i-t}) and Spearman-Brown's split-half reliability (r_{SH}). The values of each are high enough to construct the index.

2. Internal economic conditions

Adhering to the widely accepted opinion that GDP (or GNP) alone is an insufficient indicator of a nation's economic condition (Sirgy 2011), we have supplemented it with other economic indicators. We have included indicators not directly related to GDP, such as inflation, public debt, real wages, or business profitability, and those characterizing GDP distribution, especially its disaggregation into consumption and accumulation. In all, they describe the domestic economy well. Cronbach's α , r_{i-t} and r_{SH} are quite satisfactory.

Components of the Internal Economic Index

($\alpha = 0,841$; $r_{i-t} = .598$; $r_{SH} = .869$):

- production of electricity (source: GUS)
- number of dwellings completed (source: GUS)
- increase in real wages (source: GUS)
- Gross Domestic Product (source: GUS)
- amount of consumption (source: GUS)
- amount of accumulation (source: GUS)
- gross business profitability (source: GUS)
- public debt (% of GDP inverted) (source: the Polish Min. of Fin.)
- unemployment rate (inverted) (source: GUS)
- inflation rate (inverted) (source: GUS)

Here also the index was constructed as a mean of z-scores for all the detailed indicators.

3. Social expectations

Social indicators have been grouped into subjective social expectations (public hopes and fears concerning various aspects of economic and social life) and current social situation (subjective evaluations and objectively measured socio-economic conditions). This is consistent with the University of Michigan Consumer Sentiment Index (MCSI 2015) based on the evidence that social expectations do not always change in accord with social evaluations, which are closer to actual conditions (for Polish evidence see Zagórski et al. 2015: 41–45). Moreover, many social attitudes are usually influenced by expectations more than by evaluation of the current situation (Hirschman 1981, for Polish evidence see Zagórski 2001). The *Stiglitz Report* emphasizes the necessity to include both objective and subjective social indicators in composite indexes of development (Stiglitz et al. 2009). We have placed the social mood (both in terms of assessment and expectations) alongside objective social and economic elements within the concept of socio-economic development for two reasons. Firstly, because economic development cannot be treated as an aim in itself but should be considered a means to improve the 'human condition', which involves satisfaction, happiness, optimism, etc. This refers to the concept of 'well-being'. Secondly, social, political, and economic moods influence individual and group behaviour, which in turn shape the state of the economy and society. There is a clear connection between subjective and objective aspects of social, political, and economic life. The dynamics of society and the economy cannot be fully comprehended if this fact is disregarded.

Data on social expectations are from monthly surveys by the Public Opinion Research Center (CBOS 2015).² The respondents were asked whether they think the situation in respect to politics, the economy, employment, living conditions, and the overall condition of Poland would be better or worse in a year's time and whether they are afraid of losing their jobs. The answers were given on a scale of 1 to 5, ranging from 'will much improve/not at all worried', through 'will somewhat improve/rather not worried', to 'won't change/neither', 'will somewhat deteriorate/somewhat worried' and 'will deteriorate considerably /very worried' (Poland's general situation was measured only on a three-point scale). Each indicator was calculated as a ratio of positive to negative answers. The index was constructed as a yearly mean of all these indicators after their standardization ('z' scores). Despite such diverse domains as politics, the economy, living conditions, and the general situation, the middle-level index of social expectations is internally consistent. Cronbach's α , r_{i-t} , and r_{SH} coefficients are close to the maximum values.

Components of the Social Expectations Index

($\alpha = 0,960$; $r_{i-t} = .876$; $r_{SH} = .906$):

- anticipated changes in the overall situation of Poland (source: CBOS—Public Opinion Research Center)
- anticipated changes in the political situation in Poland (source: CBOS)
- anticipated changes in the economic situation in Poland (source: CBOS)
- anticipated changes in the situation in the workplace (source: CBOS)
- anticipated changes in the family's living conditions (source: CBOS)
- fear of losing a job (inversed). (source: CBOS)

4. The Current Social Situation Index

The Current Social Situation Index is composed of two kinds of indicators: subjective evaluations of the current situation in domains previously included in the index of expectations and objective statistical data. Subjective evaluations are also drawn from CBOS public opinion surveys. They concern politics, the economy (with the business confidence index as an additional indicator), the workplace, and living conditions. Like the indicators of social expectations, the evaluation indicators are calculated as ratios of positive to negative answers and then standardized. In addition to evaluations, a long list of objective statistical social indicators characterizing demographic structure and processes, education, welfare, poverty, unemployment, and social pathology contribute to the index (many are inversed). Despite growing interest in social inequalities, we have decided not to include an income inequality measure, since it has almost not changed in Poland during the last two decades. In the absence of better and more reliable data on social aspects of globalization, only two indicators, concerning international exchange students, are used to characterize the internationalization of the education system. Despite a wide range of social domains and a high

² The wording of the questions concerning Poland's general situation and particular aspects is: 'In your opinion, will the general/ economic/ political/ situation in Poland/ your workplace situation/ your material living conditions/ improve or deteriorate in the next year?' These questions are asked every month in CBOS representative surveys, so their yearly means serve as simple indicators.

number of indicators, Cronbach's α and Spearman-Brown's r_{SH} approach their possible maximum, while r_{i-t} is quite high, so the computation of the middle-level index is justified.

Current social situation
($\alpha = 0,957$; $r_{i-t} = .679$; $r_{SH} = .964$):

- attitude to the government (source: CBOS)³
- evaluation of the political situation (source: CBOS)⁴
- evaluation of the economic situation (source: CBOS)
- evaluation of family living conditions (source: CBOS)
- evaluation of workplace conditions (source: CBOS)
- business confidence index (source: www.tradingeconomics.com)
- % of people living below the extreme poverty line (inverted) (source: GUS)
- state budget expenditure on social welfare (% of GDP, inverted) (source: GUS)
- state budget expenditure on health (% of GDP) (source: GUS)
- youth (15–24) unemployment rate (inverted) (World Bank)
- access to the Internet (% of households) (source: Eurostat)
- birth rate, (source: GUS)
- infant mortality rate (inverted) (source: GUS)
- number of marriages contracted (source: GUS)
- ratio of persons of pre-productive age to those of post-productive age (source: GUS)
- number of persons aged 18–59 living in households in which no one is employed (% , inverted) (source: GUS)
- number of tertiary education graduates (public and private combined) (source: GUS)
- number of scientific-research employees (source: GUS)
- number of young people not continuing education (% , inverted) (source: GUS)
- number of homicides (inverted) (source: Polish police statistics)
- number of thefts (inverted) (source: Polish police statistics)
- number of Polish students who went abroad on an Erasmus grant (source: www.erasmus.org.pl)
- number of foreign students in Polish tertiary education institutions (source: GUS).

The standardised value was calculated for each of the detailed indicators in the period 1999–2014 (later data was not available). The average value of the standardised indicators was then calculated to form a middle-level index. The Balanced Development Index was calculated as the mean of four equally-weighted, middle-level indexes.

We have used a relatively long list of detailed indicators instead of making a more stringent selection for two reasons. First, their diversity reduces the danger of high correlations between measurement errors. Second, it reduces the danger of an excessive accidental influence caused by unusual and temporary circumstances (e.g., a flu epidemic raising the death rate, an unusually large one-time contract changing the direct foreign investment in-

³ The wording is: 'Are you a supporter or an opponent of the government?'

⁴ The wording is: 'In your opinion, is (are) the political situation/economic situation/workplace situation/family living conditions good or bad? The questions are asked each month, so their yearly means serve as simple indicators.'

indicator, international sanctions affecting some industries, bad weather affecting agricultural production, etc.). The smaller the number and diversity of indicators the higher is the danger of such temporary influences distorting the overall picture of the development pattern. Finally, an important disadvantage of the means that constitute the values of each composite index is that they are sensitive to the extreme values of indicators for a few outliers, or sometimes even one, especially when the number of total cases is small (Dawson and Trapp 2004). The number of cases (years) is quite small in our research, so the large number of particular indicators reduces the impact of possible outliers. The strategy of using many indicators as components of composite indexes was chosen, for example, for the Index of Social Progress (45 indicators in 10 domains, see [Estes 1976, 1984, 1988](#)) and the State of Caring Index (36 indicators in 6 domains, see [The United Way of America 2015](#), also described by [Estes, 2016](#)). The recently published Social Progress Index is composed of 52 indicators in 12 sub-domains compiled into 3 domains, which ultimately contribute to the general index ([Scott et al. 2015](#)). Thus using many indicators to compose an index is a widely accepted approach.

Although the time scale during which we observed the dynamics of our indicators is short, it still gives a valuable picture. This is because it covers a period of tumultuous changes, including in the financial and economic world.

The high correlations between four aspects of development and the high Cronbach's α coefficient (.870) allow the general BDI to be calculated as the average of the four middle-level indexes after their standardization. The correlations between all four middle-level indexes in 14 years, treated as 14 cases, are shown in [Table 1](#).

Table 1

Correlations Between Middle Level Indexes Constituting General BDI (Prerson's r)

	Internal economic	Public expectations	Current social situation
External economic	.802**	.635**	.688**
Internal economic	×	.451	.909**
Public expectations	×	×	.583*

* Significant at .05 level.

** Significant at .01 level.

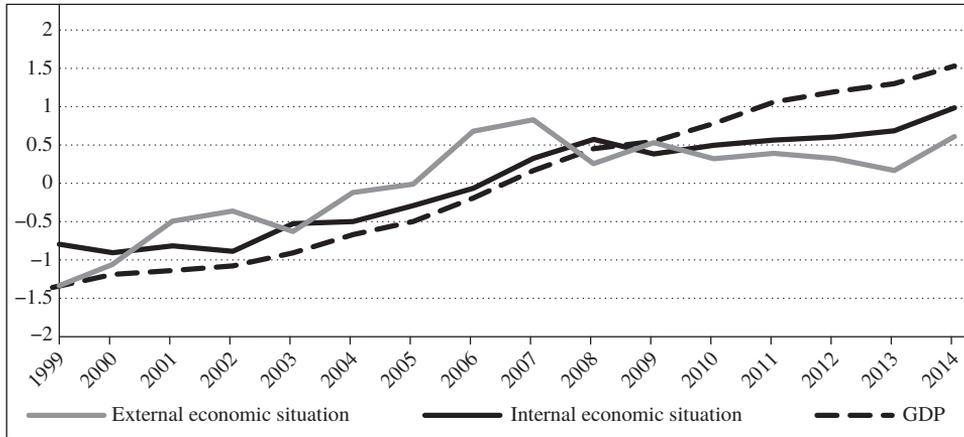
Correlations between the four composite components of the general index are statistically significant despite the very low number of cases (years). Correlations between the current social and internal economic situation as well as between the internal and external economic situation are strikingly high.

Description of the BDI and its Trend

Let us first look at changes in Poland's economy that were not reflected by GDP ([Figure 1](#)). GDP rose continuously in Poland during the whole 1999–2014 period, including the world financial crisis. The crisis slowed this growth but has not caused a decline (recession). However, neither the external nor internal economic situation, as measured by more comprehensive indexes than GDP, improved significantly during the crisis.

Figure 1

Changes in GDP and in Middle Level Composite Indexes of External and Internal Economic Situation, 1999–2014



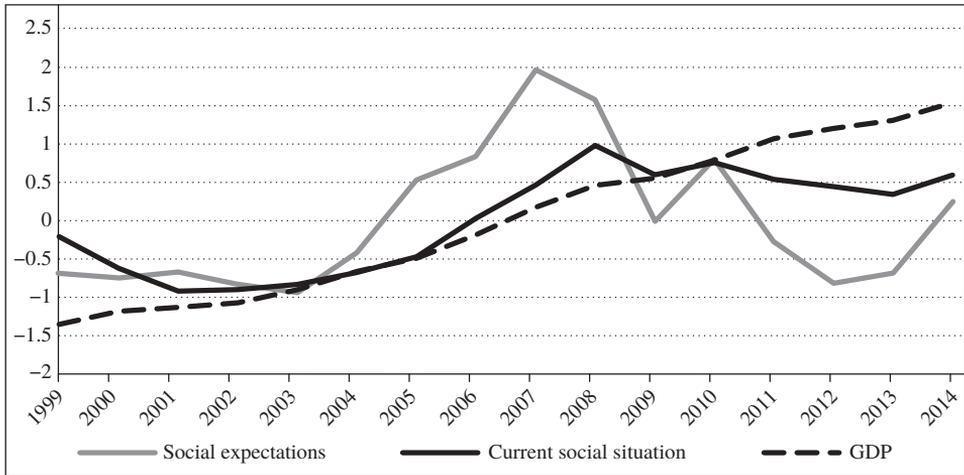
Comprehensive measures of economic performance provide a less optimistic picture of the changes than GDP alone. It would seem that the more comprehensive picture is more realistic.

Moreover, changes in the external index precede those of the internal index, so the external economic measure can be called a 'leading index', while the 'lagging index' reflects internal conditions. The international functioning of Poland's economy was improving till 2002 and then deteriorated in 2003, while improvement in domestic conditions occurred in 2003 but halted in 2004. The next period of improvement in international economic relations lasted from 2004 to 2007, while the internal situation was improving from 2005 to 2008. External economic relations deteriorated sharply in 2008 as a result of the world financial crisis, while the deterioration of domestic conditions took place a year later and was much less apparent. The slight improvement in external conditions in 2009 was followed by an internal improvement the next year. All in all, internal economic conditions change in the same direction as external ones, a year later.

Equally interesting are changes in the middle-level social indexes (Figure 2). Similarly to the economic indexes, the social-expectations index and current-social-conditions index show the negative effects of the world financial crisis, which were not reflected by changes in the GDP.

While post-crisis changes in current social conditions resemble those in domestic economic conditions, social expectations change in the same direction but with very much greater amplitude. Public expectations drastically deteriorated at the very beginning of the world crisis as a result of sensational news reporting. Expectations very soon improved significantly when Poland was called a 'green island', unaffected by the crisis, and then again deteriorated considerably due to news concerning the budget deficit, pension reform, and the need to economize on spending from the public purse. The amplitude of change in expectations suggests people were overreacting in regard to actual conditions.

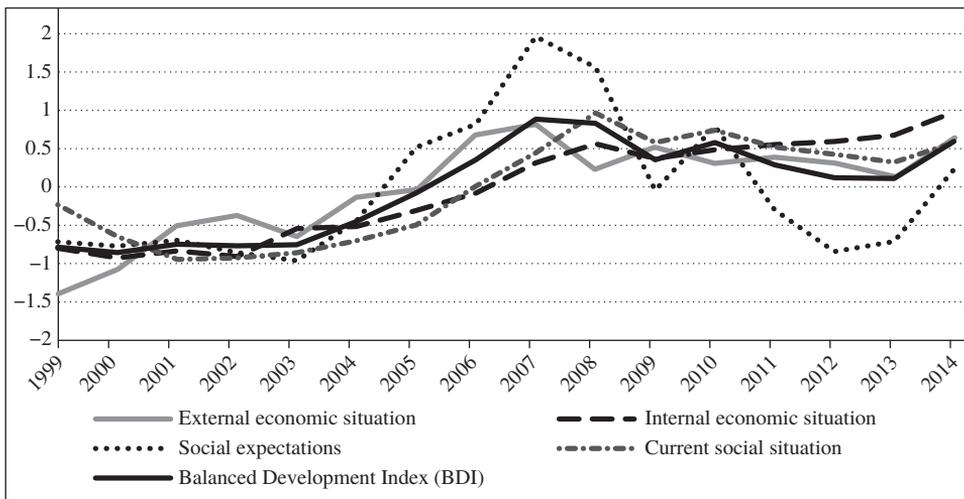
Figure 2
Changes in GDP and in Middle Level Composite Indexes of Social Expectations and Current Social Situation, 1999–2014



Such reactions were indubitably the effect of the news received from politicians and the media.

The very high value of Cronbach’s α coefficient (.891) allowed us to combine the four middle-level indexes into a general BDI index. Figure 3 clearly shows that changes in Poland occur similarly for all four dimensions of development but with different amplitude.

Figure 3
Changes in Four Middle Level Composite Indexes and General Balanced Development Index, 1999–2014



Changes in the general index illustrate the course of socio-economic development. Economists and politicians emphasize Poland's slow but steady growth in GDP during and after the world financial crisis. However, the overall socio-economic index shows a slight downward trend since 2007, with some fluctuations. This downward trend was caused mostly by social trends, especially by worsening public expectations, and—to a much lesser extent—by external economic circumstances (the international economic environment), while the current economic situation, measured by the middle-level composite index, has improved slightly since 2009, after a temporary decline.

This seemingly stands in contradiction to the general conviction among economists that economic growth forms the social mood as 'being determines feelings (consciousness)'. However, economic growth measured by the GDP is only one of many aspects of development, while the BDI also applies to the social situation, including unemployment, poverty, the deteriorating demographic situation, insufficient social policy outcomes, and the worsening economic and political mood. The slight downward economic trend observed in recent years was not revealed by one-sided indicators like GDP. The BDI better describes the overall socio-economic situation, not the production of goods and services alone. It is also worth stressing that growth in individual consumption has slowed during the past few years and is clearly below the GDP growth rate. It can be assumed that the continuous though slow growth of Poland's GDP during the world crisis was possible because of economizing on social expenditures and curbing individual consumption. This may have led to a worsening of the social mood, particularly in regard to expectation for the future.

The variability of the middle-level index of public expectations, which can be interpreted in terms of optimism and pessimism, is much greater than the variability of the other middle-level indexes. This is the reason for the relatively low (though still not low in absolute terms) correlation between public expectations and the economic situation (see [Table 1](#)).

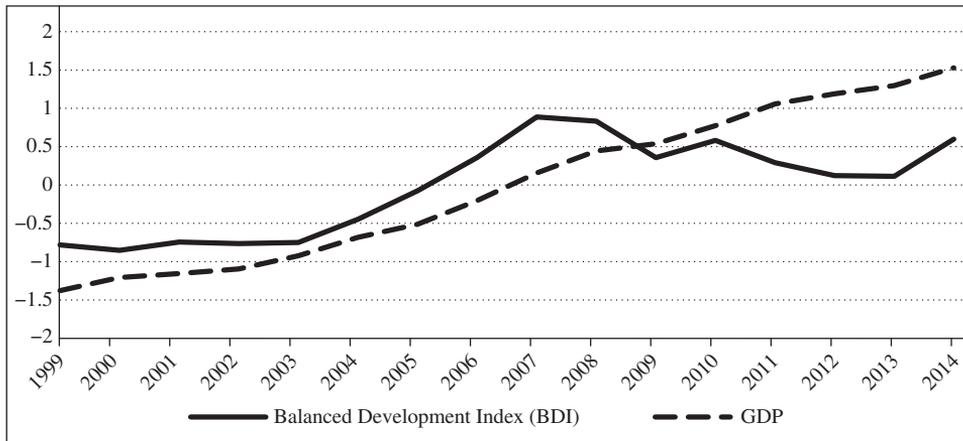
We may assume that public expectations are to a great extent subject to manipulation by politicians and the media. Such a phenomenon is not unique to Poland. E. Noelle-Neumann (1989) has presented German data for a period of nearly forty years, showing that the degree of society's optimism or pessimism changes with greater amplitude than the economic situation as defined by growth in GDP.

The excessive reaction of public opinion to an objective economic situation—especially in terms of social expectations but also of evaluations—has its counterpart in what is sometimes called 'herd behaviour' in the stock-market, where players overreact to economic news.

As shown in [Figure 4](#), the difference between GDP and the BDI value has been increasing since 2010.

Two slowdowns (albeit not recessions) in GDP growth occurred twice in Poland during the period being studied: one weaker (2001–2003) and one more severe (2008–2012). The BDI index shows these slowdowns as more acute, which in itself is not a revelation, although their social consequences are interesting. In the first case, the BDI shows stagnation, while GDP was still growing (by 3.9% in 2003); and in the second case we see a flattening and temporary decline of BDI, despite the fact that GDP grew by 5.1% in 2008, 3.9% in 2010 and 4.3% in 2011. The ability to show this discrepancy between economic growth

Figure 4
Changes in GDP and Balanced Development Index, 1999–2014



(measured as the increasing volume of production and services) and broader socio-economic development is another valuable feature of the synthetic index. It indicates the state of society and the economy much better than GDP, which ignores social conditions.

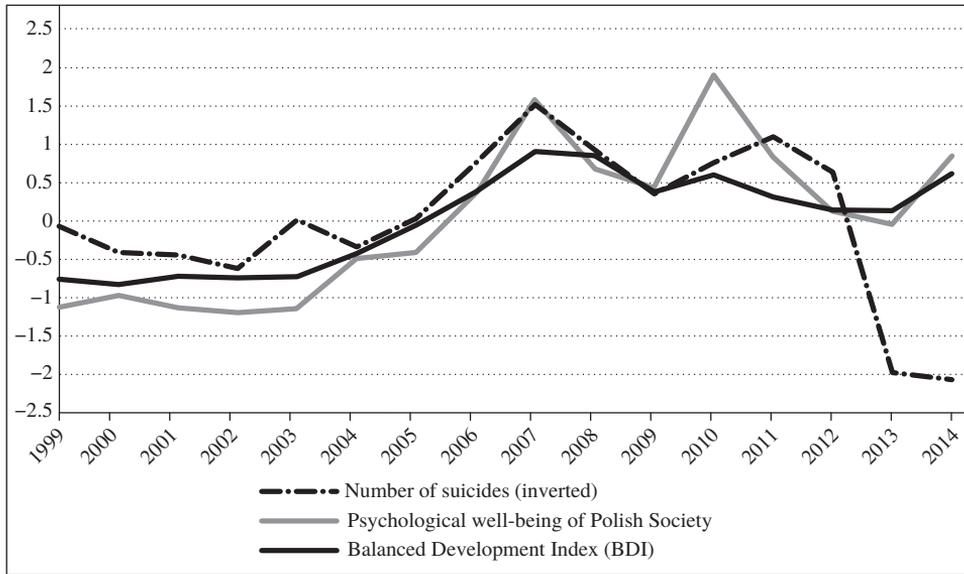
The BDI and the Psychological Conditions of Society

The primary aim of socio-economic development should be to improve people's well-being rather than to produce growth in the GDP or any similar economic indicator. When examining the relevance of our Balanced Development Index we should check whether its improvement reflects a better life for society. It is thus important to find a distinct measure of well-being that does not fall within the scope of our index. The concept of 'flourishing' used by Diener et al. (2010), Huppert and So (2013), and Hone et al. (2014) emphasizes the importance of mental health and happiness as opposed to disorder and anxiety. We take a similar approach, using representative surveys of the Public Opinion Research Center (CBOS 2013), which annually measure the psychological well-being of Poles. The short psychological test that is used concerns the respondents' own emotions and is therefore largely subjective. It is calculated as a mean of interval scales constituting answers to nine questions about the frequency of positive feelings such as being proud of one's achievements, being curious and interested in something new, being glad that something went well in one's life, etc., and such negative feelings (inversely valued) as being nervous and irritated, helpless, angry, unhappy, etc. As an objective indicator of a similar nature we have adopted the inverted suicide rate (the less suicides the better). As shown in previous studies and as consistent with the classic writings of Emil Durkheim, the number of suicides is a very good indicator of the socio-psychological condition of contemporary Polish society (Jarosz 2004).

Figure 5 depicts an extremely strong correlation between BDI and psychological well-being, treated as one of the two ultimate measures of the good life (Pearson's $r = .931$; Spearman's $\rho = .900$). This is the best confirmation of the relevance and validity of the BDI.

Figure 5

Changes in Psychological Well-being, Suicides (inverted) and Balanced Development Index, 1999–2014



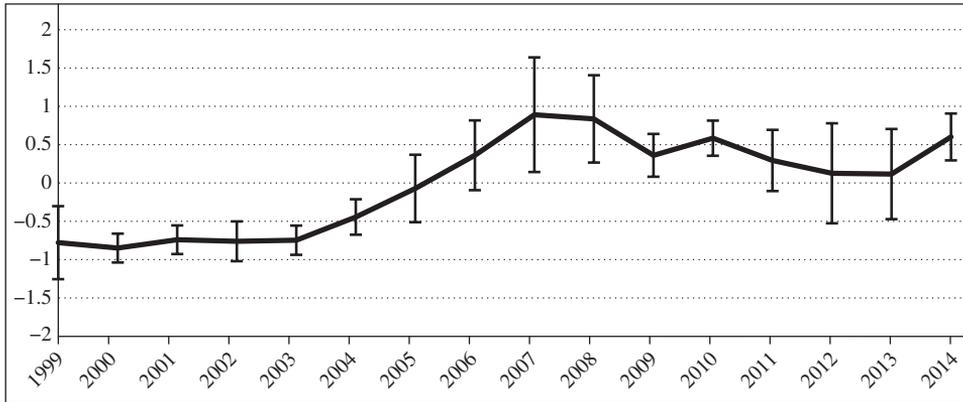
However, the larger variability in people's psychological well-being compared to the general socio-economic situation should be emphasized. Poles are prone to great mood swings. The sharp decline in psychological well-being as a result of the crisis is particularly apparent when the number of suicides is used as its indicator. This once again proves the above-mentioned hypersensitivity of people to changes in the socio-economic situation.

Socio-Economic Balance

The standard deviation of the four BDI components is taken as a measure of socio-economic balance. In accordance with our hypothesis, the changes from growth to decline, or vice versa, take place when there is an increase in the standard deviation and thus in conditions of imbalance (Figure 6).

The period of relative stagnation—or at least of a slowdown in growth—at the beginning of the twenty-first century was characterised by a high balance. The beginning of the economic crisis of 2007–2009 was marked by a rising imbalance. The standard deviation exceeded .55 in 2007. Such a strong imbalance caused a deterioration of the previously improving general socio-economic situation in the following years or at least halted further

Figure 6
Changes in BDI and Standard Deviations of Its Four Components, Poland 1999–2014



development. In 2012 a similar increase in the imbalance led to the next reversal in the trend and caused a slight improvement of the socio-economic situation in 2014.

Forecasts

A disadvantage with most econometric forecasting methods is that they primarily predict phenomena free from the discontinuities that essentially alter the course of the processes studied. Rapid changes that occurred during the period under examination, have motivated us to design a model that could predict further changes. The proposed model is as follows:

Eq. 1

$$BDI' = b_0 + b_1 BDI_{t-1} + b_2 \Delta BDI + b_3 (\Delta BDI)^2 + b_4 (\Delta BDI)^3 + b_5 \Delta SD + b_6 (\Delta SD)^2 + b_7 (\Delta SD)^3$$

Specific values of the equation’s coefficients for the period under analyses are:

Eq. 2

$$BDI' = -0.001 + 0.677BDI_{t-1} + 0.129\Delta BDI + 2.311(\Delta BDI)^2 - 0.440(\Delta BDI)^3 - 0.201\Delta SD - 2.468(\Delta SD)^2 + 1.114(\Delta SD)^3$$

$$R^2 = .849$$

where:

BDI' —BDI value in the year t (predicted)

BDI_{t-1} —value of BDI in the previous year ($t - 1$)

ΔBDI — $BDI_{t-1} - BDI_{t-2}$ —Difference between the BDI value during the previous year and two years earlier

SD' —Standard deviation of the index’s components in the year t (predicted)

ΔSD — $SD_{t-1} - SD_{t-2}$ —Change in the standard deviation of the index’s components between the previous year and two years ago

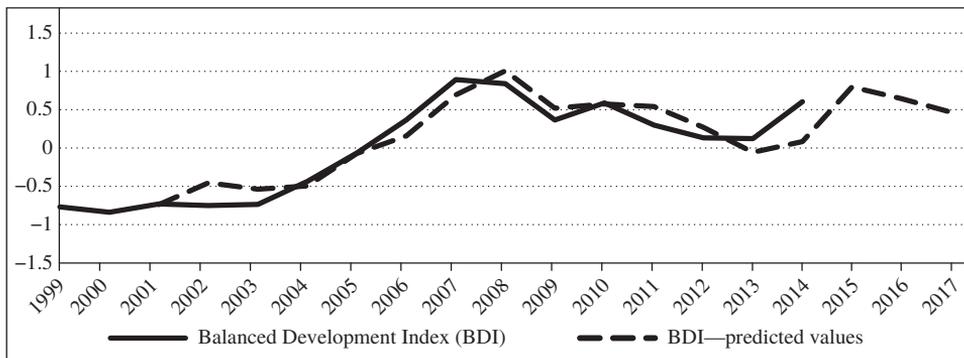
SD_{t-1} —(Standard deviation of BDI components in the previous year) ($t - 1$)
(Notation as above).

The previous results allow us to claim that the desired level of balance, measured by the standard deviation of the four BDI components, is about .4. Until now, an imbalance at this level has always been associated with a BDI rise during the next year. Deviations far above this level (such as .67 in 2007) or below (e.g., .17 in 2001) tend to be followed by a worsening or stagnation of socio-economic conditions. Our hypothesis was that a high imbalance following a period of stagnation or decline should result in development, while a high imbalance following a period of growth should result in stagnation or decline.

Our model very accurately reproduces the actual shape of the BDI curve (Figure 7). Pearson's r correlation between the actual yearly values and those estimated by the model is as high as .97. Our estimates accurately showed the points where the trend changed, with an annual delay observed only in 2001 and 2003. From 2005 to 2012, the actual and estimated curves completely overlap, even during the period of frequent fluctuations between 2007 and 2010.

Figure 7

The Actual and Predicted Course of Socio-economic Development, Measured by the BDI, 1999–2017



The model allows BDI values to be estimated three years ahead. Given the conditions of extreme uncertainty caused by worldwide economic turbulences, we have not been tempted to make long-term predictions. We predict that a slight deterioration of Poland's socio-economic situation will take place in 2016–2017, though radical current political changes may influence the development in unexpected way.

Conclusions

We have chosen the statistical indicators of four domains of socio-economic development as well as traced their changes and degree of balance in the period 1999–2013. The four middle-level composite indexes, which characterise such aspects of socio-economic development as internal economic conditions, external economic conditions, social expectations,

and current social conditions, are combined in the general (synthetic) index of socio-economic development (the BDI). The BDI differs from other indexes of a similar kind in giving equal importance to economic and social aspects of development and in analysing the balance between them as a factor influencing further development.

The prime conclusion of our analysis is that socio-economic development is reflected much better by the BDI than by GDP. The phases of socio-economic cycles, as measured by the BDI, have their own beginnings and ends, which are different from those of classical economic fluctuations measured by GDP. The index, consisting of both economic and social indicators, provides a good depiction of the turbulences produced in Poland by the last world financial crisis, despite continuous growth of GDP. It can be supposed that such turbulence was caused by policies assuring the growth of production at the cost of other economic and social conditions.

There is a high congruence between socio-economic development measured by the BDI (but not by GDP) and the psychological well-being of society. Well-being can be used as a final criterion, consistent with the concept of 'flourishing', which is understood as mental health and happiness. We are convinced that social flourishing is the essential feature of a properly functioning socio-economic system and should thus constitute the ultimate aim of development.

Changes in psychological well-being or flourishing—especially when reflected by the suicide rate—do change in a way similar to the manner in which the BDI changes but with much greater amplitude. This indicates people's oversensitivity and overreaction to changing conditions and may be partly explained by politicians' and the media's tendency to dramatize the news and manipulate public opinion.

Distinguishing four BDI domains was consistent with Fleurbaey and Blanchet's (2013) suggestion that a few middle-level (domain-related) indexes should be used rather than a very general one. Comparison of the four middle-level indexes revealed that changes in external economic conditions precede changes in domestic economic conditions, and that people have a tendency to overreact to an objectively changing situation. More important, however, was our ability to relate changes in socio-economic development to the balance between the four components. We have discovered that changes in the general developmental trend follow the previous growth of imbalance between its components.

Finally, we have built a statistical function that describes the dynamics of the composite index of socio-economic development. It not only makes possible a good description of current trends but also enables short-term changes to be forecast by anticipating the points where an excessive drift of the four middle-level indicators will occur. Our hypothesis is confirmed that a high imbalance after a period of stagnation or decline results in development, while a high imbalance after a period of growth results in stagnation or decline.

In sum, the BDI constitutes a tool-box (Noll 2011) rather than a single universal instrument, because it facilitates analysis of changes in the developmental trend and in its four composite components, their interrelations (including incongruence), and their influence on general socio-economic development.

Our analysis suggests that one of several possible ways to increase the chances for balanced development is to improve the quality of political life, which translates itself into the public mood, especially expectations. Uncertainty is an important element of a crisis situ-

ation (Koźmiński and Zagórski 2015). To prevent large, hysterical fluctuations from social optimism to pessimism, it is essential to reduce feelings of uncertainty.

We have described socio-economic development in Poland, comparing it to social flourishing and to economic growth as measured by GDP. We have predicted its changes in the near future and analysed the relations—especially the level of balance—between the main developmental domains. We were concerned with a dynamic analysis rather than with international comparisons. We do not feel we are in a position to claim that our Balanced Development Index is applicable to other countries. So far, we have discovered some regularities—trends and mechanisms—of Poland’s socio-economic development in the post-transformation period and, *inter alia* during the world economic crisis. The adaptation of the BDI for comparative analyses is certainly possible but would first require adopting a common and perhaps shorter list of fully comparable detailed indicators.

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